HOLIDAY SHORE

Books by
Edith M. Patch

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HOLIDAY SHORE

by

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and

Carroll Lane Fenton

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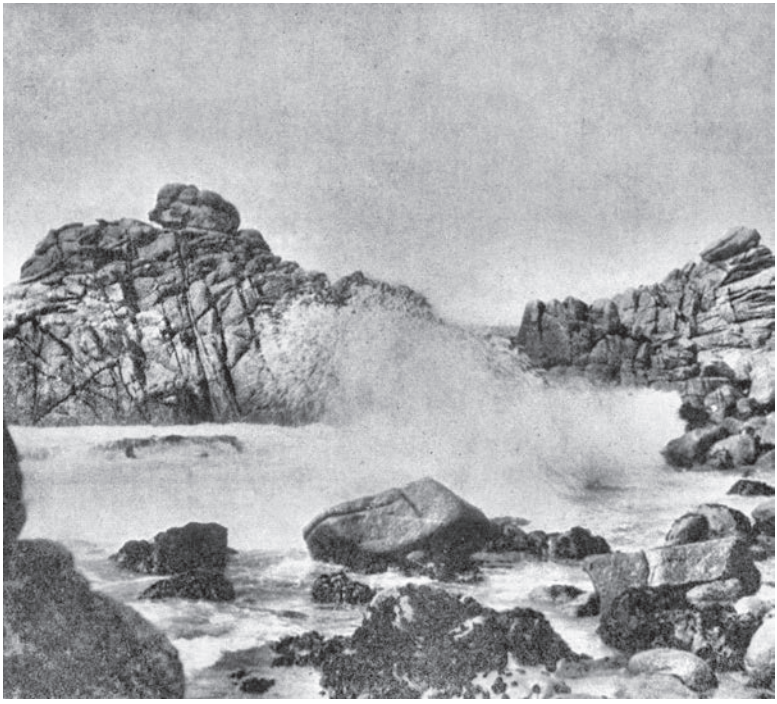


Storm waves break into spray on the rocks of Holiday Point.

CHAPTER I

WELCOME TO THE SHORE

HAVE you ever spent a day or a summer at a place called Holiday Shore?

Probably not, for most shore places are named for towns, or people, or bays. Yet there are thousands of holiday shores on the Atlantic and Pacific coasts. There are ways by which you can tell them at once, whatever their names may be on maps.

A really fine holiday shore lies at the end of a cove or bay. It will have cliffs of rocks on which gulls rest. There will be big stones sticking up through sand, or shingle, and round cobbles that rattle when the waves break.

A good shore, too, must have a beach—with the shape of a half-moon of wet yellow sand when the tide is out. There you may wade or dig for clams. Or you may look for shells and seaweeds washed ashore when the waves are high. You may also see the tracks of gulls that come to find food.

In the shallow water, plants and animals live. One plant you are almost sure to see is called eel grass. Look in eel-grass tangles for the pink and brown bodies of

jellyfish. You may take the pink ones up in your hands, but catch the brown ones with a pail or net. They have many special cells in their bodies that sting, and the stings hurt for a long time.

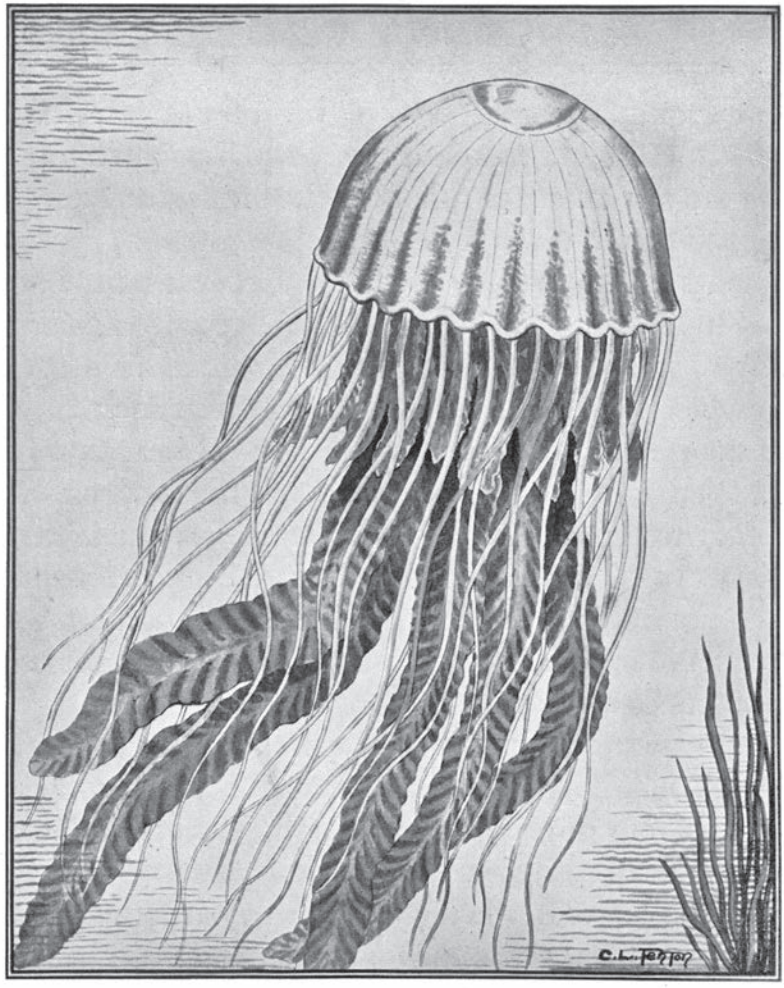
In the sand among the eel-grass roots are little lumps that move. Dig under one and you will find a snail that draws its soft body into its shell as you pull it out of the sand. Other snails crawl on the bottom, eating very tiny plants.

Perhaps you will find a larger lump, and will dig out a big, gray king crab with a long spine on his tail. This is Limulus. His race has lived in the sea for more than a hundred million years. You will wish to meet him again, and learn some of his strange habits.

When the tide is as low as it will go, you will hunt among the rocks that lie on Holiday Shore. Watch out for the barnacles! They could do nothing to hurt you if they tried; but if you slip on their rough shells, you may get some cuts.

As you climb about among the rocks, you will find bunches of brownish-green seaweed. Don't forget to lift them, for many things live under these weeds while the tide is out. There are snails, crabs, starfish, and even little fish called blennies. There are also many purple mussels that fasten their shells to the rocks with threads.

What is this—a snail with claws? No, it is a little hermit crab. His body has no shell of its own, so he lives in one left by a snail. He is a timid creature and will do his best to get away when you find him in a crack between rocks.



Jellyfish

Of course you will look for fish that come and go in the water and for birds that come and go in the air. You will no doubt try to find all those mentioned in this book. Perhaps you will think it a good game to count all those whose names you do not find on these pages. One small book cannot tell about all the creatures on and near the shore. The shore itself is the place to study them.

Keep watch of the water beyond the rocks. It is higher than it was an hour ago. That means the tide is coming in. Twice each day of twenty-four hours it goes out and returns, sometimes very, very fast. For your own safety find out how fast the tide comes in when you plan a day at Holiday Shore.

As you walk back over the rocks, you find many green and purple snails. You also see pretty pools where pink and brown plants grow on the rocks, and bright red worms live in shell-like tubes.

While you watch, the water comes up to these pools and spreads over part of the sandy beach. The sea is covering Holiday Shore and you must go away for a time. But the plants and animals that live on the rocks remain and take their food, for their mealtime lasts as long as they are covered with water.

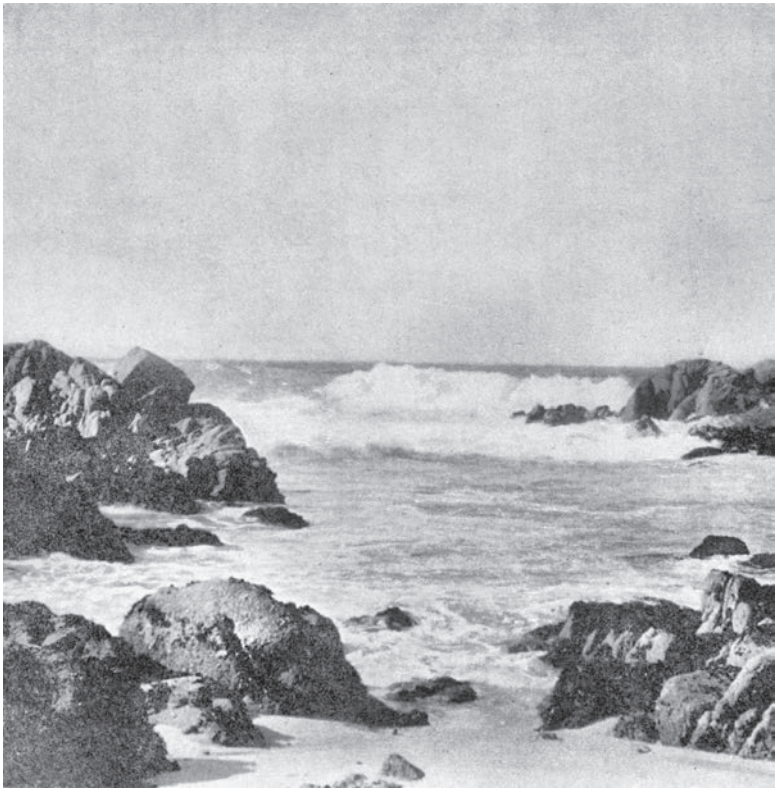
CHAPTER II

THE CHANGING SHORE

The road to Holiday Shore runs through meadows and past the farm at the foot of Holiday Hill. Then it winds through woods and crosses a stream. This is the stream up which the alewives and some other fish swim to lay their eggs in Holiday Pond.

At last the road comes near the sea. On windy days you can hear the waves as they break on the rocks. When the big waves come in and break like that, you can see how Holiday Shore was made, and why it changes every year.

For the shore really does change. Look at that rocky point: it was once bigger than it is to-day. To be sure it seems firm and unchangeable while the water of the quiet sea ripples on the rocks at its foot. Even on stormy days the point still holds itself strong and steady against huge waves that roll in from the bay. They dash against its hard gray stone and splash into fine, white spray that the wind carries far inshore. How can waves that break into weak misty spray change the shape of Holiday Point?

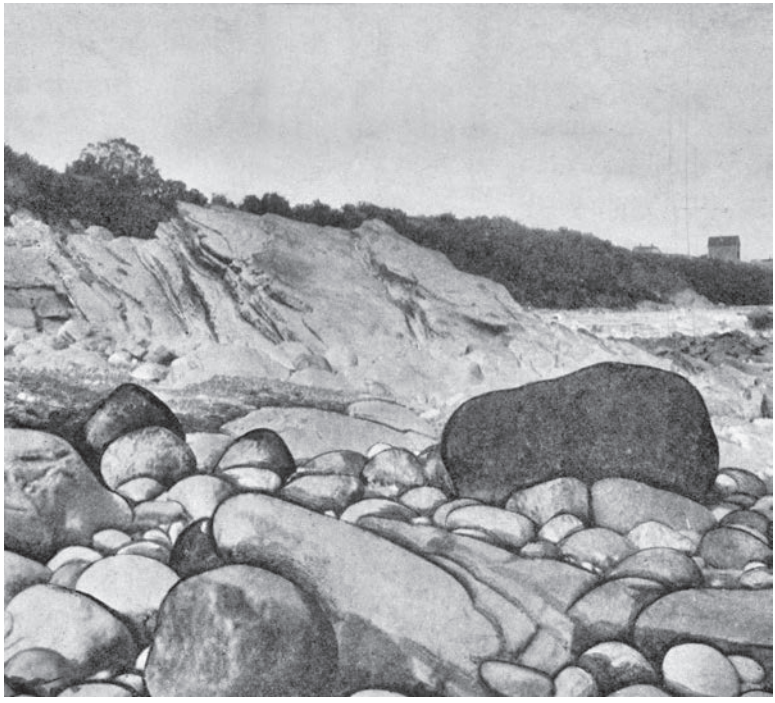


Holiday Shore

Stand behind this old, twisted tree and see a little of what storm waves can do to the shore. Here comes a big one now; watch it fill every hole and crack. Will it succeed in pushing the rocks apart?

After the wave has broken against the point and the water has run back toward Holiday Bay, you will see pieces of rock come loose and whirl away in the water. Every piece leaves a crack to mark the place from which it fell. When these cracks become deep enough, larger blocks of stone will be loosened to fall from the cliff. You may find blocks on Holiday Point that seem almost ready to fall.

When they go down, they will lie among the other rocks in the foaming water. Waves will bump them together, small rocks will be pushed against them, and sand will be scrubbed over their faces. All this rubbing will wear away rough bits from the rocks. It may take only a year or so for the waves to turn sharp-edged rocks into rounded stones like those that lie on the sandy part of Holiday Shore.



Waves pound the cobbles against one another until they become smooth and round.

Stones worn round by water are called cobbles. Some cobbles are very large. They are blocks that fell from the cliff only a few years ago. Others are small and very smooth. They have been tossed and pounded so

long that most of their mass has been carried away. A few were dropped by melting glaciers[1] that once came down from the north and covered the cliffs of Holiday Shore. When the glaciers dropped them, these stones were scratched, but waves have worn their faces smooth.

You can hear the cobbles being ground together. A strong wave rolls up the shore. Listen as the wave breaks and the water runs back to the sea. Clatter-clatter-clatter go the cobbles as they roll about and hit one another. And clackety-clackety-clack go the pebbles that once were cobbles themselves, but have been worn down until they are little. Some day they will be only grains of sand as tiny as those on the beach that covers part of Holiday Shore.

So you see how waves may change the coast. Once it was a straight line of cliffs. Then the waves found a place where they could break off chips of rock, and let big stones fall into the water. They kept this up year after year. In time they dug a little cove. After hundreds and thousands of years, the cove grew big enough to be a bay. You have seen that it is still growing to-day as the waves break on its shore.

What happened to all the rock and sand that was dug out to make Holiday Bay? Part of it was worn so very fine that it drifted far away on the waves. When it did settle to the bottom of the ocean, it was many miles from shore. Much stayed in the bay itself. A great deal still lies on the shore or in the shallow water near by.

[1]See the chapter about "The Old Boulder," in the book *Holiday Hill*.

To study the sands of Holiday Shore, we shall come on a quiet, sunny day. We should choose a time when the tide is low, so that we can walk along the beach and wade far out in the shallow water.

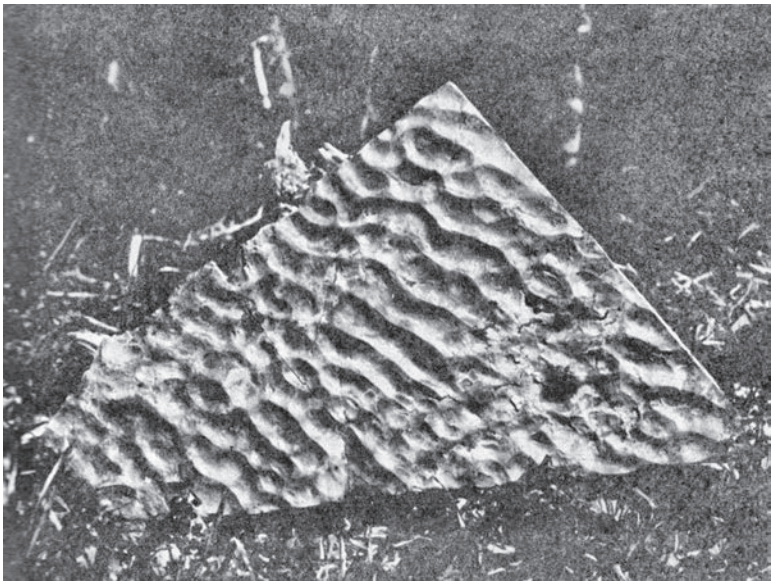
Water, rippling in the breeze, makes these marks on the sand of Holiday Shore.

We may dig holes in the wet sand, finding worms, sand dollars, and white-shelled clams that spend their lives burrowing in it. It is not well to waste the clams. So, unless you wish to cook them for a meal, throw your clams back into the water or give them to people who may use them for food.

As your spade turns up sand from the beach, you

find that it lies in layers or beds like many rocks that stand on land. Some layers go this way and that, as the waves or currents dropped the sand. If you pry or dig into the bedrock of Holiday Hill you may find stones that show the same kind of crisscrossed layers. Then you will know that they were formed near shore very, very long ago.

Now let us go to a place where the water hardly covers the sand. It ripples under the summer breeze—and looking at the beach we find ripples like those in the water.



This piece of old sandstone shows ripples made by waves millions of years ago.

If the sand were to become hard stone, most of those ripples would be preserved. There are many places where you can find sandstones that are millions and millions of years old. And they show the marks of

rippling waves like those we now see on the beach even though they may be miles from any ocean. Surely in the ages when the earth was young the sea waves must have rippled over countless shores that are now far inland.

As the coast changes and is worn by waves, the things that live upon it change their homes. When Holiday Shore inclosed a little cove, barnacles and rock mussels lived where we now find sand with seaweeds and clams. Perhaps a hundred years from to-day that cliff will have crumpled and become a pile of cobbles where snails and crabs will crawl.

CHAPTER III

LOW TIDE

While the tide is high, water covers much of Holiday Shore. Bright-colored fish swim among the rocks. Snails crawl about eating plants. Pink and blue starfishes hunt for clams, while seaweeds nod their red and green fronds. Plantlike animals attached to stones spread their legs and tentacles (flexible organs of touch) to catch food.

When the tide is low, all this is changed. Seaweeds hang limp and motionless from Holiday Cliff. Little fish hide in wet cracks and big fish swim away in the bay. Many snails hide under stones, and so do the starfishes and crabs. The shore seems to lie asleep, waiting for the tide to return.

But the animals that burrow in the fine sand are not asleep. Those holes over there were dug by clams and if you stamp your foot near them the clams will squirt water and you will know that they are awake. Those wrinkled lumps of mud were brought up by long green worms that live in burrows under the sand.

If you dig farther out, you will find sand dollars.

They are circular flat creatures with very thick shells covered with silky brown spines. In deeper water they live on the bottom. Codfish and haddock visit Holiday Bay just to get meals of sand dollars.

There are pools on the shore where creatures swim, crawl, and eat, no matter how low the tide may be. These are hollows or basins worn in the rock near the foot of Holiday Cliff. When the tide goes out, water still remains in these hollows. That is why we call them "tide pools."

Let us visit one of these pools while the rest of the shore is free from water.

The rocks around the pool are covered with thick bunches of brownish-green seaweed. In the water float some bright purple sheets. They are the fronds of seaweed called "dulse," which many people like to eat. If you go to grocery stores in seashore towns, you may find baskets of dried dulse for sale. It has a musty, salty taste and it will make you very thirsty if you eat any of it.

On the rocks at the bottom of the pool are hard, rough patches of pink. They are made by a strange seaweed that covers itself with colored lime. Some seaweeds spread out on flat stones. Others, like those in that corner, form lacy fronds of lime.

Those plants that look like huge brown leaves have drifted in from Holiday Bay. The biggest seaweeds in this Eastern bay have fronds that are two or three feet long. But if you visit the coast of Washington, you may find seaweeds called kelp that sometimes are hundreds of feet in length. One of them has a cluster of fronds

fastened to a big, hollow ball. This ball is on the end of a stem so long that it reaches to the bottom of the bay. There it anchors the kelp to a stone. Sailors sometimes have thought that these long, twisting stems were brown sea serpents.

Seaweeds, of course, are not really weeds. They have no roots or true leaves. They never have flowers or seeds. Seaweeds belong to a very ancient group of plants called algæ (al-jee). Algæ began to live in the sea millions of years before there were grasses or trees or plants of most other kinds on land. Even now, most algæ live in the sea or in streams and shallow ponds of fresh water.

Those sharp, rough shells fastened to rocks in our tide pool belong to animals called barnacles. Barnacles often live on rocks so high that they are left dry by the low tide. Then they close their shells and wait for the water to cover them before they can have anything to eat.

There in the pool, too, are tubes built by little worms with red gills. They cannot come out and crawl away, like the worms you found burrowing in the beach.

What are those pretty, checkered mats? They are the homes of creatures so plantlike in appearance that they have been given a name meaning "moss animals." Some of their relatives live on the seaweeds that float in Holiday Bay.

Sponges also are animals, even though they look like plants in the pool. Some are green, while others are yellow or pink. Each sponge has a great many tiny mouths, through which it sucks in water and food.

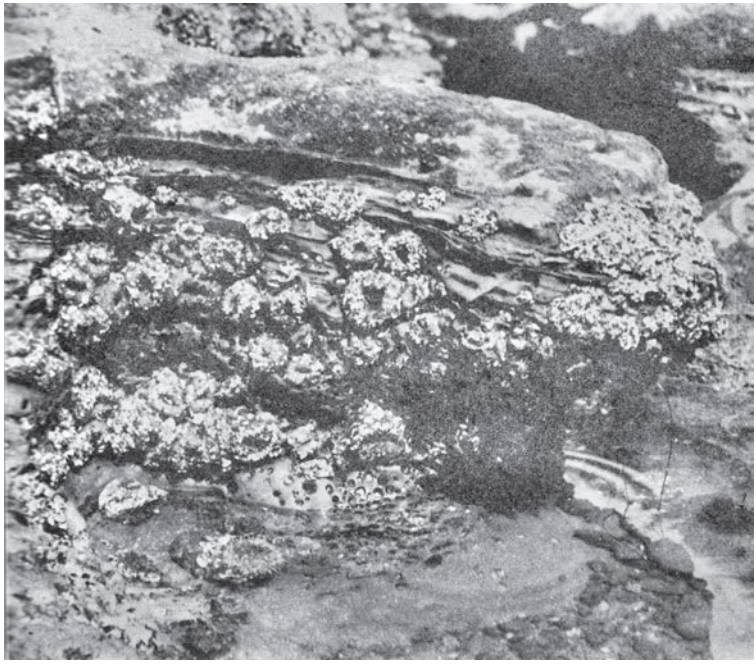
When it has eaten as much as it can, it sends the water out through another larger hole.

In a shady corner of the pool are some large sea anemones (a-nem′-o-nies). Some of them have been scared by a crab. They have shut their mouths and drawn in their tentacles and now look like red and green tomatoes sitting in the water. Other anemones were not frightened by the crab. They sit in the shelter of the floating seaweeds with their mouths open and their fluffy tentacles out, ready to catch food.

Some sea anemones in a corner of the tide pool

Though it is pretty and flowerlike and is named for a flower, the sea anemone is an animal. It is a relative of the corals that build banks and reefs in the sea near Florida. Other relatives are the pale pink jellyfish that swim in the shallows of Holiday Bay.

Some sea anemones cover their bodies with pieces of broken shell. When they close their mouths you can hardly tell them from rubbish that has been caught in a crack.



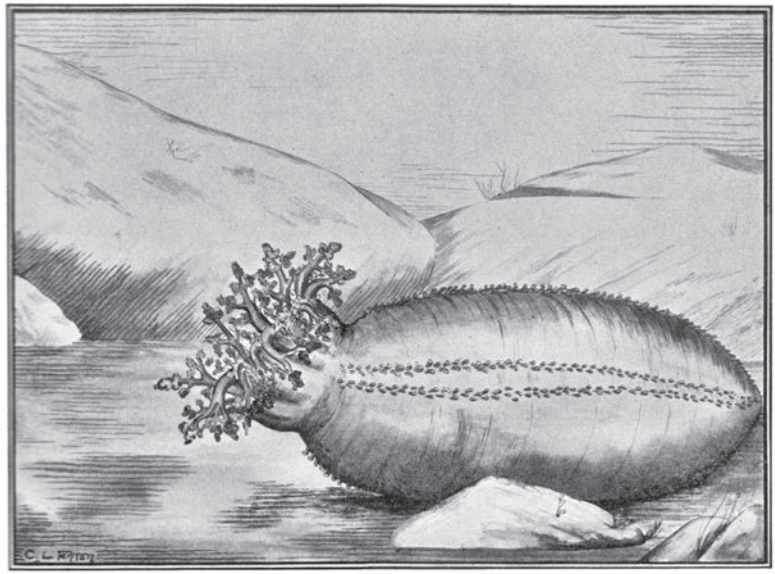
Some sea anemones cover themselves with pieces of shell.

How do sea anemones eat? Watch this big one when a little fish swims near. His tentacles wave and stretch. Three of them catch the fish and sting it so it cannot

swim. Then other tentacles get to work. They pull and push the little fish into the anemone's mouth. He will eat all of it but the fat before he is ready for another meal.

At one end of the tide pool the bottom is covered with sand. There lies a long purple creature with branched tentacles at one end. Five double rows of suckers run the whole length of his body. As he stays there undisturbed his body grows longer and longer, till it looks like a huge purple worm. If you pick him up, however, his body becomes short and stiff. He does not bite or sting.

This queer creature is a sea cucumber. It is a distant cousin of the starfish, even though it looks more like a worm.



The sea cucumber is a relative of the starfish even though he looks like a worm.

There are other sea cucumbers in Holiday Bay, but most of them live in the mud or sand. They swallow a lot of it every day, to get the bits of food it contains. That means a great deal of work for a little meal—but they are sure of getting something to eat.

The strangest animal in the tide pool is the little white tunicate, or sea squirt. When a baby, he swims freely about in the bay. He has a head, eyes, and a long tail. Down his back runs a piece of gristle like that which in higher animals comes before the backbone is developed. It means that the baby sea squirt is related to fish and frogs.

But this gristle never becomes a backbone. After swimming about for a while, the sea squirt settles down

Sea squirts look like little vases with two spouts.

on a stone. He fastens himself by his head, and loses his eyes and tail. Soon he looks like a little vase with two spouts.

Into one spout he sucks water containing food. From the other he sends the water out after he has taken all he can eat. The animal that once seemed to have the promise of a backbone now lives and eats like a sponge!

One sea squirt in the pool near Holiday Shore even buds much as a plant does and forms colonies somewhat like those of the "bread-crumb" sponge.

But why call him sea squirt? Pick up a pebble to which one of these little animals is attached. Squeeze him suddenly. Watch him squirt water two or three feet across the pool. Could you give him a better name than the one he has?

If you go to a tide pool on the Pacific coast, what will you expect to see?

You will find barnacles, seaweeds, and snails. The barnacles will not be quite like those on Holiday Shore. The seaweeds will be bigger. Some of them even may be kelp that waves have washed in from the bay.

You will see many moss animals and creatures that resemble them, though they are really relatives of the corals. You will find purple clams on the shore above the pool, and yellow or red sponges in it. You may think that many of the animals are much like those in the pool on Holiday Shore.

Yet you will find many things that are different. Most of the sea anemones are green; more of the sponges

are red. The crabs are purple with green spots. Their shells are longer than those of the crabs in the pool near Holiday Cliff.

Western sea cucumbers are very large, but their tentacles are short. The commonest one often lives in pools. He is long and red, with purple and orange lumps on his skin. If you pick him up, he becomes so slimy and limp that he may slip out of your hands.

Many of the starfish are purple, too. Instead of living in the pools, they like to crawl between cobbles, where they are covered by clumps of damp seaweed. Sometimes you may find five or six, all crowded into one corner.

You will find purple clams on the rocks above the pool.

The most common sea squirt in Western pools is bright red, with a tough, wrinkled skin. Often it is so dirty that you may think its color is brown. A big one will squirt five or six feet if you squeeze him quickly and firmly.

We may spend a long time watching the animals and plants of either a Western or an Eastern tide pool. Even then we shall miss many of them unless we hunt with a microscope. Every sea plant and animal we have met in this chapter begins its life as a very tiny creature that spends its days floating or swimming. Some plants, called diatoms, never do grow big enough to be seen without a microscope.

These young and tiny animals and plants are eaten by their big neighbors. When sea squirts suck and barnacles wave their legs, they are carrying animals too small to be seen into their hungry mouths. Moss animals feed in the same way, and so do worms and clams.

What do the tiny animals eat? Some eat their still tinier neighbors. But those neighbors must also have food. Where do they get their meals?

The affair really starts with plants—both the little ones that float all their lives, and larger ones like scums and seaweeds.

Plants cannot think, neither can they feel as animals do. But they do one thing that no animal can do—they make their own food.

A seaweed or a diatom eats water (which is made of

oxygen and hydrogen) and a gas called carbon dioxide that is contained in the water. You know this gas, which gives soda water its "bitey" taste.

Next, the plant uses sunlight. With the sunlight that comes into a tide pool, green cells in a seaweed turn the water and gas into one of the many kinds of sugar. Then they change that sugar into still other foods, such as starch.

In this work, part of the carbon dioxide is not used. So the seaweed or diatom throws it away in the water. That part is the gas called oxygen. Snails, crabs, sea anemones and other sea animals breathe this gas. Some people believe that no animals could live in the sea until plants had time to throw away a lot of oxygen for them to breathe.

Here, then, Holiday Shore's food chain begins. Plants are nourished by the food they make from gas and water during the day while the sun shines. Sunlight, like dissolved gas, is more plentiful in shallow water near shore than in the deep waters of the ocean. Also, the shore offers protection for animals like barnacles, snails, and crabs.

Now you see why Holiday Shore is such a good place to find plants and certain animals of the sea. It gives them more food, more light, and more shelter than they would find on the bottom of the deep ocean, or even in Holiday Bay. It is because they find the sort of home they need there that animals and plants of so many kinds live on the rocks, in the pools, and even in the sand that make up Holiday Shore.