ART TO ZOO

APRIL/MAY 1977

NEWS FOR SCHOOLS FROM
THE SMITHSONIAN INSTITUTION
Office of Elementary and Secondary Education
Washington, D.C. 20560

Small Worlds: Stamps as Storytellers

Have you ever looked at an ordinary postage stamp —really looked—with an eye to its enormous clue-finding potential? Through a Smithsonian Resident Young Associates course entitled "Stamps and Their Stories," this sixth-grader is learning to do just that.

"Stamps and Their Stories" is taught by MR. ROBERT HARDING, Education Specialist with the Smithsonian's National Museum of History and Technology. In the museum's famous Hall of Stamps and the Mails, more than 75,000 stamps from the National Postage Stamp Collection are exhibited. Here children can discover how important clues to United States history can be found in stamps. Mr. Harding attributes the success of his program (now in its third year) to the fact that "many kids have stamp collections of their own and most kids are just naturally interested in stamps." In addition to teaching about American history, and many other subjects as well, stamps can help children to be better observers —and more aware of the everyday things around us.

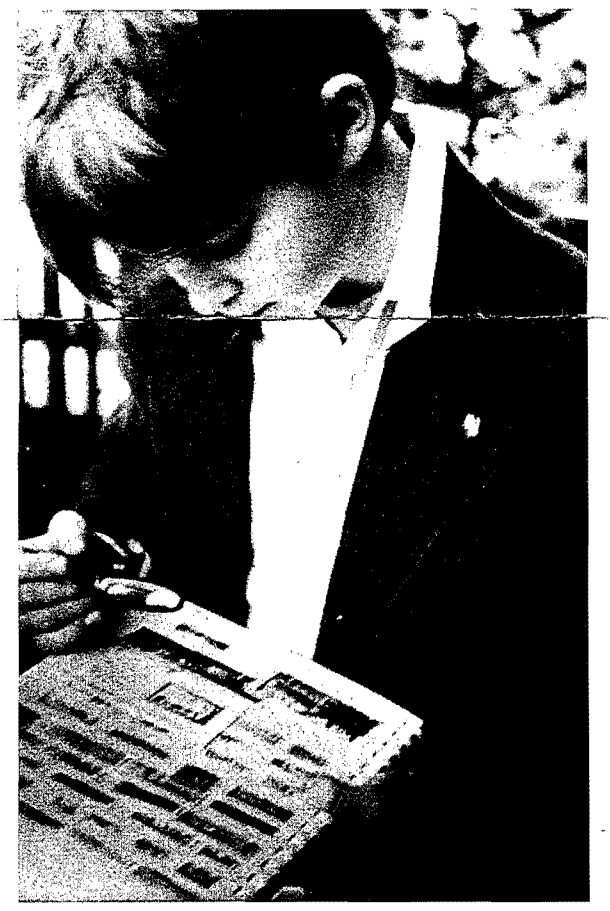


Photo by Robert Harding.

Stamps in Your Classroom

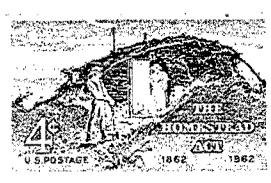
There are essentially two kinds of stamps. *Regular issues* are infrequently changed in design and are always available in a range of values. *Commemoratives* are issued on a short-term basis to honor a particular person, place, or event. Although both kinds of stamps have their stories to tell, commemoratives are especially revealing. As miniature social documents that can be examined at first hand, commemorative stamps provide an inexpensive and convenient way of bringing a country, a culture, or a period of history dramatically to life, *right in your classroom.*

Introducing stamps in your classroom involves two steps. The first step is to teach students how to look at a stamp and draw conclusions from what they see. The second step is to involve the children themselves in the stamp-making process in some way so that they can appreciate the problems and decisions faced by the stamp designer. In the history lesson that follows, MR. DAVID ESTABROOK of the Smithsonian's Office of Elementary and Secondary Education shows how you can *from stamps* teach your students to draw conclusions about important factors in the United States westward movement. The eight commemorative stamps on which Mr. Estabrook's lesson is based are recent issues purchased for less than $1.00 from a local dealer. Other stamp sources besides dealers include mail order concerns that send you stamps on approval, and your post office. (See the references listed in the bibliography at the end of this article for details on how and where to buy stamps.)

Lesson Plan: The Westward Movement

This lesson is designed to serve as an introduction to the complex and colorful subject of the westward movement in the United States in the 18th and 19th centuries. The stamps should be discussed in the order indicated, with the class divided into small groups. To show the stamps to the children, either use an opaque projector or provide each group with a hand lens and a copy of the stamp (mounted on cardboard and protected by plastic mylar) to pass around and look at. After searching the stamps for picture clues, the children will draw tentative conclusions, based on those clues, about the causes and effects of the westward movement.

Begin with **Stamp #1,** commemorating the hundredth anniversary of the Homestead Act. What clues to the westward movement can you find here? After asking the children to name some of the *means of transportation* the family pictured on the stamp might have used to reach the prairie, have the children state their opinions as to *why* the family might have moved west (to farm? to get free land from the government? to find equality of opportunity?) . . . and to hazard a guess as to what hardships (wild animals? extremes in weather? Indians? food shortages? loneliness?) the family might have encountered on the way. Then ask the children to imagine themselves visitors to the sod hut—what would they find if they were to step inside?—and also to speculate on how living on the prairie in those days might have affected a person's character.



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Encourage the children to respond freely to these questions and to identify the clues that are the basis for their answers. In identifying clues, the children might point out that judging from the *outside* of the house, the inside would almost certainly have been dark; either damp or dusty, depending on the season; small; and sparsely furnished. The children might also guess correctly that this treeless, unsettled land would have required its settlers to be hardworking, self-sufficient, and resourceful.

Seven more stamps (numbered "2" through "8") relating to the westward movement are reproduced here. What can students learn from them? **Stamp #2** marks the Bicentenary of Fort Harrod, Kentucky's first settlement, established in 1774. Here students might look for clues as to how the early settlers attempted to deal with some of the *hardships and dangers* found in the west and compare the situation of the Kentucky frontiersman with that of the sod-hut family discussed earlier. The other six stamps show various *means of transportation* used in going west and some of the people who took part in the westward movement, including *explorers* Father Marquette and Louis Joliet (**Stamp #3**), *homesteaders* racing to the Cherokee Strip (**Stamp #4**), *traders* near Fort Snelling, Minnesota (**Stamp #5**), and Missouri *settlers* (**Stamp #6**). From this evidence, the student should be able to reach further conclusions about why people went west and how they got there. The children may also speculate about how the westward movement might have benefited not only the people who took part, but also the United States as a whole.

To sum up this introductory lesson on the westward movement, have each group of students invent a story about one of the stamps. Woven into each story should be the four key factors discussed earlier and shown graphically on this chart. As the children tell their stories, record these key factors on the chalkboard and leave them there to be returned to and modified as the children continue their study of the westward movement.

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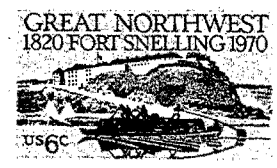

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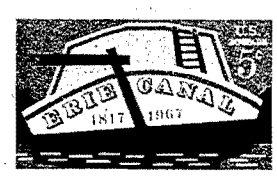

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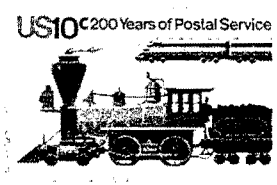

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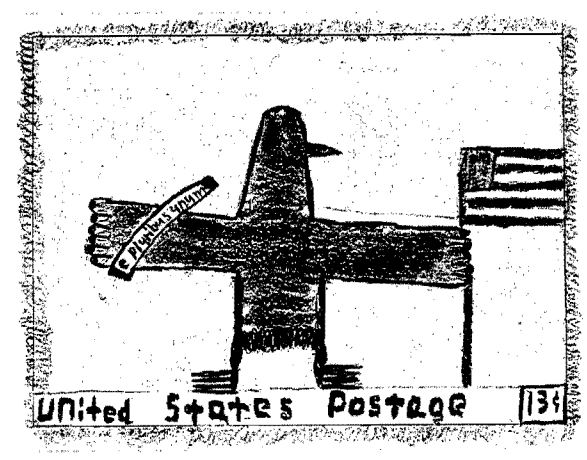
KEY FACTORS IN THE WESTWARD MOVEMENT

Name of Stamp	1 Purpose of Going West	2 Trans-portation Used	3 Hardships Met	4 Benefits Derived

Design Your Own Stamp

A good follow-up exercise to any lesson built around stamps is to have students design their own stamps representing their country, their state, their neighborhood, themselves, or some area of classroom study. Give each child the opportunity to think ahead of time about the particular aspects of his subject he wants to stress. Discuss how such things can be communicated through the use of symbolism, as well as through drawings of real people and events. Then explain to the children there are three conditions that a stamp must satisfy. First, as a receipt for prepaid postage, a stamp must show clearly its *denomination.* Second, a stamp must give obvious indication of its *country of origin.* And third, it must be the *right size*—small enough to be handled easily, yet large enough to carry its message plainly.

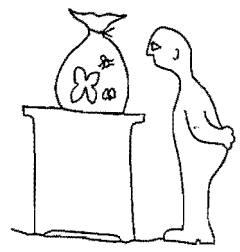
This "United States Stamp" by Richie Granger (one of Mr. Harding's students) illustrates these principles of good stamp design. What clues to our system of government can you find in Richie's stamp —miniature social document and storyteller?



"United States Stamp" by Richie Granger, age 9, Reston, Virginia.

Continued on page four

Delving into Diversity, or Some Easy Lessons on Bugging Your Class



Based on material by JOHN FALK
Associate Director for Education
Chesapeake Bay Center for Environmental Studies

Illustrated by JUDITH WHITE
Office of Education and Information
National Zoo

Under cabbage leaf or toadstool, in sidewalk crack or hollow tree—*anywhere* you might happen to look—one of the basic facts of life is diversity. Anywhere and everywhere you look in nature you see plants and animals, and the more you look the greater the variety of organisms you find.

Nowhere is this more dramatically realized than in the world of insects. Insects show more diversity in appearance and behavior than any other class of animal. Insects fly, swim, creep, and burrow; sting, bite, pierce, chew, suck, and sponge; live alone, in swarms, or in highly structured societies; reproduce sexually or by parthenogenesis; are phytophagous, fungivorous, or predacious; and live practically everywhere (except in the ocean), from arctic to tropics. There are over 1,000,000 known species of insects, and diversity is the key to their astonishing biological success.

If I were to design a biology lesson introducing students to the concept of diversity, I would be sure to base that lesson on insects. Insects are so numerous that you can

always depend on finding them . . .

collect them without undue concern about depleting their population . . .

insure that every child will have his or her own specimens to study. . . .

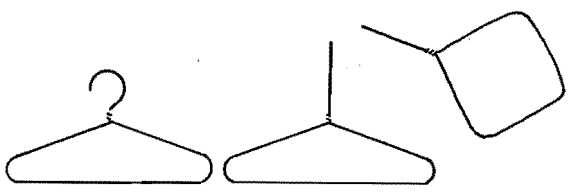
This article suggests several ways of collecting live insects, as well as some study activities your students might try once they've caught the critters. But first, a reminder that one very important object of insect study is to teach a respect for life. Please make sure that your students recognize the insects they have captured as complicated, highly evolved, *living* organisms—and that they release the animals unharmed at the site of entrapment when the lesson is over.

Methods of Capture

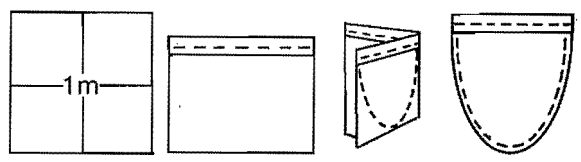
Students use sweepnets at the Smithsonian's Chesapeake Bay Center for Environmental Studies.

Method #1: The Trusty Sweepnet. The device used by school groups here at the Chesapeake Bay Center and also by professional scientists, a sweepnet may be bought from a biological supply house or just as easily made. The following directions for making a sweepnet are excerpted from the resource kit, Outdoor Biology Instructional Strategies, listed in the bibliography at the end of this article.

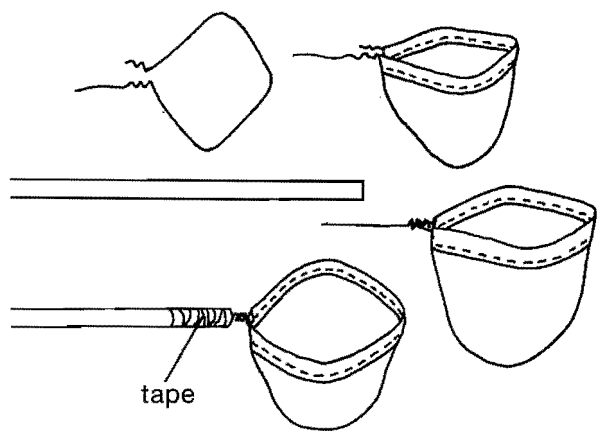
First, prepare the hoop: Take a wire coathanger, straighten the hook, and pull the hanger into a square.



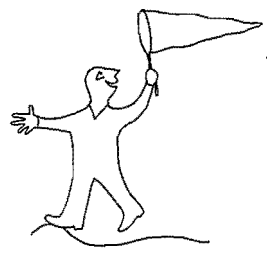
Second, make the bag: The bag should be about one meter in circumference at the top, tapering down to a point. A sewing machine speeds up construction, but older children will enjoy doing their own sewing by hand. Sew like this: Fold one edge down and sew. Fold square in half and sew. Cut off excess.



Third, assemble the net. Open the wire square and thread it on the net. Wind the tail of the square around the end of a sturdy stick. Secure with tape.



Although you may use a sweepnet to pursue and capture a particular insect that has caught your eye, the net is really designed for gathering random samples. The idea is to walk at moderate speed across an area, swinging the net back and forth, pendulum-style, over the tops of the vegetation you are sampling. After you have made between fifteen and thirty sweeps with the net, execute a quick swing around your head to concentrate the insects at the bottom of the net. Now grab the end of the net in your hand to keep your catch from escaping, and then immediately transfer the animals to a quart-size plastic bag. Close the plastic bag by knotting or with a "twistum."



Method #2: Light Trap. Cut holes in either end of a shoe box. Fit a funnel into one hole. Through the other hole, tape a flashlight so that it will shine into the box. Insects will be attracted to the light and will fly or crawl through the funnel into the box. Or instead of using a light, you might simply make one hole and try placing peanut butter, bacon grease, a cookie, or other bait inside the box.

Method #3: White Sheet. Using rope or string tied to the two top corners, hang a white sheet from a tree in a vegetated area on a dark and windless night. Stand behind the sheet with a flashlight and see how many insects you can catch in a jar, a sweepnet, or your hands. Many insects will fall into the folds of the sheet, where they will be easy to capture. From the sheet, you can funnel them gently into a plastic bag.

Method #4: Pitfall Trap. Wrap a square piece of aluminum foil around your thumb, and pinch the foil into a thin cup two or three inches long. With a pencil point or pin, punch a small hole in the bottom of the foil to allow water to drain through. Now dig a pit the size of the foil cup and press the cup into the pit, making sure that the top edge of the trap is even with the ground level. Drop a piece of bait into the trap. Come back in several hours and see what you have caught. Transfer the insects to a plastic bag.

Observation and Identification

By now each child should have his own plastic bag containing a mix of insects. An elementary field guide (see the bibliography below), hand lenses (if available), and p a t i e n c e are the only other things needed for this exercise, in which students practice observation and inductive reasoning skills.

Place the bag of insects on the ground and wait quietly for five to ten seconds. Soon the action will begin. Things to look for include: *predatory behaviors* (stalking, pouncing, web spinning) . . . *fear responses* (retreating, hiding, "playing possum") . . . *defense mechanisms* (camouflage, hard body coverings, stingers, bright warning colorations) . . . *mating behaviors* (if the season is right) . . . *identifying characteristics* (use your field guide, and stick to basics here; insect taxonomy is very complex below the level of "order," and most elementary students do well enough merely to distinguish a beetle from a true bug or a wasp from a fly) . . . and, of course, *diversity*.

In respect to diversity, it helps students to know that while all adult insects have three body parts, plus six legs, and (usually) wings, beyond that, the variation is absolutely staggering. Insects range in size from microscopic to almost a foot in length—and come in every color known to man, as well as in some colors that insects can see but we can't. As shown—opposite on *page 3*—in photographs taken in the National Museum of Natural History's new Insect Zoo, the differences in the shape, habits, and basic equipment of insects and other arthropods are fascinatingly manifold.

Testing Insect Response to Temperature, Moisture, and Light

This testing is best done with crawling insects like earwigs, beetles, and caterpillars, or with such other arthropods as pillbugs and sowbugs. You place the animal successively in each of three 12-inch or longer containers. Rectangular boxes are ideal. Each container—as the tests described below demonstrate—provides a different choice of physical conditions at opposite ends: the first offers a choice between light and dark; the second, between warmth and cold; the third, between moisture and dryness. By seeing which end of the container your insect chooses in each of the three instances, you should be able to determine what combination of conditions your insect prefers. This should give you a good idea of what kind of physical environment the animal is partial to within its natural habitat, and this, in turn, tells you where to look next time you are out collecting.

The Tests

Test #1: Light versus Dark. Place a light bulb at one end of the container in a dark room. Or wrap one end of the container in foil or black paper in a light room. If your insect likes to hide under objects, it may be because it likes darkness, or it may be because it wants to be protected from above. To find out which is the case, see if it will hide under a sheet of clear plastic.

Test #2: Heat versus Cold. Put one end of the container near a heater or some ice cubes.

Test #3: Moisture versus Dry. Place a wet paper towel at one end of the container, or lightly sprinkle some water at one end of the container, leaving the other end dry.

And those are my suggestions for some easy lessons on bugging your class. Always the idea is to encourage active investigation with real materials to teach the concept of *diversity*—a basic and profound fact of life.

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The Insect Zoo

"Success through diversity" is the theme of the National Museum of Natural History's new Insect Zoo, where a large variety of living insects and other arthropods—both familiar and exotic—are exhibited. Here is just a small sampling of what visitors to the Insect Zoo can see.

1. *Tarantula.* This large, hairy spider may be found in many warm regions of the world, including the American Southwest. Among the longest-lived of all arthropods—the females sometimes reach an age of twenty years or more!—tarantulas are secretive animals that often make their homes in burrows. Although the tarantula will bite you if provoked, it is no more poisonous to most human beings than, say, a wasp or a bee.

2. *Monarch Butterfly.* Here is a good example of defense through coloration. Monarch butterflies, found throughout the United States, are distasteful to predators because as caterpillars they feed on milkweed, a plant containing bad-tasting chemicals. The adult monarchs retain these chemicals in their bodies, and their vivid coloration warns predators that they are unpalatable.

3. *Eastern Lubber Grasshopper.* This big grasshopper is from the Southeastern United States. Like all grasshoppers, it is a herbivore, which means that it lives by chewing plants. Commonly found in fields, open meadows, and vacant lots, grasshoppers can consume great quantities of leaves in a short time and often are devastating pests in agricultural areas.

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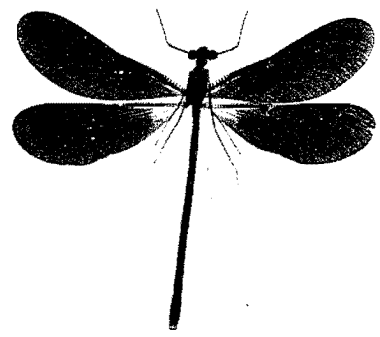

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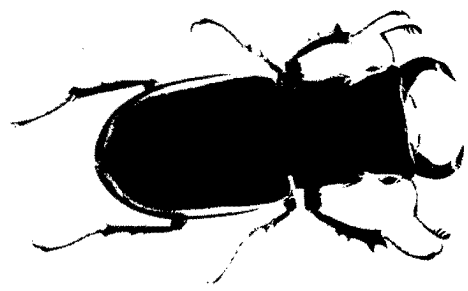
4. *Damselfly.* Found near ponds and moist meadows, the damselfly lays its eggs in the water, where the nymphs develop. After several growing stages, the nymph crawls out of the water on a stick, where it splits its skin—and the adult damselfly emerges.



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5. *Stag Beetle.* These Eastern United States forest beetles are so named because the enormous mandibles of the male resemble a stag's antlers. The larvae live in rotten wood. Like millipedes, adult stag beetles stay hidden under logs during the day.

6

6. *Millipede.* Millipedes—"thousand-leggers"—inhabit wooded areas the world over. They frequently live under logs. In the wild, they eat decaying vegetation. Here at the Insect Zoo, they eat mostly bananas, mellons, and lettuce.

Photo credits: For 1, 3, and 5, photo by Chip Clark, Exhibits, National Museum of Natural History. For 2, photo by Kjell B. Sandved, National Museum of Natural History.

BENJAMIN FRANKLIN STAMP CLUBS

Why not start a stamp club in your school? To get young people interested in stamp collecting, the United States Postal Service is sponsoring Benjamin Franklin Stamp Clubs for grades four through six. Membership is free. Imaginative resource materials are provided. For information, contact your local postmaster, who may obtain details from the manager of the Retail Branch of the Regional Office.

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ART TO ZOO

ART TO ZOO is a new publication, bringing news from the Smithsonian Institution to teachers of grades three through six. The purpose is to help you use museums, parks, libraries, zoos, and many other resources within your community to open up learning opportunities for your students.

Our reason for launching a publication dedicated *to promoting the use of community resources among students and teachers nationally* stems from a fundamental belief, shared by all of us here at the Smithsonian, in the power of objects. Working as we do with a vast collection of national treasures that literally contains the spectrum from "art" to "zoo," we believe that objects (be they works of art, natural history specimens, historical artifacts, or live animals) have a tremendous power to educate. We maintain that it is equally important for students to learn to use objects as research tools as it is for them to learn to use words and numbers—and you can find these objects close at hand, by drawing on the resources of your own community.

Our idea then, in producing ART TO ZOO, is to share with you—and you with us—methods of working with students and objects that Smithsonian education staff members have found successful. This is the last of four pilot issues published in October, December, February/March, and April/May of this school year. Beginning in the fall of 1977, ART TO ZOO will be made available on a wider basis to teachers nationally.

You are one of approximately seven hundred teachers across the United States who have agreed to respond critically to the four pilot issues. With this issue, a form on which to evaluate both this issue and the February/March issue has been sent to you. To make it easier for you to know who we are, we have listed—in the masthead shown below—the Smithsonian museums and divisions whose education staff members will be contributing regularly. Please read the articles carefully and be absolutely frank in stating your opinions on the evaluation form. We're counting on your help.

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THE NATIONAL AIR AND SPACE MUSEUM
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THE NATIONAL MUSEUM OF NATURAL HISTORY
THE NATIONAL PORTRAIT GALLERY
THE NATIONAL ZOOLOGICAL PARK
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TEACHER'S NOTE: This article, based on an interview with DR. DEVRA KLEIMAN, Reproduction Zoologist at the National Zoo, has been written *to be read by your students.* It is the fourth in a series of interviews with Smithsonian staff members to be printed in *Art to Zoo* this school year. Through these interviews, we hope to give students some insight into what we do here at the Smithsonian—and why—in a format that can be worked into your curriculum in a variety of ways.

When you first see this little monkey, you half expect it to roar, as it looks so much like a pint-sized lion! One of the rarest animals at the National Zoo, it is the *golden lion tamarin.*

The golden lion tamarin has almost disappeared in the wild because of the destruction of its original home, the coastal rain forest of southeastern Brazil. Now the National Zoo is keeping close watch over golden lion tamarins in captivity in order to understand better what conditions they need so as to breed and raise their young successfully. As a result of this effort *to save the golden lion tamarin* from extinction, there were, at last count, thirty-five tamarins at the National Zoo, all but two of them born in captivity.

"We've found that a diet with lots of protein—including grasshoppers, shrimp, and eggs—is very important," says Zoo scientist, Dr. Devra Kleiman. "We've also learned to keep the young tamarins (or juveniles) in the same cage as their parents until the mother has had another litter. In this way, the juveniles learn to take care of their younger brothers and sisters. There is good evidence that tamarins who miss this experience grow up to be poor parents, either ignoring or killing their own offspring."

Dr. Kleiman goes on to explain that tamarins live in small family groups, each consisting of a mother, a father, and several young. One to three babies are born at once, most often twins. Family ties are strong—in fact stronger than in most other mammals. Fathers and older juveniles help to carry and feed the newborn young, which are about the size of adult house mice.

The mother generally tends the babies the first week; then the rest of the family takes over. Eventually the fathers and brothers and sisters carry the babies most of the time and only take them back to the mother for feeding. We saw a baby tamarin clinging to its mother's back. The father approached, sniffed the mother and the baby, then pressed himself against the mother's back and against the baby. The baby reached up and pulled itself onto the father, and off *they* went!

The tamarin cages at the Zoo are as alike the animals' natural home as possible, with branches to climb on and lots of space in which to run. In the wild, tamarins sleep in tree holes; at the Zoo, they sleep in wooden nest boxes.

Golden lion tamarins are fun to watch. One of their favorite pastimes is hunting for crickets and other tidbits on the floor of their cage. They also like to peel the bark off branches and chew on it. The juveniles wrestle and chase one another, leaping from branch to branch, with the fathers joining to play with the babies. A while ago the Zoo had two young parents with a three-month-old baby. The baby and the father would go into the nest box and wrestle—THUMP-A-BUMP-A-BUMP! Then out they would come and go charging around the cage as the baby tried to grab the father by the tail.

"We hope that someday a tamarin reserve will be established in Brazil," says Dr. Kleiman. "That way the tamarins can be returned to their native environment."

Meanwhile the National Zoo will continue to try to save the golden lion tamarin from extinction. You may ask, "Why go to so much trouble for one very small monkey?" That is an extremely important question, which your class might think about and try to answer.

Pair of Golden Lion Tamarins at the National Zoo, Washington, D.C.