LOBSTERS

A Guide to the Maine Lobster

INSIDE-OUT

by Robert and Juanita Bayer

Illustrations by Marcia Spencer and MaJo Keleshian

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Prepared in conjunction with the authors by **Kathleen Lignell,** editor, and **MaJo Keleshian,** graphic designer of the University of Maine's Sea Grant Communications staff in Orono.

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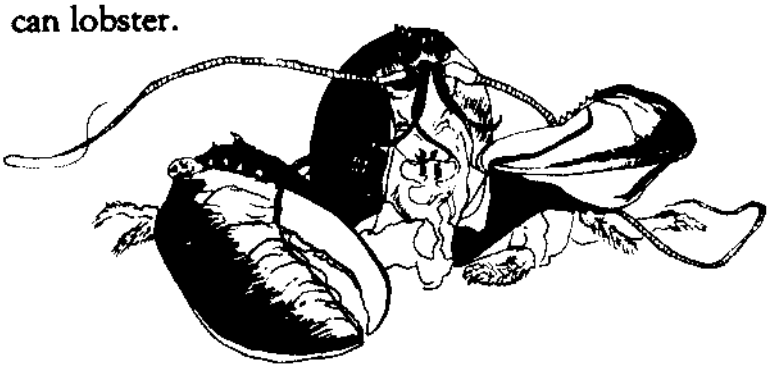
THE AMERICAN LOBSTER

Homarus Americanus, the American lobster, is synonymous with the Maine coast. Seventy percent of all lobsters harvested in New England are caught in Maine, and it is the state's most valuable fishery. For the last 20 years, the amount of the lobster catch in Maine has remained stable at around 20 million pounds.

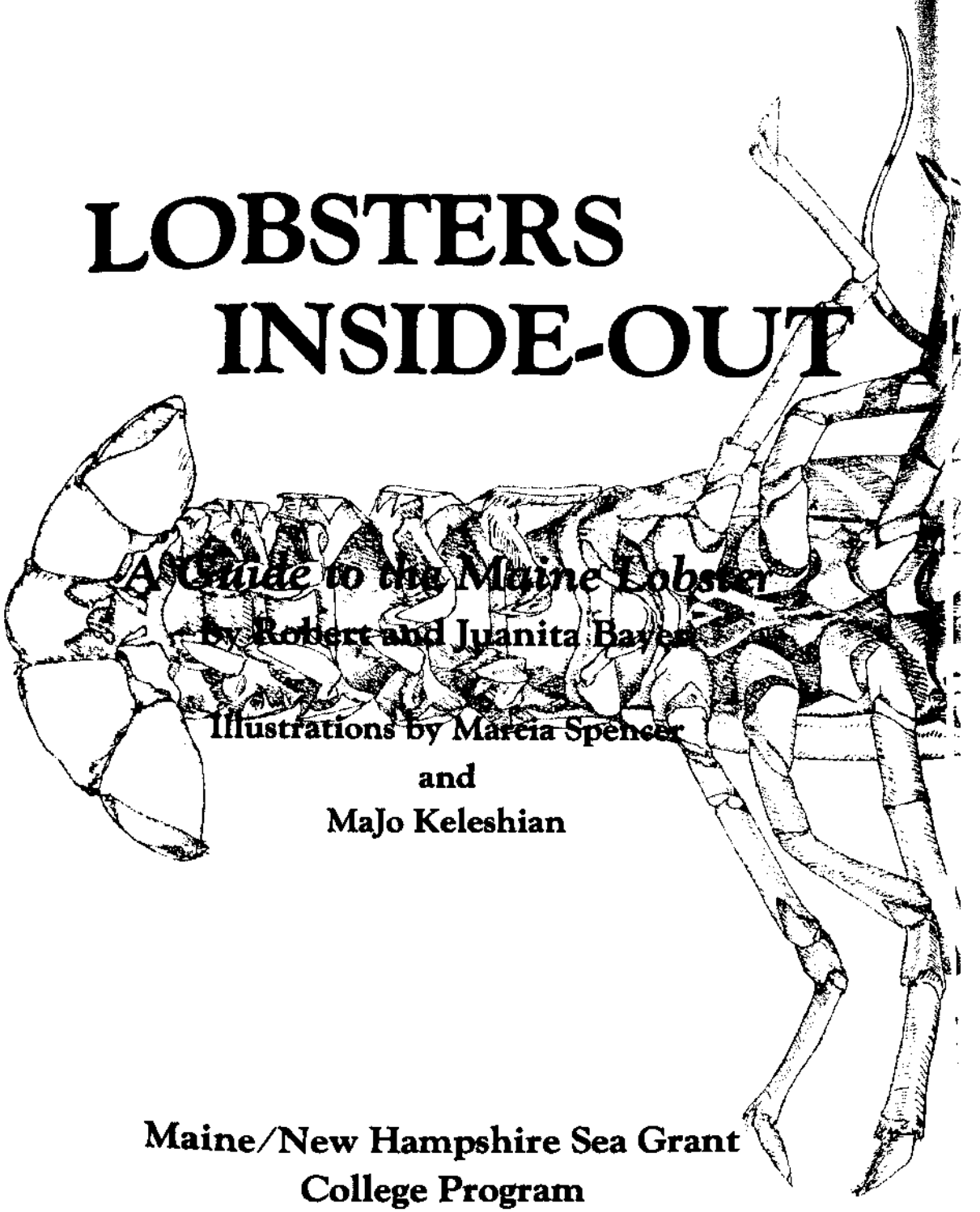
This book explores the basic questions most often asked about the American lobster. Have you ever wondered why lobsters shed their shells and claws? Did you know lobsters are "cannibals"? How do they grow? Can you tell a male from a female lobster? What do they eat and how do they find their food?

The authors, a lobster researcher at the University of Maine and an elementary school teacher, describe the life cycle of the lobster, the environment in which it lives, and much more.

Here is a fascinating approach to the study of one of nature's most unique and tasty creatures, the American lobster.



LOBSTERS INSIDE-OUT



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Acknowledgments

The outline of this book came from Meghan, Alison, and Andrew Bayer (ages 14, 11, and 10 at the time of this writing), who supplied many of the questions upon which this book is based. Thanks also to Dr. Anne Marie V. Quinn of The Reading Consultancy of Bangor, Maine for her careful review of the manuscript.

For Alison, Meghan, and Andrew

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HOW MUCH DO YOU KNOW ABOUT LOBSTERS?

Read to discover if the following statements are true or false.

_____ 1. Lobster eggs are held together with a jelly-like glue until they hatch.

_____ 2. When a lobster hatches, it looks the same as a big lobster, only smaller.

_____ 3. Lobsters are scavengers.

_____ 4. The lobster "smells" out its food by use of small hairs that cover the lobster and the four small antennae.

_____ 5. The teeth of a lobster are in its stomach.

_____ 6. Lobstermen can keep all the lobsters they catch.

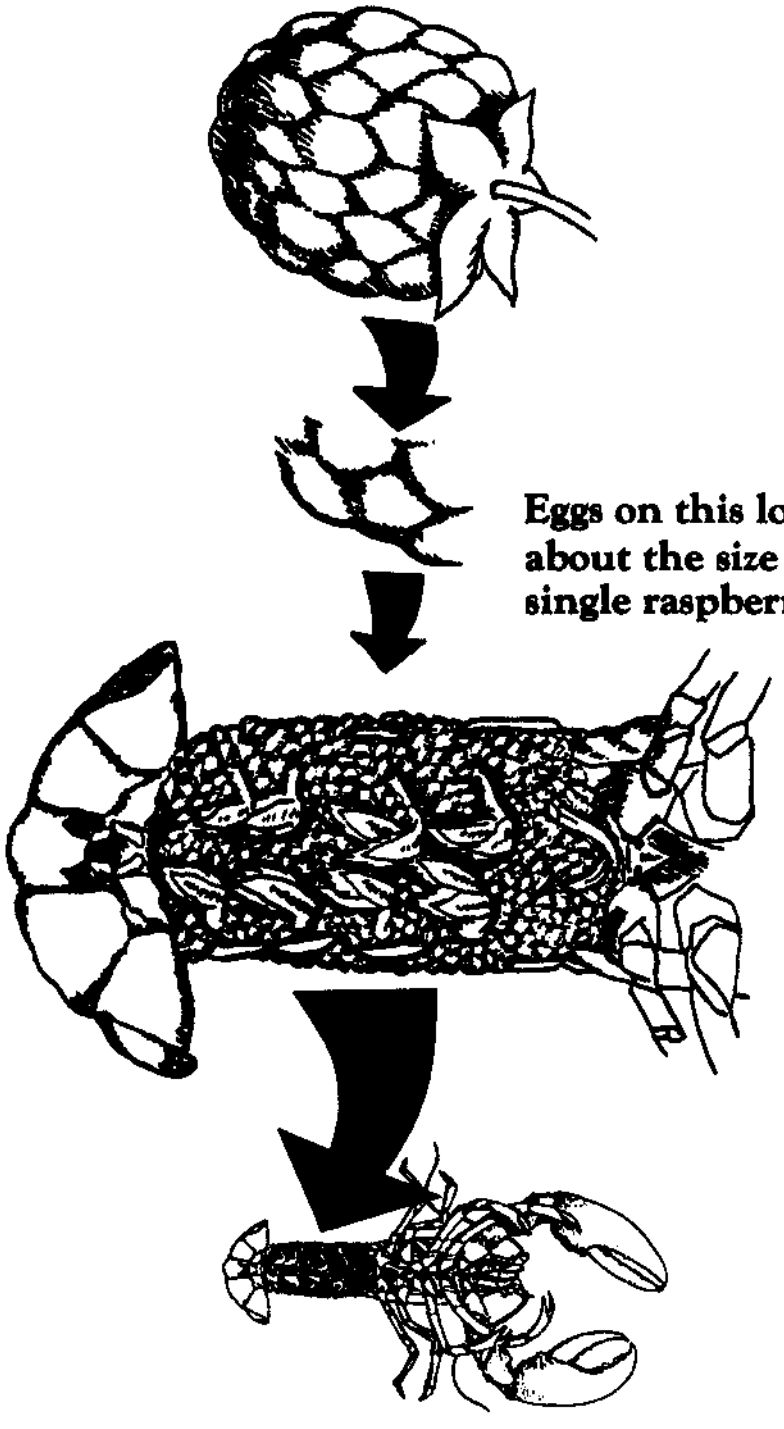
_____ 7. Lobsters grow by molting.

_____ 8. Lobster blood is red in color.

_____ 9. Pollution kills lobsters.

_____ 10. Lobsters come in many colors, but when you cook them they all turn red.

(Answers on page 26)

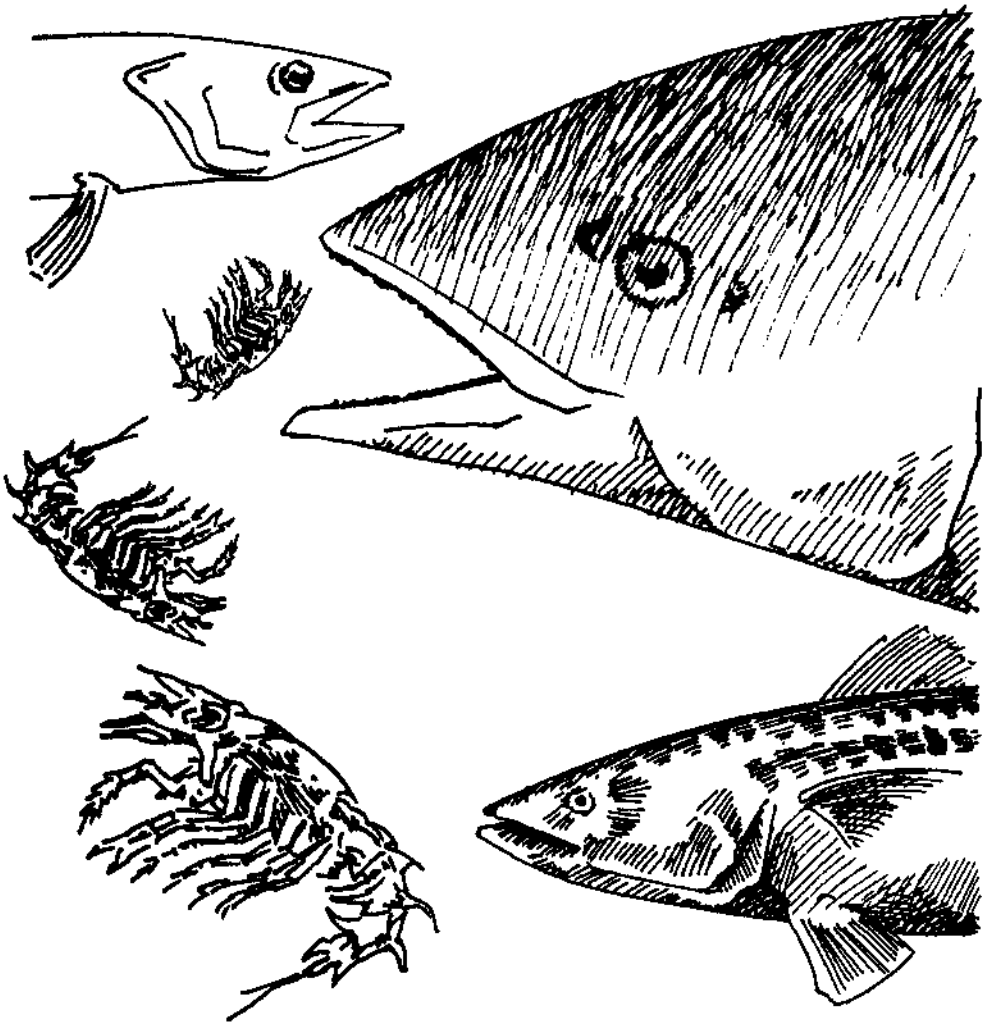


Eggs on this lobster are about the size of a single raspberry segment.

LOBSTERS INSIDE-OUT

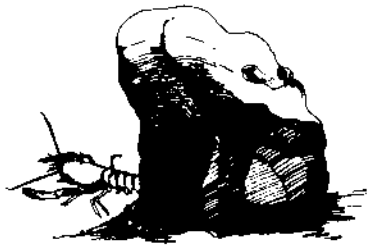
A TINY LOBSTER HATCHES from an egg not much larger than the head of a pin. This egg, along with thousands of other eggs, has been suspended from the female's tail held together in a mass by jelly-like glue. The lobster makes this glue in what are called cement glands so that when she extrudes her eggs, allowing them to come from inside the body, they will stay attached rather than float away.

Any eggs that do not stick to the lobster will not hatch and will probably be eaten by fish or other sea creatures. When the eggs are extruded, the lobster lies on its back and cups its tail to catch the eggs. The eggs on a lobster look like little parts of berries, which is why a lobster with eggs is often referred to as a **berried** female. Lobster eggs take about nine months to develop from the time they are extruded.



A baby lobster is food for fish.

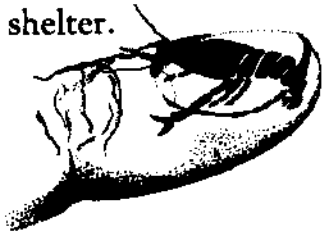
A newly hatched lobster is found near the surface of the ocean. How easy it would be for fish or birds to eat it. It doesn't look like a lobster, does it?



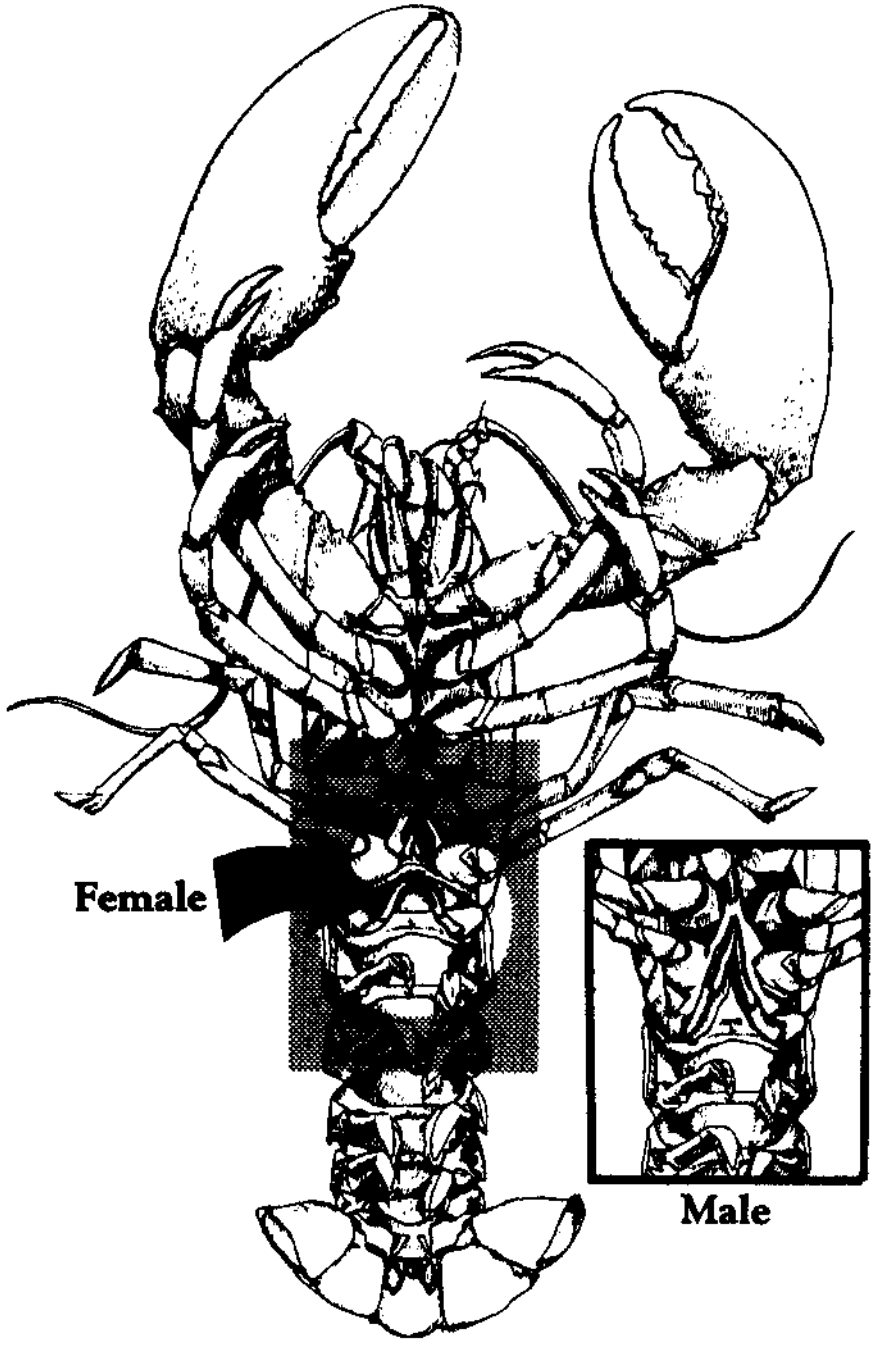
Three molts after hatching, this lobster, now with new claws, is hiding under a rock. It is much safer.

When the lobster first hatches it doesn't look very much like a lobster: it has no claws and it looks more like an insect. At this stage in life, it is called a **larva.** More than one larva are called larvae. It takes about a month before the new lobster is recognizable as the lobster that we know. During this time, it grows internally and sheds its shell three times. With each shed or **molt,** the lobster looks a little different and grows a little larger.

During these larval states, before the claws develop, the lobsters float near the surface of the sea. They are very vulnerable to being eaten by fish, and very few survive out of the thousands that hatch from each female lobster. When the lobster finally sinks to the bottom, it may be miles from the place it hatched as it seeks the safety of a shelter on the ocean bottom. Most of the early life of the new lobster is spent hiding, but the older and larger it gets, the more time it spends outside its shelter.



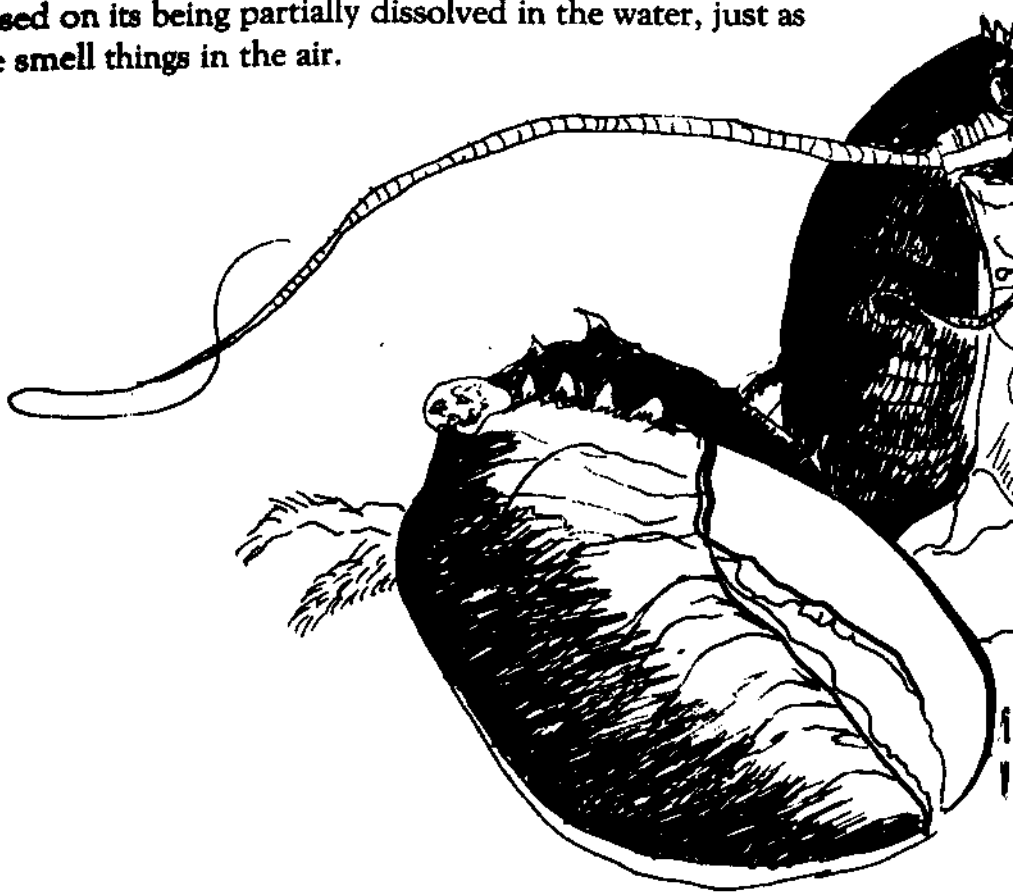
The finger shows the real size of the lobster.


Female
Male

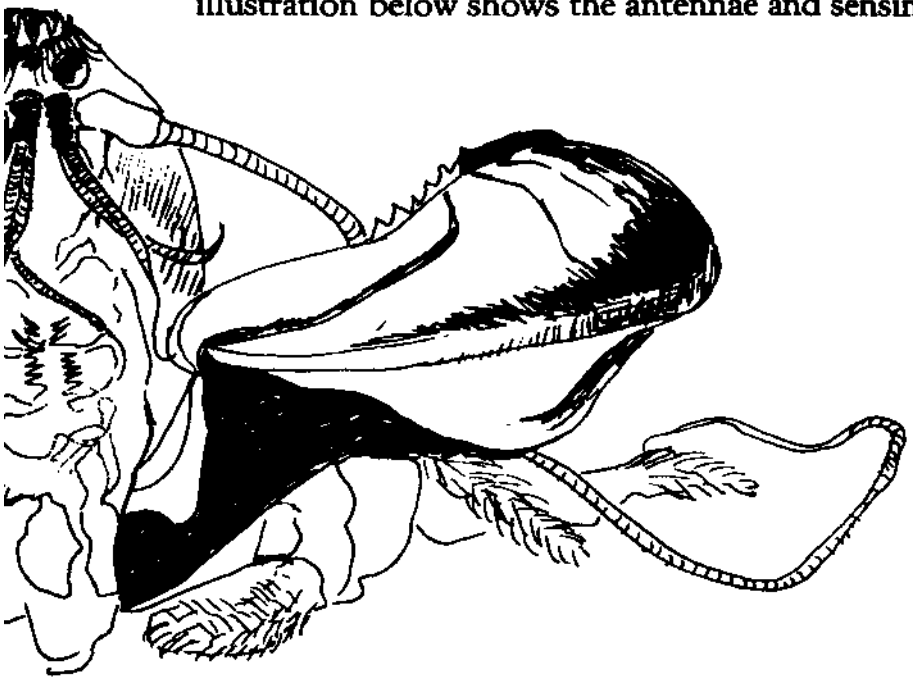
HOW DO YOU TELL IF A LOBSTER is a male or a female? It's easy. Turn the lobster on its back and look at the first pair of **swimmerets** in the illustration. These are hard and bone-like in the male, but soft and feather-like in the female. Study the illustration on the opposite page to make sure you can tell the male from the female lobster.

LOBSTERS EAT A VARIETY OF THINGS — it was once thought that lobsters were scavengers, eating mainly dead things. However, scientists have studied the things that are in the lobster's stomach and have discovered that they catch primarily fresh food, which includes nearly 100 different animals and some plants. Some of the things lobsters often eat are: crabs, clams, mussels, starfish, sea urchins, and other lobsters. Lobsters are cannibals; they eat each other!

THE LOBSTER IS TRICKED into a trap using the same method with which he finds food. He uses something similar to our sense of taste and smell, even though he has no nose. The lobster locates his food based on its being partially dissolved in the water, just as we smell things in the air.

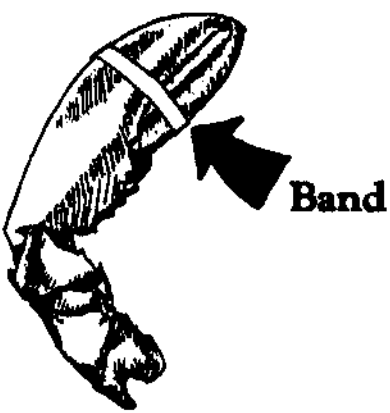


He smells his food or bait in a trap by using four small antennae located on the front of his head. Many parts of the lobster, especially the legs, are covered with tiny hairs. These are also used for finding food. The illustration below shows the antennae and sensing hairs.

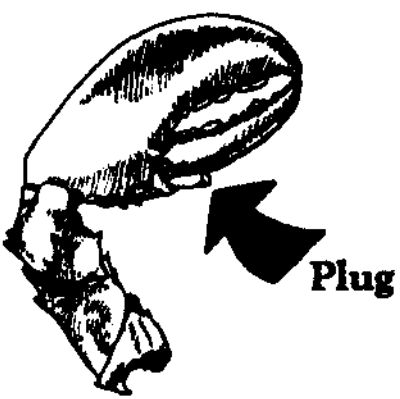


Look at the four small antennae on the lobster's head and its hairy legs. Both are used for finding and identifying food.

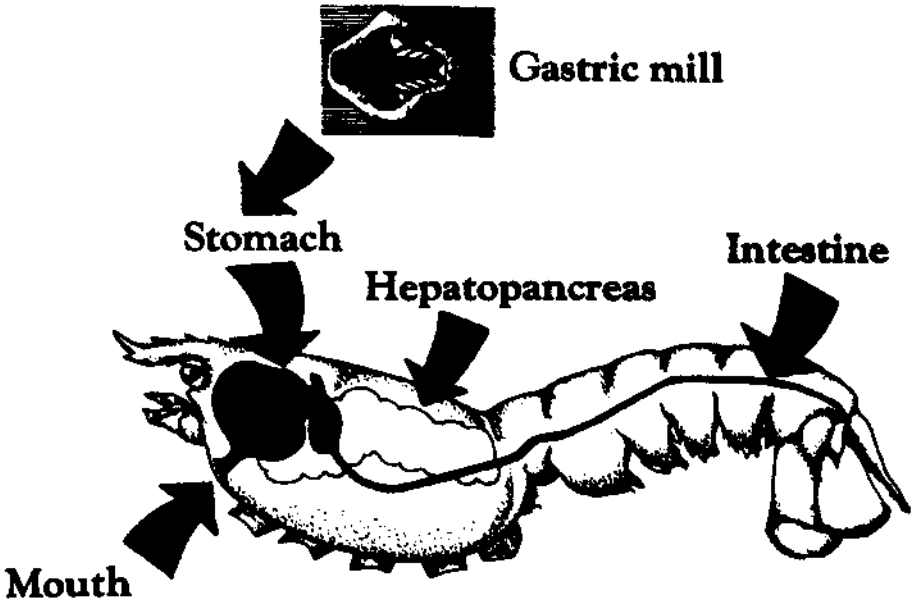
A HUNGRY LOBSTER usually grabs its dinner using its two claws. One claw is sharp and pointed (called the **ripper** claw because it can be used to tear food apart). The other claw, which is slightly larger, has a rounder crunching surface and is called the **crusher** claw. Both claws are very powerful; it would certainly hurt to be snapped by either one. When lobsters are caught, a special rubber band is placed around each claw, or a plastic (or wooden) **plug** is placed in the hinge of the claw, so they cannot open them and hurt the fisherman or each other when held together in captivity.



Ripper Claw



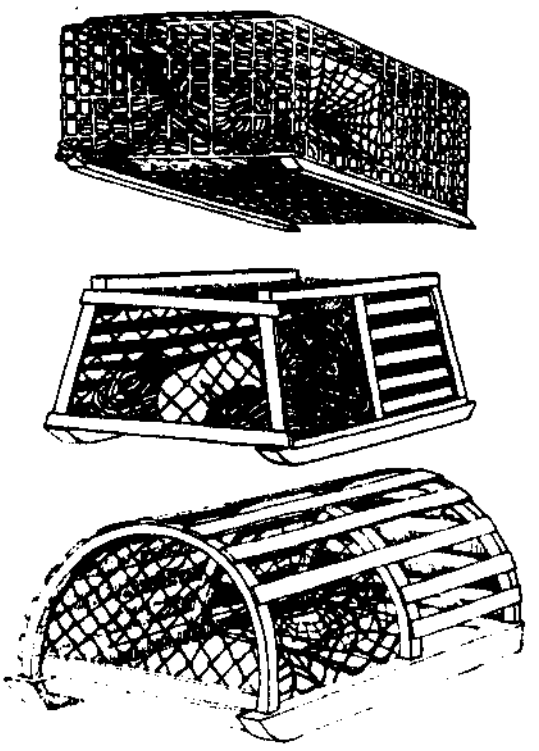
Crusher Claw

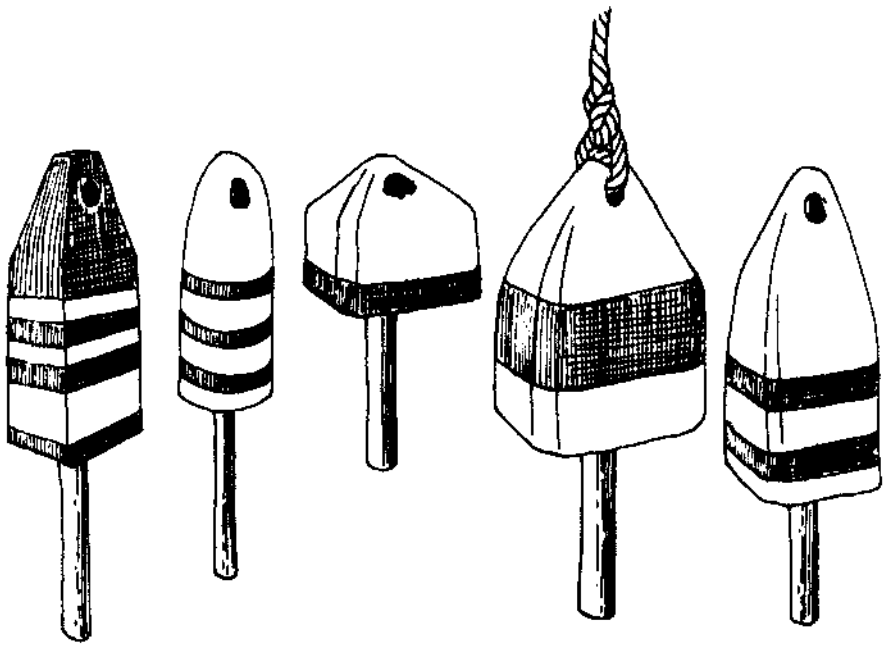


The claws tear the food into pieces small enough to be picked by the small claws on the walking legs. Using these small claws, the food is stuffed into the lobster's mouth. The stomach is located a very short distance from the mouth, and the food is actually chewed in the stomach between three grinding surfaces that look like molar teeth. These three teeth-like grinders are together called the **gastric mill.** You can see the gastric mill and stomach in the diagram above.

The next stop for the chewed-up food is called the ***hepatopancreas.*** This is where the food is digested and absorbed. It works a lot like your own intestine and other digestive organs. Look again at the diagram to see how the food moves inside the lobster.

LOBSTER TRAPS COME IN VARIOUS sizes and shapes. Many lobstermen build their own traps out of wood. These traps are either rounded or rectangular in shape, and some are made of heavy plastic-coated wire. The general design of traps is about the same whether they are made of wood or metal. There is netting in the entrance of the trap leading to a metal circle through which the lobster comes when he tries to get the bait. There is another funnel-shaped piece of netting that leads to a second part of the trap. Look at the drawing of the lobster traps.

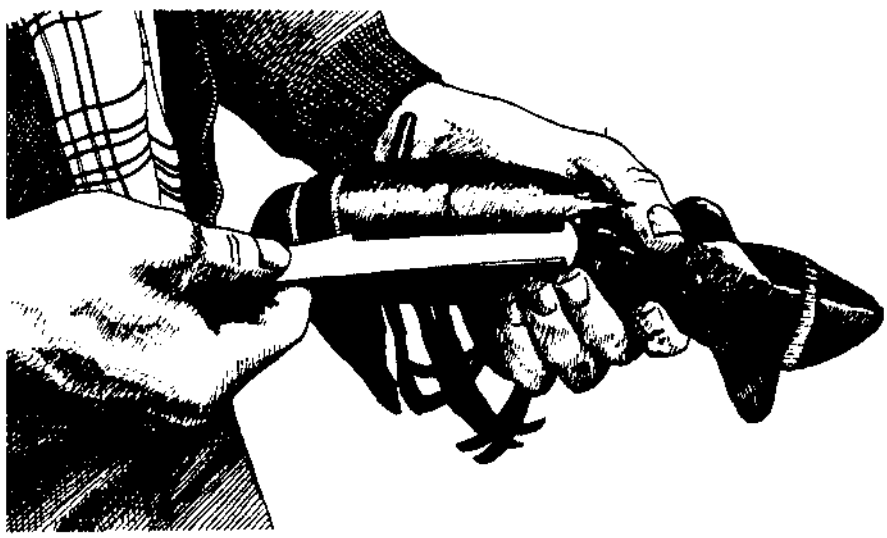




EACH TRAP IS CONNECTED BY ROPE TO A BUOY. The buoys come in many color combinations. Every lobsterman has his own buoy color pattern to help him find his traps. Most fishermen have mechanical trap haulers so that they don't have to pull the long ropes with their heavy traps.

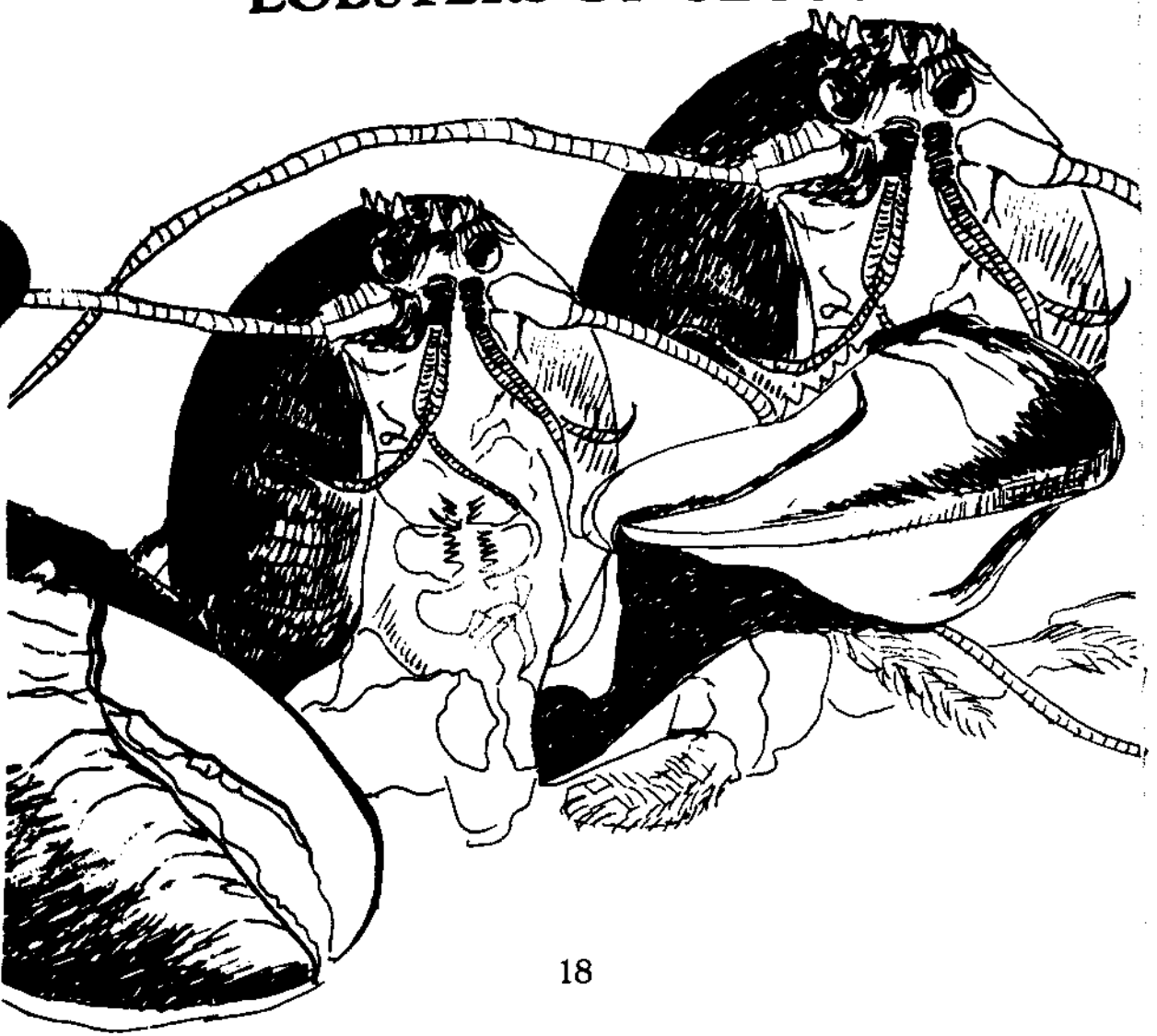
WHEN A LOBSTERMAN PULLS HIS TRAPS and finds lobsters in them, he must measure them to make sure they are large enough to keep, but not too large. The measurement is made with a gauge placed between the eye socket and the end of the large body shell, called the **carapace.** This drawing shows what the gauge looks like and where the measurement is made.

LOBSTER TRAPS CATCH OTHER THINGS besides lobsters. There are always surprises when traps are hauled. Besides lobsters of various sizes, there are creatures like crabs, sea urchins, sea cucumbers, and fish.



This lobster is being measured with a gauge to see if it can be kept or must be thrown back.

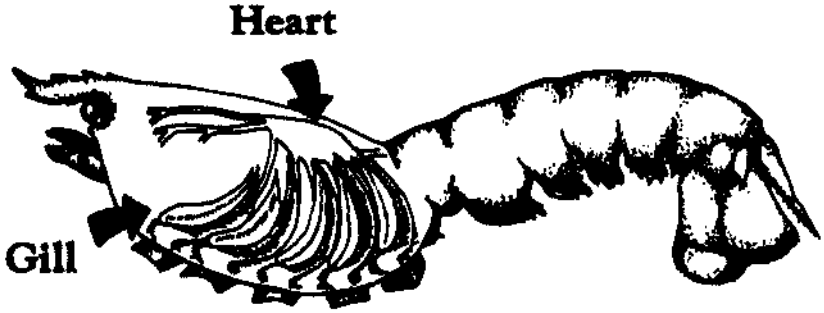
LOBSTERS UP-CLOSE



HOW DOES THE LOBSTER MOLT AND GROW? Here are some facts about the lobster that will help you understand its biology and how it grows new legs and claws, and even its body shell. The shell is the lobster skeleton which must be shed for the lobster to grow. This process is called **molting.** It takes about twenty molts over five to seven years for a lobster to become an adult. Before shedding its old shell, a new soft shell is formed under the old shell. To get out of its old shell, the body shell **(carapace)** splits and the skin between the tail and carapace opens.

Next, the lobster rolls over on its side and bends itself almost in half to pull itself out of its old shell. The new-shell lobster then pumps itself with fluid to enlarge the very soft shell. The shell is paper-thin at this time and the lobster must find a place to hide for a while, so the shell can become stronger. The shell is so soft that if you lift the lobster out of water and don't hold the claws, they will fall off. There isn't much meat in a new-shell lobster. In time, more **muscle** (meat) grows until it's time to molt again.

Molting also gives the lobster a chance to grow new body parts, like legs or claws, that might have been lost in fighting. It takes several molts, but eventually a whole new claw can be grown.



THE BLOOD OF A LOBSTER is a gray or slightly blue color. It is pumped by a heart located just behind the stomach, through a few large blood vessels. One important place the blood circulates is to the **gills** where oxygen is picked up from the water, much like we take oxygen from the air with our lungs. Look at the drawing above showing the heart and gills.

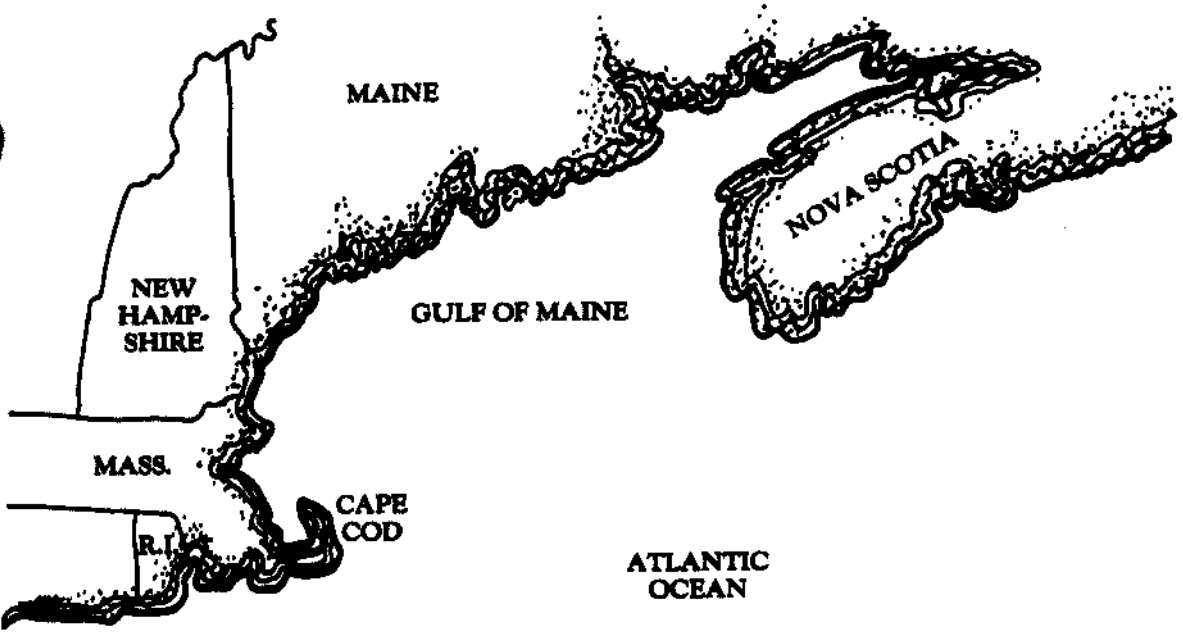
LOBSTERS ARE VERY SENSITIVE TO POLLUTION. Oil in the water reduces a lobster's appetite, while chemicals we use to kill insects are deadly to lobsters.

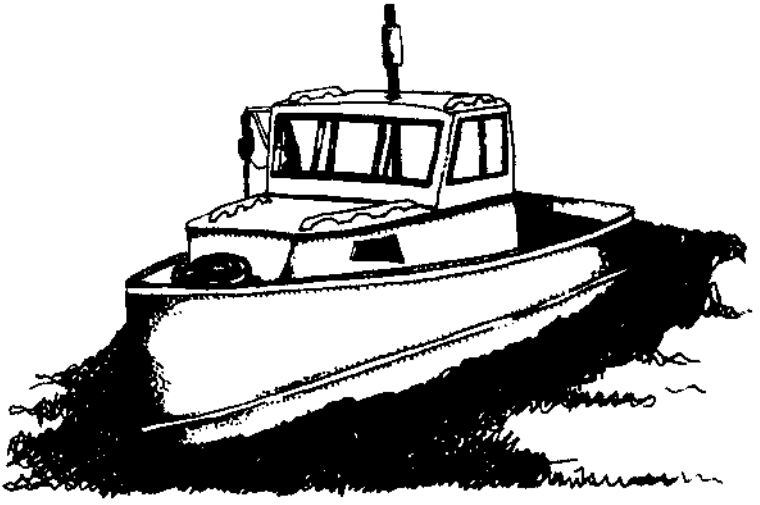
LOBSTERS CAN COME IN MANY COLORS. The common color is a greenish-brown with an orange underside, but there are also rare blue, red, white, and yellow-spotted lobsters. All of these turn red when cooked.

WE CAN FARM LOBSTERS, but since it is very expensive, it is cheaper to catch them. Because lobsters like to eat each other, each farmed lobster must have an individual cage or tank compartment.

HOW LONG HAVE LOBSTERS BEEN FISHED IN MAINE? The first reports of caught lobsters was in 1605 when early explorers threw over a net and caught them. The commercial lobster fishery really started some time around the mid-1800's. The prices paid to a fisherman for his lobsters has risen from just a few cents per pound in 1880 to two to five dollars per pound today in Maine, and up to ten dollars per pound as you move further from Maine.

LOBSTERS CAN TRAVEL LONG DISTANCES. Researchers have tagged lobsters with pieces of plastic carrying identification of where the lobster was released. Lobsters, tagged and released in Maine, have been found as far away as Rhode Island and Massachusetts.





WHAT ARE LOBSTER BOATS LIKE?

There are four types of boats used in the lobster fishery, classified according to their source of power: oar, outboard motor, inboard gasoline power, or inboard diesel power. The smaller boats (from 14 to 22 feet long) fish a smaller number of traps closer inshore and are often used by young people learning the trade. Larger boats are from 22 to 45 feet long and may fish several hundred traps.

Virtually all boats with inboard power and some with outboard power have some type of powered hauler to bring the trap from the bottom to the rail. The present trend is almost exclusively to hydraulic haulers. A depth sounder, and a CB radio and/or a VHF marine radio telephone, are considered necessary accessories. Larger boats often have radar to make it possible to fish during poor visibility.

GLOSSARY

Antennae	Located on the front of the head of the lobster and used to find food.
Berried	Having eggs; eggs look like tiny berries.
Buoys	The markers attached by rope to a trap which identify the trap as belonging to a particular fisherman.
Carapace	The large main body shell covering the front portion of the lobster.
Extrude	Refers to the release of eggs from inside the lobster body to the tail.
Gastric mill	The grinding organ located inside the lobster stomach.
Gauge	The measure used to check a lobster to be sure it is the proper size to keep.
Hepatopancreas	The major digestive organ of the lobster.

Larva	A newly-hatched lobster before it develops claws and looks like a lobster.
Molar teeth	Broad grinding surfaces.
Molting	The process of shedding the shell to grow to the next larger stage.
Plug	The piece of plastic or wood placed in the hinge of the lobster's large claws so they cannot open.
Ripper claw	The sharp, pointed claw used for tearing food.
Scavenger	An animal that lives on dead food rather than fresh, live food.
Swimmerets	Flap-like structures located under the tail. The first pair of swimmerets distinguishes a male from a female.
Walking legs	The long legs with small claws on which the lobster walks.

ANSWERS TO LOBSTER QUIZ

(from page 3)

1. True
2. False
3. False
4. True
5. True
6. False
7. True
8. False
9. True
10. True

ABOUT THE AUTHORS

ROBERT BAYER has been involved in lobster research for more than ten years as a professor at the University of Maine in the Department of Animal and Veterinary Sciences and Maine Lobster Institute. Dr. Bayer has degrees from the University of Vermont and Michigan State University.

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