

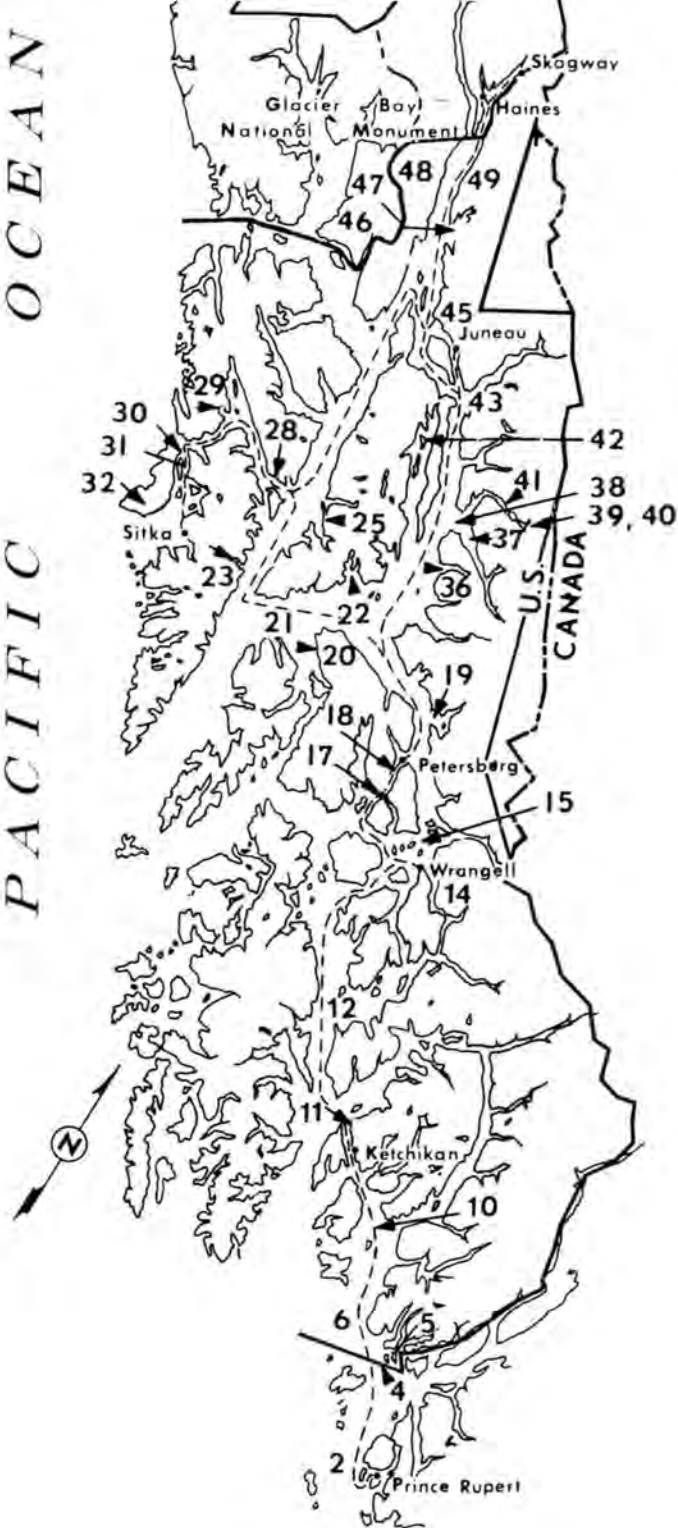
INTERPRETING THE TONGASS NATIONAL FOREST



via the

ALASKA MARINE HIGHWAY

**U. S. Department of Agriculture
Alaska Region Forest Service**



INTERPRETING THE TONGASS NATIONAL FOREST

By
D. R. (Bob) Hakala
Visitor Information Service

Illustrations by Ann Pritchard
Surveys and Maps
U.S.D.A. Forest Service
Juneau, Alaska

TO OUR VISITORS

The messages in this booklet have been heard by thousands of travelers to Southeast Alaska. They were prepared originally as tape recordings to be broadcast by means of message repeater systems on board the Alaska State ferries and commercial cruise vessels plying the Alaska waters of the Inside Passage. Public interest caused us to publish them in this form so they would be available to anyone on ships traveling through the Tongass country.

The U.S.D.A. Forest Service, in cooperation with the State of Alaska, has developed the interpretive program for the Alaska Marine Highway (Inside Passage) because, as one of the messages says, "... most of the landward view is National Forest. The Forest Service and the State of Alaska share the objective of providing factual, meaningful information which adds understanding and pride in Alaska and the National Forests within its boundaries."

We hope these pages will enrich your recall of Alaska scenes and adventures.

Charles Yates
Regional Forester

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I. THE PASSAGE AHEAD

Every place you travel is rich with history, nature lore, culture — the grand story of man and earth. The story is everywhere but may be quite meaningless unless someone who knows the land interprets it for you.

Because you're traveling in Alaska, this place commands your interest. Even if you know nothing about the country, we daresay you could not help being impressed one way or another.

At the hotel on one rainy day last summer, an Alaskan was dining out with his wife. At the next table, another couple — cheechakos, or newcomers — were seated and reacting: complaining about the weather and the prices, chuckling at the plainness of the town, amused at the people. They looked at the Alaskan couple and asked, "Do you actually live here? What do you do?" By tone of voice it was clear, that no place could be drearier.

So, as people will, they got to talking, first about the "outside." But, as always happens in Alaska, the conversation kept coming back to Alaska — bears, glaciers, wildflowers, forestry, gold mining, oil, salmon, Russians, Eskimos. Eventually the visitors began to feel they were glad they had come.

It happened that this Alaskan met the same couple on a plane the following week, heading north. With his help, the St. Elias Mountains, Malaspina Glacier, the Alaska Good Friday Earthquake, Turnagain Arm, and a dozen other major land marks and events of Alaska's story were explored. Still later that week, the same couple — now virtually sourdoughs of enthusiasm — were enroute to Alyeska, Portage, Mt. McKinley. For all we know they may still be in Alaska.

Now we'd like to help you, too, toward a rewarding Alaska visit. These stories may be the beginning.

THE NUMBERS shown on the cover map refer to message numbers. The message, in each case, relates only to a feature in that location. Other messages are about more general subjects — like climate or the forest; or to unexpected subjects—like eagles or log rafts. These may be observed in many places along the Marine Highway.

2. WELCOME

Dixon Entrance, heading North

Welcome, everyone, to Southeast Alaska and the Tongass National Forest. In your view right now, and for hundreds of miles over the length of Alaska's Panhandle, are forest, snowfields and glacier, and waterway. Since the U.S.D.A. Forest Service has the responsibility for managing the resources over most of this vast land area, the State of Alaska has invited us to interpret the environment for your interest.

From time to time, therefore, the voice of a Forest Naturalist is heard over the ship's public address system. He'll be explaining something of the trees, wildlife, mountains, rivers, and other natural features that come into view.

You'll be interested in man's story here too — the heritage of the original Indian culture, the history of settlements; and how people make their living here today. You'll see that the backtrail of Alaska's history has been blazed by stalwart men and women, and that its resource managers and its citizens today are determined that the many values in this largest State containing the Nation's two largest National Forests will never be lost through abuse or waste. There are big stories to tell about this great land, and we hope you'll enjoy them as we move into Alaska's second century under the American flag.



3. ALASKA DISCOVERY

Some of you travelers likely have come a long way to get to Alaska, taking at least a few days of your vacation to get here. In contrast with your trip, consider how long it took the first explorers to reach Alaska once they realized there was land in this vicinity.

History records that early in the 1700's Peter the Great of Russia ordered that "inquiry be made in relation to the northern coast of Asia to see whether they were not contiguous with America, since their end was not known, and this done they should see whether they could not somewhere find a harbor belonging to Europeans."



In 1725, a Dane named Vitus Bering, an Admiral in the Russian Navy, left St. Petersburg to carry out this order. To reach the Pacific Coast he had to cross the continent of Asia — which took him three years. At Kamchatka on the Pacific Coast, he built the ships *GABRIEL* and *FORTUNA*. In 1728 he sailed eastward, entered the sea now named for him, and passed and named St. Lawrence Island. But he did not on that trip discover the Alaska mainland.

In 1741 Bering made another trip with two vessels, the *ST. PETER* and *ST. PAUL*. Compare their 80 foot lengths to that of your ship. This time he succeeded in reaching the shores of southeast Alaska. Bering made land fall July 16 in sight of the St. Elias range — up in the vicinity of Cordova. But his lieutenant, Chirikof, who commanded the other ship, had the day before anchored and sent men ashore near Sitka. This was sixteen years from the time Bering received his orders to find America, and despite crude ships, bad weather, and sickness, he had succeeded.

Bering found no European ports here, but he charted these waters, and on the basis of his log book and these charts, his discovery of Alaska was verified by Captain James Cook of the British Admiralty in 1778.

Vitus Bering never returned to Russia. During a violent storm, his ship broke up on a treeless island, now known as Bering Island, where the brave sea captain died in December.

4. INTERNATIONAL BOUNDARY

Dixon Entrance

At this approximate position we are crossing the International Boundary—the unseen line that separates Canada from the United States of America.

The near exact location of the boundary may be determined by sighting a line between the southern tip of Prince of Wales Island, about 45 miles to the west, and the southern tip of another island also called Wales, about 14 miles to the east. Without a doubt, this is the only instance in history that a line between two Wales became an international boundary. But — check the spelling!



The boundary hooks around back of the islands to the east and nearer to us, then follows the center of a long deep linear waterway — the Pearse and Portland Canals. The channel curves due north and terminates at the towns of Hyder and Stewart, one on each side of the border.

About here, the boundary begins to parallel the coast northwesterly, along the summit of the Coast Range, though never exceeding the distance of 10 marine leagues — or about 30 miles — from the coast.

Near Mt. St. Elias, up where the Alaska Panhandle attaches to the pan — meaning the large part of the State — the boundary strikes true north along the 141st meridian, 645 miles to the Arctic Ocean.

The boundary we have just crossed, though unseen, unguarded, has existed here since 1725. Its position was negotiated by diplomats of the Russian and British Governments, but it represented the agreement between two powerful fur trade companies, the Russian-American Company and the British Hudson's Bay Company. They had met on this coast, the one by sea, the other by land—half way around the world from their mother countries. They sought the same prize — furs: the valuable sea otter, the beaver, land otter, marten, mink, and

other furbearers. By this treaty, the Russians retained possession of the Alaska Panhandle but the British got a strip of land five degrees wide, that became part of the Yukon Territory. They also received the right of trade and travel through Southeast Alaska, and the right to navigate the rivers flowing from Canada through the Russian coastal strip to the sea.

When, in 1867, the United States purchased Alaska from the Russians, the boundary that had been established by the Russians and the British remained unchanged. By this time the most prized of the fur treasures — the sea otter — was almost gone. The gold strikes were yet to be made. And other resources were too far from market to be of economic value.

Distance remains the greatest obstacle to the exploitation of the tremendous stores of resources of Alaska today; distance — which has also been Alaska's safeguard from the destructive pillage of resources as occurred over much of the rest of the United States. So what you'll be seeing ahead is a land close to its history, abundant with its natural wealth, and rich with the excitement of a modern frontier.

5. TONGASS ISLAND

Opposite Nakat Bay

We have crossed the International Boundary and are now passing Tongass Island, a name well remembered in our geography and cultural history. The island is located eight miles northeasterly of our present position, and very close to shore so that it does not stand out. You'd best look at a navigation chart to find it.

On this isolated island, seemingly far from the mainstream of American history, some meaningful events took place about 100 years ago but which are not clearly recorded in our history. These events involve the Tongass clan of Tlingit Indians, the U. S. Army, a famous President, and a totem pole.

The Tlingit Indians who occupied most of Southeast Alaska were a wealthy people, in terms of basic needs, luxuries, and slaves. Some clans were richer and stronger than others, and the way they got that way was by raiding neighboring clans and tribes and taking the young people

especially into slavery. It happens that the Tongass clan in some way had violated the customs of keeping slaves, and, as a result, was preyed upon by other tribes.



In their search for a safe village site, from which they could easily repel enemies, they had recently moved to Tongass Island. About this time the U. S. purchased Alaska from Russia—that was in 1867. The next year a post of the U. S. Army was established on the same island for the purpose of guarding the southern entrance to Alaska, preventing smuggling and illegal trade, and maintaining the peace among Indians and settlers. The post complement consisted of five officers and 103 enlisted men, and was assisted by the Revenue Cutter LINCOLN.

The Tongass Indians were grateful for the protection given them by the American government. Although the record is not clear, about this time a totem pole with some special significance was carved and erected. Because

the figure at the top of the pole resembled Abraham Lincoln, it became known as the Lincoln totem pole. We can't state for sure but Lincoln, the emancipator of slaves even in the north, may have been the model and inspiration for this pole.

Ebbits was the Chief's name that ordered the carving. We know nothing of the actual ceremony of erecting the pole on Tongass Island, or about the potlatch that was given in honor of the event. But we know these things happened as they had for similar occasions for hundreds of years previously.

As American settlement of Alaska progressed, the Tongass Indians moved from their island. In 1938, with the permission of the Indians, the Lincoln totem pole, in an advanced stage of decay, was moved to Ketchikan. There, in a work program of crafts preservation under the direction of the U. S. Forest Service, a replica pole was carved and erected at Saxman Park near Ketchikan. The original pole — what was left of it — may be seen at the Alaska State Museum in Juneau.

Warfare between clans, for plunder or slaves, has long since ceased and the Tlingits of one clan may live in the village of others. Modern Tongass descendants still fish these waters, hunt these forests, and honor the great men of their tribal and American history.

6. INDIANS OF SOUTHEAST ALASKA

Whether you began your passage at Skagway, or at the southern end of the Alaska Panhandle near Cape Fox, you were entering the territory of the Tlingits. Like other coastal tribes living as far south as the Puget Sound country, the Tlingit Indians had reached a high level of culture hundreds of years ago. They were able to do this because of the abundance of natural resources found in this area. Food, shelter, and clothing were procured with little effort, which left time for the development of a complex clan system or society and an extraordinary art expression — the totem pole and related totemic design.

There is a large population of Tlingit Indians in Southeast Alaska, along with the abundant evidence of their past culture. They easily adapted to the way of life of the settlers that moved in, but have not abandoned their arts, customs, and traditions. You may see totems and other village artifacts in or near most of the cities of Southeast

Alaska. Saxman Park and Totem Bight near Ketchikan, and Chief Shakes Island at Wrangell are outstanding; Sitka National Monument preserves exact replicas of many others, and the Chilkats near Haines have an active program of native arts, crafts, and dances. The Alaska State Museum in Juneau has outstanding collections, and there are many others.

In addition to the Tlingits, there are two Indian tribes which moved into Southeastern Alaska during historic times, or shortly before. The Tsimshian, who own and occupy Annette Island near Ketchikan, came here as a colony from Metlakatla, British Columbia in 1887. The other tribe, the Haidas, extended their territory northward from the Queen Charlotte Island area to the southern end of Prince of Wales Island.

What, no Eskimos? Actually, you wouldn't have to go very far to come to Eskimo country. The closest are the southern or Chugach Eskimos who live on the coast in the curve



of Gulf of Alaska — around Prince William Sound, and Cordova. The relationship of these people to more northern Eskimos is based on the similarity of their tools, language, and customs.

Inland from Alaska's coastal region live the Athapascan Indians whose territory reaches well into Canada. The Alaska Highway passes through much of their country.

Southeast Alaska today has over 10,000 people of Indian descent, about 8,400 of which are Tlingit, 800 Haida, and 1,000 Tsimshian. This is about the same number of Indians as lived here when the first European explorers arrived over 200 years ago.

7. CLIMATE

If you are to appreciate Southeast Alaska and to enjoy your visit here, you've got to understand the weather. Maybe right now you think you prefer dry, hot desert, tropical humidity, the extreme high and low temperatures of interior areas, or maybe the man-made environment of an irrigated landscape. The scenery in each of these is a product of climate — temperature, rainfall, humidity, wind, and season.

And so it is here. The snowfield above 3,000 feet, the glaciers of mountain valleys, the rivers that yield our salmon and other fish, and the vast evergreen forest with all its wildlife, are dependent upon this climate.

Down on the coast here the annual rainfall varies from 60 to 250 inches each year in different places. At higher elevations the total in the form of snow may be even greater. The range of temperature year round is small, from the 20's to the mid 50's with rare extremes in the 90's and in the winter occasionally below zero. The average temperatures in southeastern Alaska are comparable to those of the State of Maryland, for example, without, however, the extreme of heat. The mean annual temperature is 10 to 15 degrees higher than that of eastern Canada.

So this is no land of perennial ice and snow, but a region of mild maritime climate where forest and wildlife flourish and mankind finds a rich and productive place in which to live.

8. NAVIGATION AIDS

Northbound passage

We are approaching a black, barrel-shaped object in the channel ahead. Our ferry will miss it, all right, and as we pass, it'll be off our port side — that's to the left side of the ship as you face forward.

This object, one of several kinds of buoys, is a navigation aid which assists the Captain and his crew members to guide this ship. Depending upon position and purpose, there are cans, spars, nuns, lighted, bell, and whistle buoys. There are about 1200 such aids in Alaska waters, placed and maintained by the United States Coast Guard. The buoyage system has a language all its own including, as the situation may require, color, light, sound, and radio signals. It's fun to know a little of that language as you watch the channel ahead and, in your mind, keep us on course.



Our channel is part of the Inland Waters in which the following buoyage standards are used: heading from the open sea into and through the Inside Passage (that's north, in our case) all buoys on the starboard side of our ship—that's the right side, remember?—are red and numbered with consecutive even numbers. All markers on the port side of the ship are black and odd numbered.



Buoyage alone is not enough to assure the safe navigation of our ship, however. Along shore you'll see range markers, radio beacons, light stations, and light houses.

You'll also see buoys marked with vertical black and white striping, in the middle of the channel. Those we can pass on either side. If the buoy is striped horizontally with red and black bands, the color of the top band tells us which is the preferred channel — for example, if the top band is red, we'll leave it on our starboard side.

There was a time when all light houses were manned by a light keeper, often with his family. Most lights today are automatic, turned on and off by the light of day — but a few strategic lights still have light keepers. In Southeastern Alaska waters, you may see eight such light houses.

But if, because of fog, you can't see them, you will hear them, blating out their ominous language of warning. Every fog horn has its own code, and so does every flashing light. These, together with details of all navigation aids, are described and pinpointed on charts and light lists used in navigation up on the ship's bridge.

To folks living and working in these parts, the navigational aids are as important as traffic signs to folks in the big cities. These channels, you see, are part of our highway system, a main link among our cities and villages, logging camps and canneries, fishing grounds and recreational sites.

And in the Coast Guard we've got the most competent, helpful, and respected guardians of our maritime safety.

9. TIDES

Here's a riddle for you.

There's something around us that changes its height every day; in fact, its height is never constant for more than a few minutes at a time. Sometimes this thing is so low that it's called a low low! and sometimes so high it's called a high high! Furthermore, you can get an idea of how high or low it's going to be today not by looking down at it, but up — at the moon.

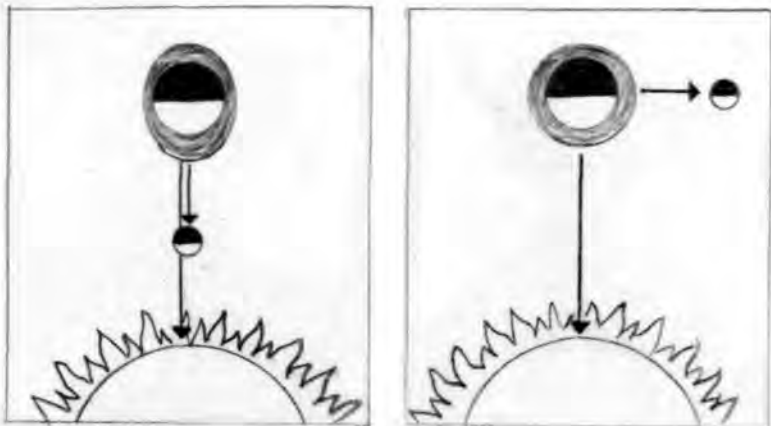
You guessed it. We're thinking about the changing level of the ocean surface, a phenomenon called *tide*.

Twice each day the ocean level rises, and twice each day it falls. More precisely, there is a change every six hours and 50 minutes. As regular as the moon circles the earth, two high tides follow it, one on either side of the earth.

What causes this strange phenomenon?

Imagine that you have a plastic ball to which a string is attached. Holding onto the string you swing the ball in a circle. What shape does the ball assume? . . . remember it's rather plastic. Pulling outward from the end of your string the ball becomes sort of egg-shaped, with a bulge on either end.

That's what happens to the surface of the planets and moons in orbit. Centrifugal force caused by rotation pulls



them apart and the force of gravity holds them together. The resultant bulges are called the tide.

Because the moon is much closer to the earth, its pull is much greater than that of the sun. When they're both pulling on the earth from the same or opposite directions, the tidal effect is the greatest. Let me illustrate:

While the sun and moon are in line with the earth, either on opposite sides or on the same side, their combined pull produces the highest tides. The moon, during highest tides, would be either in new moon or full moon phase, at which time we in Southeast Alaska may expect a rise and fall of sea level of up to 25 feet.

All phases of the moon in between, as half, quarter, etc., will coincide with lesser tides.

Mariners and folks ashore hereabouts regulate much of their activity by the tides. Many times each day the radio stations announce the tide tables. Your ship's schedule most certainly is determined by the state of the tide, since it is only during slack water — that's when the water stands still between changes — that we can safely pass through the narrower channels which during tidal flood or ebb become turbulent and fast flowing.

While the schedule of our activities is regulated to a degree by the tides, there is a myriad of life whose very existence depends upon this ceaseless natural clock. Molluscs, crustaceans, fishes; insects, worms, algae; birds and mammals — all life along the tidal zone goes by this tidal timepiece — adapted to every intricacy of high and low,

ebb and flow. At this juncture of two habitats, we find the richest realm of life on earth. Here the table is spread four times each day — twice for creatures of the sea, and twice for creatures of the land — or more precisely, every six hours and fifty minutes, as surely as the moon orbits our mother earth.

10. SOUTHEAST ALASKA ISLANDS

At this point in the cruise, we are surrounded by islands, just a few of the hundreds that shelter Alaska's Inside Passage. Their story is related to the story of glaciers, like those glaciers up in the Coast Range mountains to the east.

Very recently, geologically speaking, glacial ice several thousand feet deep covered this coastal region. By its weight alone, the ice compressed and lowered the land surface about five hundred feet.

Glacial erosion also lowered the land surface, but it was not the ice that carved the bedrock over which the glacier slowly moved — because ice crystals are much softer than rock. What happened is that the slowly moving ice picked up rock debris which became embedded in the bottom of the glacier. This rock was the primary tool of erosion. In a sense, a glacier works like a piece of sand paper, grinding, gouging, and polishing the bedrock as it moves along.



Frost action, avalanche, and streams of glacial meltwater all add to the erosion.

When the highest mountain summits are in view you can see for yourself how deep the glacier was in this area. Only those rugged and jagged peaks which today rise higher than the round-surfaced terrain stood above the glacier surface. Such mountain peaks, rising above a glacier or snowfield, are called nunataks. Many of the peaks you see in the Coast Range to the east are nunataks because their bases are still buried in glacial ice.

But how did all these islands result? As the climate warmed, the glacier melted back faster than it moved forward. The coast again became exposed. But where previous to glaciation there had been ranges of mountains separated by river valleys, now there appeared islands — chains of islands — separated by deep glacier carved channels called fjords.

The ship on which you are riding is now passing through one of these fjords.

11. TOTEM BIGHT

Opposite Totem Bight near Ketchikan

A bend in the coastline is sometimes called a bight. The bay or bend in the coast just to the east of us is called Totem Bight, and on some maps — Mud Bight.

Look sharp — or use your binoculars — to see there a Tlingit community house and in front of it a number of totem poles.

What's distinctive about a Tlingit house? Consider, first, the architecture. The early explorers to this area must have been amazed to discover houses with the double pitched roof much like houses in Europe and elsewhere. And, unlike the log structures made by some tribes, and by the pioneers themselves, these were made of planks — planks which the natives split and hewed from huge cedar and spruce trees using only crude stone and bone implements, later improved with iron blades received in trade.

Aurel Krause, a geographer from the Geographical Society of Bremen, Germany, who lived among and studied the Tlingits for a period around 1880, wrote as follows: "A Tlingit village is an impressive site as one sees it from the



water. The regular row of solid wooden structures on the shore presents in this wilderness a friendly picture of a civilization that would bring thoughts of home, if the sight of an occasional totem pole or grave post and Indian figures wrapped in blankets or skins did not transpose one into a strange world."

The impression of the 'strange world' would be intensified were the long-ago traveler to step inside the house. There he would discover, after his eyes became adjusted to the dim light, the abode of about 30 Indians, all of one clan.

Along the side walls and far end, partitioned off by animal skins and woven mats hanging from the beams, are the sleeping quarters and storage areas of the various families. The central area is taken up with the firepit used by everyone in the house. Hunting and fishing gear, guns, paddles, salmon spears, and the like lie on the beams overhead. In practically every house a space is reserved for a sweat bath, large enough to accommodate one person.

The steam is made by pouring water on hot stones — a method similar to that of many other people over the world, from Navajos to Finns.

The Tlingit house we've just passed is one of the three replicas built in the Tlingit tradition in southeast Alaska today, the others being at Haines and Wrangell. These houses were built quite recently, in fact during the days of the Civilian Conservation Corps of the 1930's. Native craftsmen in a work program of the U. S. Forest Service were employed in the timely and appropriate project of salvaging totem poles slowly rotting away in abandoned villages. They also constructed these houses so that this amazing example of native architecture and art would not be lost to the world.

12. ALASKA DIMENSIONS

Northbound, in Clarence Strait

Well, you've finally arrived in Alaska. Back home in Alaska for a few of you, or on a return visit for a few others. Dreams, memories, and plans — all mingle in the kindred spirit of the passengers aboard this ship. As we head north the dimensions of ideas, of resources and of land grow larger. Let's take a brief look at some of them.

You're now seeing waterways, forests, and mountains at the southern panhandle extremity of Alaska — at about



the same latitude as the British Isles and southern Norway and Sweden. You're now 600 miles north of Seattle, and 400 miles west of the same city. If you happen to be heading out to the end of the Aleutian Chain, you would, on arrival, find yourself further west than any State in the Union, including Hawaii. Up near the Bering Straits, Alaska is but three miles from the Soviet Union — three miles, which are the equivalent of one whole day, for in between passes the International Date Line.

This is a state of big dimensions. If the people living in Alaska today were evenly spread out over the landscape, each would have about 2½ square miles around him. That makes enough square miles to equal about one-fifth of all the other states put together. Alaska's coastline is longer than the entire coast of the other 49 states.

Alaska has two National Forests within its boundaries — the Chugach along the coast south and east of Anchorage and the Tongass which comprises most of Alaska's Panhandle. Each of these Forests is larger than any of the others in the National Forest system. In fact, our Ranger Districts are larger than most National Forests.

Within these forests — as you will be seeing during this trip — is a tremendous store of resources, of which trees for lumber and pulp is only one. Modern forestry manages the whole environment for all the uses that can be provided, as water, wildlife habitat, range, and recreation. The scenery by itself is a mighty valuable resource of National Forests in Alaska.

One more item by way of acquainting you with our State. In 1967 we celebrated the first 100 years that Alaska has belonged to the United States. Do you know what the U. S. paid Russia for it? The price was 2 cents per acre! At that price, the part which is now National Forest land cost only \$400,000, a value which is returned many times over every year.

Hope you'll enjoy viewing one of the biggest bargains in history during your visit with us.

13. TREES OF SOUTHEAST ALASKA

Since you cannot get a really close look at these trees before you go ashore, we'd like to introduce you to them with a little fact and lore of Southeast Alaska forests.

About 3/4 of the trees you see from shoreline to timber-



line, which is around 2500 feet above sea level, are western hemlock. So, you might say that if you recognize the western hemlock you already know 3/4 of the trees in Southeast Alaska. That's one way of thinking. Another 1/5 of the trees are Sitka spruce. Then there are western red cedar, Alaska cedar, red alder, black cottonwood, lodge pole pine, alpine fir, and a few others. The variety is not great because the climate and other growing conditions are quite uniform throughout our forested region. We don't mean to oversimplify, but a forest of similar size — 10,000,000 acres — in the states south of here would likely contain twice as many species of trees—or more—because of the variety of growing conditions found there.

If you could grab a few twigs as the ship enters some of the narrower channels you'd rather quickly learn what species grow along shore. A handful of Sitka spruce feels like a handful of small porcupine quills because the needles are so stiff and sharp. The needles of western hemlock, on the other hand, are soft and flat, and are two-ranked along the twig rather than extending out at all angles.

The Sitka spruce is the State tree of Alaska. It is our largest tree, growing up to 225 feet in height and 14 feet in diameter, and can reach an age of 800 years. This most imposing of the spruces, and the western hemlock — which is the most graceful tree of our forest — together with their associates, comprise Alaska's rain forest. Let's face it, a forest as rich and thick as this could not grow except for abundant rain and a mild climate. Despite that wet fact, we hope you may enjoy their view in bright sunlight, against a backdrop of snowcapped mountains, with a deep glacial fjord at their feet.

14. STIKINE RIVER, WRANGELL, AND EARLY FUR TRADE

Approaching Wrangell, or leaving, when Stikine River is in view.

The city now in sight from the ferry is called Wrangell. One hundred and thirty years ago it had a different name —Fort Dionysi. Let's go back that 130 years and imagine that our vessel is the DRYAD, a ship belonging to the British Hudson's Bay Company.

As we approach Fort Dionysi, a volley of shot is fired from shore across our bow. Our captain discreetly commands that the vessel be turned about and carried out of cannon range, and then we anchor. A boat is seen pulling from shore. When it gets alongside, a Russian officer, Lt. Dionysi Zarembo, boards our ship and after explaining that these are Russian waters, orders us to leave. This, despite a treaty made in 1825 which gave us, British subjects, the right to navigate streams which begin in Canada but cross Russian territory to the sea.

You see, we officers of the British Hudson's Bay Company have planned to establish a trading post here near the mouth of the Stikine River which is one of the few rivers that crosses the Coast Range from Canada to the coast. Our trappers have already reached the headwaters of the Stikine, and it would be convenient for us to use this river in our fur trade commerce. It would be good to have a trading post here. But it is evident that the Russians do not intend to allow us access to this coast, where they are already engaged in a rich fur trade, exploiting mainly the sea otter. So, we have no choice but to return to Astoria, Oregon and consider what our next move will be.

This incident actually happened here. The British Hudson's Bay Company ship DRYAD headed south, but within seven years, a treaty was made between the Russian and the British governments which gave the British Hudson's Bay Company a lease to the southeast Alaska mainland coast — but not the islands — in exchange for 2,000 land otter skins per year and certain trade guarantees.

Fort Dionysi then became Fort Stikine — that was in 1840 — which, as a trading post of the Hudson's Bay Company, lasted until this became United States territory in 1867.



The city that grew up here was named for the man who had been the director of the Russian American Company at the time of the episode just related, Baron von Wrangell.

15. GLACIAL MILK

Near rivers, such as Stikine, flows conspicuous glacial meltwater.

Have any of you folks noticed the different color of the water flowing into our channel from the rivers to the east? Where the light colored river water meets the salt water of the channel there is a sharp line, as though the two resist mixing.

No one need tell you that rivers carry a lot of silt. What's interesting here is the nature of this silt—at least much of it. The river water is lighter in color because it is mixed with milk, glacial milk. This is the very fine material, the microscopic particles of rock, which the glacier grinds from the bedrock as it moves. The particles are so fine that like the particles in regular milk they stay suspended in the water for a long time. When they finally settle to the bottom, flocculated by the action of the salt water, they add fertility to the broad shallow delta. Here sedges and other plants grow and produce a rich harvest of seeds and other food — a welcome feast for hungry waterfowl. To your eye, were you to look down from an airplane, or a mountain slope, the rich plant margins would be an abstract pattern among the ponds and streams of opalescent blue — the turquoise that glacial silt imparts to its meltwater.

16. FORESTRY IN SOUTHEAST ALASKA

One resource that obviously is not in short supply in Southeast Alaska is trees. There are 10,000,000 acres of forest here, half on the mainland, and half on the islands. There are trees for scenery, trees to protect watersheds and streams, trees for wildlife habitat, and trees for timber. The same tree during its life span could serve all of these uses, and some do.

Occasionally during this cruise you will see evidence of the timber industry in operation: pulp mills, log rafts, ships being loaded with lumber, the logged forest itself in a few places, and even floating loggers' towns being moved from one base of operations to another.

In sight from the ship are some areas from which the forest has been harvested. You may wonder why the logging is done in clearcut blocks like this. The answer is implicit in the nature of this forest.

First of all, the trees in this coastal rain forest have shallow root systems. The soil mantle in which they grow is thin and soft because of constant moisture. If we were to cut half the trees in a stand, the rest would soon be blown over by the wind.

Second, Sitka spruce, our most valuable tree, requires full light for healthy growth. In a clearcut area all young trees standing with their tops in sunlight get an equal chance to grow. Crowding upward in competition for sunlight they grow tall and straight. The Western hemlock also makes its best growth in clearcut areas.

A third factor to consider is that from the standpoint of forest economics the old growth forest - the virgin forest - is like an investment that is not earning anything. Year after year, there is little if any increase in volume of wood added to the stand. The presence of "buckskin poles" — dead trees without bark — shows that fungus disease and destructive insects are at work. There is so much cull or defect in the old growth forest that only about half of the wood can be economically harvested and utilized.

After the forest has been harvested, the rangers don't have to worry about planting new trees. Nature promptly takes care of that. Abundant seed from nearby stands is blown in by the wind — or carried in by birds or squirrels.

Seedlings are up within a few years. In a hundred years they will be ready for harvest. This second growth forest of high quality trees will yield about 1½ times as much useable wood fiber as did the original stand.

In the meantime, the vigorous young forest has provided food and cover for many more wildlife, and protected the watershed from runoff and erosion, and the streams from siltation.

Such is the silvicultural basis for the system of timber harvest in southeast Alaska. Still, a recent harvest area in the midst of a nearly unbroken landscape of old growth forest can be shocking. The impact increases in direct proportion to the size of the clearcut, and some of the harvesting in past years was oversized and does not meet the public's emphasis on aesthetics today. Foresters are now applying landscape techniques to more effectively blend clearcuts into the natural scene. Smaller size and better design of timber sale layouts will improve aesthetics.



CLEARCUTS ON THE slopes in the distance are "rigid" patterns of right angles. New timber sale layouts will resemble the irregular size and shape of natural openings like the muskeg in the foreground on Mitkof Island.

17. PAPKE'S LANDING LOGGING OPERATIONS

Opposite Papke's Landing in Wrangell Narrows

May I call your attention to the shoreline. We are now approaching about as close to a logging operation as we can get along the Inside Passage. To the east of us, at a place called Papke's Landing, you may see some of the work involved in a logging show in action.

The forest from which the logs are being harvested is located on the slopes back from the water. After cutting, the logs are hauled to this landing by logging trucks which drive out to the end of the pier where you see the tall A-frame. That's the structure resembling the letter A made up of upright poles and cross bracing. At the base of that A-frame is a diesel engine called a donkey which is operated by a man called a puncher. The puncher, with his diesel donkey, hoists the bundle of logs off the truck by means of a cable system rigged to the top of that A-frame. The bundle of logs is then swung out and dropped into the water, after which the pond men take over and move the bundle into position in the log raft that is being assembled.

The rafts assembled here are slightly different from the one you may recall on that pond or creek back home — in several ways. One of these rafts is made up of about 60 bundles — that's truck loads — of logs. Each log is about 44 feet long with an average butt diameter of three feet. Holding the bundles together are eight or more 72-foot long boom logs chained together in the shape of a rectangle tightly enclosing the log bundles. The tug that pulls the raft to the mill at Sitka, Wrangell, or Ketchikan will have in tow the equivalent of 20 three-bedroom houses!

That gives you an idea of the volume of wood, but actually 85% of these logs will be used for the production of plastics, rayon, and other products of wood chemistry.

Foresters like to call a large timber sale, such as this represents, a logging show. And indeed it is quite a show: a show of man's skill in harvesting the largest kind of crop on earth, a show of nature's productivity, and a show of professional forest management. I was going to say "timber management" except that it's not only timber that we're concerned with here. The resources of wildlife, recreation, minerals, watersheds and fisheries are included in the management plan for the entire National Forest.



This show is called the Falls Creek No. One Timber Sale. What does this mean? On the slopes back from the landing, you may see part of the more than two square miles of forest involved in this timber operation. The stumpage, that means the standing trees, was sold by the Forest Service by competitive bid. One-fourth of the revenue from the sale is returned to the State of Alaska for roads and schools. Ten percent more is returned for National Forest roads and trails. In addition the timber operator will build two and one-half miles of public road which, after the logging is completed, will provide access for hunting, fishing, and other uses. It will take about three years to harvest this timber, providing employment for about 35 men.

"Where is the logging camp?" you may ask. Well, this operation is so close to town that there is no need for one. The loggers are mostly family men from Petersburg who, like most of us workers, commute to the job.

The A-frame method of logging is being replaced by other methods. Balloon logging, which transports logs suspended from cables above the ground, is new to Alaska and is now in use on a timber sale near Kake.



18. WRANGELL NARROWS

The channel through which we are now passing is Wrangell Narrows. Narrow describes it well; narrow like a river, which for 21 miles between Petersburg at the north end and Point Alexander at the south averages $\frac{1}{2}$ mile in width at high tide. In the narrowest place, the channel is 100 yards wide. Like a river, the Wrangell Narrows has a current flowing through it most of the time, a current which is caused by the ebb and flow of the tide. Unlike

the current of ordinary rivers, the tidal current changes its direction four times per day — raising and lowering the depth of water up to 25 feet. The speed of the current ranges up to 7 knots or 8 miles per hour. From one end of the channel to the other, the helmsman will change the course of your vessel at least 46 times. To help in navigating the ship, the passage is marked by about 75 navigational aids. More than 60 of these have fixed, flashing, and occulting lights which give our channel the appearance at night of a well lighted Christmas tree.

While you are busy appreciating the skill of the Captain and crew bringing this ship through the Wrangell Narrows, keep your eyes open. Watch for wildlife along the shore, waterfowl in the channels, and eagles overhead. Look for the various kinds of navigation aids; each of them has its own number and purpose. Beds of kelp, the brown long-leaved plant streaming in the current, are one of nature's markers of rocky reefs. About half way through the channel, you will see a logging operation and perhaps we'll meet a log raft being towed by a tug. In the vicinity of Green Point, you may observe the meeting or the parting of the north and south tidal streams. By watching the current flowing past buoys or reefs you can detect where the tidal streams change direction. The fastest water we will navigate is likely to be at Twin Point — around the bend from Petersburg — or at Spike Rock Light, located near the southern end of the channel.

The entire channel is fascinating. Be alert for something new around every bend of the Wrangell Narrows.

19. THE DEVIL MEN OF THOMAS BAY

Frederick Sound

The waterway through which your ship is now passing is Frederick Sound. Just to the east of us is Thomas Bay, cut deep into the mainland by Baird and Patterson Glaciers. The high pinnacle on the horizon is Devil's Thumb, 9,077 feet high, over the summit of which passes the Canadian border. Perhaps you can see Kate's Needle just to the south of it and a little more distant from us. That mountain peak too sits on the International Boundary.

You'd likely see some fine scenery in Thomas Bay, but back around 1900 there were a number of prospectors who wouldn't return to the place even for a rich gold strike. Maybe their fear was related somehow to a landslide that

had happened there about 250 years previously, which wiped out an Indian village of 500 people. Anyway, the Indians called the place the Bay of Death.

The story made the rounds for a number of years in the Wrangell area about these prospectors. An Indian had told them about an outcrop of free gold quartz in the Thomas Bay area and showed them a sample to prove it. Eyes shining with the lust for gold, they wasted no time getting in there. The first prospector went in, and following the Indian's directions found the main landmark, a half moon lake up Patterson Creek, and sure enough near by he discovered a quartz ledge all speckled with gold. And right there he got the fright of his life. Swarming up the ridge were the most hideous creatures, neither men nor monkeys, whose skins were covered with long hair except where large scabs and sores showed. With their cries, stench, hot breath, and raking claws right behind him, the prospector got out of the country and when he returned to his senses he found himself drifting in his canoe.

That was just one incident. One by one, and in pairs, several others braved the Devil country. One ended up barking and digging like a dog; another crouched by an imaginary fire; another swore that the river ran uphill; a couple of prospectors disappeared completely.

So far as is known, that gold is still up there, and so are the devil men. If you're game enough to take the trip up there sometime, maybe someone from Wrangell would like to go along. They say the scenery down below the Devil's Thumb is out of this world.

20. KAKE INDIANS

Off Keku Islets

To the south of our vessel is a wide bay. On the east shore is the village of Kake. Kake was and remains today a principal village of the Tlingit Indians. About 490 live there today.

As you may have learned in your reading about Alaska, long before modern settlement, the Tlingit Indians had a rich culture and tradition, which they express in their arts, dances, and mythology. They also had an economy based upon ownership of property, including slaves, which were generally procured by capturing them from other tribes or by purchase. This story is about one of these slaves, a white lad of 14 years, who chose slavery among

the Kake Indians over the kind of bondage under which he had lived as a sailor aboard an American windjammer.

Kawoo was the boy's Indian name, so we'll call him that. In 1905, while dreaming and planning to go to sea aboard a fine ship out in San Francisco Bay, Kawoo was shanghaied and forced aboard a rough sailing vessel, along with a dozen other unfortunates. His pay was to be \$10 for the trip, and the destination was Alaska — Saginaw Bay, Alaska. This bay is located to the south of us, just inside Cornwallis Point. The ship was to be loaded here with salmon — fresh salmon heavily salted to be sold in the Orient.

Life aboard the sailing ship turned out worse than that of a prison. After two attempts to escape, each time to be caught and thrown in chains for a month, Kawoo succeeded in getting ashore in the ship's boat. He lived in hiding in the woods probably in sight of this vessel for about ten days, eating leftovers from an Indian camp, berries, roots and even capturing a deer in a pit, in the manner of the Indians. An old Indian and his squaw finally found him and took him to Quatahein, a summer village at the place now known as Pt. Ellis. Here for twenty red blankets Kawoo was sold to a minor chieftain of the Kake tribe, later to be adopted by him. The Chief's name was Ketchtooyak and the adopted white boy became known as Kawoo Ketchtooyak.

The Kake Indians had been given a reputation as being ferocious savages by the ship's officers, apparently to discourage escape by the crew. But Kawoo found them to be very peaceable and intelligent, and for over two years he lived a good life among them. At that time, the Indians still lived according to the ways of their forebears, the invading civilization not yet having displaced their tribal ways.

Through Kawoo, we have learned much about their food. A principal food, as we'd expect, was the salmon, split down the middle and smoke-dried to a thickness of less than half an inch. Before eating, it was toasted over the fire and dipped in seal oil. Seaweed was a staple food. The squaws would gather it in canoes and dry it in big piles on the beach. Boiled with herring or salmon eggs it made a very nutritious food. Berries were beaten off the bushes into a blanket. After removing leaves and twigs they would be packed in seal oil or bear grease for preservation. Salmon heads — the soft parts — were also eaten. They were prepared according to the following recipe:

Dig ditch above low tide. Line with skunk cabbage leaves, placing row of salmon heads on leaves and covering with more skunk cabbage leaves. Cover with rocks to hold in place, and let the tides for about one week wash over them. Kawoo never learned to eat this dish, but then there was always a choice of other meats, such as venison roasted to a golden brown by his Indian mother, Eclaw.

Kawoo eventually returned to his own people back in the lower states. Just a few years ago he, with his family, returned to Kake, to do honor to the people that had adopted him. He had been a lucky boy for having had so rich an adventure. Moreover, of the crew that was with him who were shanghaied in San Francisco, Kawoo was one of two known survivors who lived to relate his experiences.

21. ANCIENT FORESTS

Opposite Keku Straits

Most of the forest area we see on all sides is virgin forest. That means it's never been logged and therefore appears about the same as it has for hundreds of years. Some of the trees in our view — Sitka spruce, western hemlock and western red cedar — are more than 500 years old. Several generations of these species have lived here since the great glacier receded a few thousand years ago.

In the wide bay-like opening to the south of us at this position there is evidence of another forest, of a kind not growing anywhere in Alaska or Canada today. Although this forest disappeared here something like 50,000,000 years ago, the trees would be familiar to many of you.

The forest in that Eocene time was a strange mixture of two modern-type forests — the redwood forest of California and the hardwood forest of the eastern states. Many of you would recognize the Sequoiadendron, the ancestral redwood, for instance, which was widespread in the sub-polar regions of Alaska, Greenland, and Siberia. It did not grow in all of these places at the same time, however.

Familiar too, especially to you easterners, would be the bald cypress, magnolia, chestnut, grape, walnut, and oak. The modern habitat of these species — in the vicinity of the Nation's capital, for example — gives us an idea of the climate that prevailed hereabouts during that ancient age.

The mixed redwood-hardwood forest still occurs in this part of Southeast Alaska, the Tongass National Forest, but in a different form — as fossils, which the pounding sea is washing out of the silt, volcanic ash, and gravel in which they become buried and changed to petrified wood.

22. BROWN BEAR AND ADMIRALTY ISLAND

Vicinity of Admiralty Island

Admiralty Island lies ahead of our vessel. Admiralty Island, which will be in our view for a few hours, is well known for its population of bears — brown bears — more commonly called “brownies” hereabouts. Two areas on this very large island have been set aside as bear reserves, where hunting is not permitted in order to assure the perpetuation of this species.

The Alaska Brown Bear is an animal that, when you've come to know it, gives you some of the feeling of the size, and power, and character of this vast and rugged land. The brownie is the largest land carnivore in these parts, in fact, in the world, with the possible exception of the polar bear. He feeds his up to 1600 pounds on wild berries and vegetation mainly, along with small rodents, and any other animal he can catch. During the salmon run which lasts most of the summer he gorges on mostly spawned-



PYBUS BAY, ADMIRALTY ISLAND,
PRIME BROWN BEAR COUNTRY

out, near-dead salmon, and grows fat for the winter's sleep.

Along salmon streams is where you would most likely encounter the brownie. Time-worn trails converge from all directions on favored pools and riffles. The feast lasts all summer, but not at the expense of the next year's salmon hatch. Most of the fish captured by the bears have already completed their last vital act — spawning— and are slow and sluggish and easily caught. Perhaps we should say that the salmon's last important role comes after spawning, that of becoming a meal for a brownie or other scavenging animal. Here is a dramatic example of the system, the harmony, that is inherent in nature.

The brown bear's range covers coastal Southeast Alaska and the large islands north of Frederick Sound. In this range are also found moose, black-tailed deer, mountain goat, wolverine, and wolf. Here is a wildlife community to match anything in the world.

The brownie fears no animal — including man. Usually, he beats a hasty retreat when he gets man's scent. But not every bear, every time. Some may feel ornery at times, just as you and I. Or you may be walking toward the bear's hidden food cache; or its cubs may be nearby; or it may feel you are a threat in other ways. So, discretion says, stay away from the brown bear, and be forever on your guard in bear country.

23. HOT SPRINGS, BARANOF ISLAND

Off Warm Springs Bay

Directly to the west of the vessel is Warm Springs Bay on Baranof Island. Here is the location of Baranof Hot Springs, one of well over a hundred hot springs locales in Southeast Alaska. Most hot springs get their heat from masses of hot, granitic rock intruded from deep within the earth into surface sedimentary rocks. The springs apparently issue along small fault or fracture zones in the rock.

During Baranof's day at Sitka, the natives held hot springs in high esteem. It was reported that, “when the country is sufficiently peaceable for moving about it safely, the savages think nothing of coming two or three hundred miles to benefit by the healing water, (to) wash for hours at times, with nothing but their heads visible,

eating, drinking, and sleeping in the bath." This was written in 1841 by Sir George Simpson of the British Hudson's Bay Company after a visit to Sitka and the fur enterprise of the Russian American Company.

Depending upon your own point of view, hot springs may be of interest for any of several reasons: for sanitation and health; for commercial resort possibility; as a novelty of nature; or as evidence of heat-generating disturbances near the surface of the earth's crust. This is a region of active mountain uplift. Other evidence of this that you can see around you are the jagged mountain peaks, rapidly flowing streams, occasional earthquakes, and recent volcanic activity in a few places. The entire perimeter of the Pacific basin has been likened to a rim of fire because so much volcanic and hot springs activity is taking place. Anyone for a nice, warm swim?

24. HUMPBACK AND KILLER WHALES



Occasionally, whales can be seen from your ship.

Whales are actually large warm-blooded mammals even though they are fishlike in appearance and live in the oceans of the world. Because, like all mammals, they must have air in order to live, whales come to the surface periodically to breathe. Just before the whale breaks water, it expels air from its lungs through a blow-hole in the top of its head. The warm, moist breath and some of the water above the whale vaporize, creating the characteristic spout. If there were no other sound, you could hear, as well as see, the whale blow.

Southeastern Alaskan waters are inhabited by several species. The most common is perhaps the large humpback whale. A mature individual may be 50 feet long and weigh 50 tons. It displays large fleshy, horizontal flukes when it dives. As large as the humpback is, it feeds on plankton, a large group of microscopic marine plants and animals called the pasturage of the sea.

Another whale which you may occasionally see in these waters is the killer whale — jet black with white belly, and white patches rising up the sides near the tail. This whale, which seldom exceeds 22 feet in length, has a voracious appetite for warm blooded mammals, such as seals, sea lions, or other whales. The killer whale will also eat fish if it cannot find its preferred food. All that you might see of this aggressive whale is his 3 to 5 foot dorsal fin cutting the surface of the water.

25. KILLISNOO WHALING STATION

Opposite Angoon

To the east of our vessel at this point — that would be off the starboard side if you're heading north, port side if you're going south—are the old Tlingit villages of Killisnoo and Angoon.

Beginning in 1880, Killisnoo was the site of a whaling station where finbacked whales captured in nearby bays were processed for whale oil and other whale products. Later the plant was converted for the processing of herring, with the side products of oil and fertilizer being shipped as far away as Liverpool, England. It took a lot of herring to make the maximum seasonal output of 350,000 gallons of oil. Salt herring became an important product here in 1888 until finally the plant closed in 1931.

A tragic episode of Alaska history took place in connection with the whaling operation. In 1882 a Tlingit shaman, which is about the same as the medicine man of most Indian tribes, was accidentally killed by the explosion of a whaling gun. As was their long established custom, the Indians asked payment of 400 blankets from the company for the loss of this important individual. The company refused and sought help from the Revenue Cutter *CORWIN*, operated by the U. S. Revenue Service. The *CORWIN* was at that time about the only law in Alaska. The Captain, not understanding the Tlingit system of justice, countered with a demand for 400 blankets from the Indians, which they could not meet. He then ordered the destruction of their village by shelling. In the end a degree of justice did prevail, for the Federal Government paid the Indians \$6,000 in food and supplies for the property lost.

Angoon is today a village of about 400 Tlingits who make their living mainly in the business of fishing, a traditional industry with them, along with hunting, trapping, and guiding.

26. SALMON

Many of you travelers are from parts of the country where salmon is something that usually comes in a can. Well, you've arrived at the source of that salmon — one of Alaska's most abundant and valuable resources.

We've been passing near boats of several types and sizes, from commercial trollers, seiners, and gill netters to sports fishing skiffs and outboard cruisers. There likely are folks aboard who are familiar with the different kinds of boats and gear who'd be glad to tell you about them.

Fishing is regulated by the State of Alaska but the Forest Service has a real interest and responsibility for this resource too. Possibly you've noticed a few of the hundreds of streams flowing from the Tongass National Forest bordering the channel. Virtually every one of those streams is essential to the salmon resource, and the streams in turn depend for their water supplies on the forest watershed. Alaska waters have five species of salmon, and all of them are born in cool, clear, fresh water streams and lakes.

Throughout most of the year, from May to January, one or more species of salmon are entering the rivers to spawn—that is, to produce fertile eggs for the next hatch. For each



spawning adult it's the last trip, because after completion of spawning it will perish, to become food for bear, eagle, raven, or other scavenger. In a year or two, the young fish hatched from the eggs migrate downstream to the ocean, traveling to unknown feeding grounds. Depending upon the species, it will take from two to seven years to mature. But all adult salmon eventually head back to the forest streams of their birth.

It's during this last trip that most of the commercial and sport fishing harvest is made. The smallest, but most valuable, are the pink salmon, or "humpies," from three to ten pounds — but they're the most abundant. The largest are the kings, also called chinooks, which tip the scales at up to 80 pounds; the largest taken weighed 126 pounds. Possibly the gamest salmon is the coho or silver, which runs up to 30 pounds and will take an artificial lure even after it enters fresh water.

The salmon, which contributes to several pleasures — of sport, of food, of livelihood, and of scenery — teaches us the fundamental lesson that everything in our natural environment is interdependent. In the life cycle of the salmon, we see the meeting of the forest, the river, and the sea.

27. COMMERCIAL FISHING FOR SALMON

What kind of fish boats have you noticed in these waters? trollers? — gillnetters? — purse seiners? All three types, and a couple of others not as easy to recognize, may be seen.

The salmon troller is easiest to recognize. As you'd expect, this type of fishing boat is equipped with long poles or outriggers. When engaged in fishing the poles are extended out over the side. Stainless steel lines controlled by a power winch are trolled at depths of thirty fathoms—that's 180 feet—or more. Each of four to six lines is rigged with up to seven leaders which are baited with artificial lures or cut herring. The fishermen aboard a troller are kept busy checking bait and removing the catch of king and coho salmon, the principal species taken.

You may recognize a fishing boat called a gillnetter by the large net spool mounted near the stern. The gillnet re-



sembles a long mesh fence or curtain which is held vertical in the water by a line of floats on top and lead-weighted line along the bottom. Gillnets are most effective in muddy waters or at night. The net is drifted on the tide, or it may be anchored at both ends, in which case it is called a set-net. The salmon, which are unaware of the net's presence, swim into it and become entangled with the mesh holding the fish by their heads or gills. Gillnetting is the oldest means of commercial fishing on the Pacific Coast. In early days, the nets were set and taken in by hand, but now days the power-driven drums do the heavy work. One man can operate the boat and handle the net as well.

The purse seine is the third type of fishing boat we're likely to see. You'll recognize it by the larger size—40 to 50 feet, and the power block, which looks like a large spool, attached to a boom over the afterdeck.

The purse seine is a specialized close-meshed net, much wider than a gillnet. It is played out around a school of fish. The purse line along the weighted bottom of the net is then drawn tight and the purse, loaded, the fisherman hopes, with a good day's wages in fish, is unloaded by brailing or scooping them into the hold.

You've probably heard about two other means of catching salmon, methods which in years gone by were used quite commonly: the fish trap and fish wheel.

The fish trap is a large raft-like structure supporting a maze of net which directs the salmon toward the trap near its center. Set in a channel or along a shoreline known to be a migration route of salmon, this device was extremely effective. The trap has been outlawed, and only the rotting frames pulled up on beaches in isolated coves remain today.

The fish wheel is used only along river banks. The flow of the current turns the wheel which in turn scoops up passing salmon in a series of lift nets attached to the circular frame, and dumps them into a holding box. The fish wheel is probably the first automatic device in Alaska. You may see them in operation on the Yukon and other interior rivers. Only Indians may use them, and then only to catch fish for their own use.

These, in brief, are the means by which the silver harvest of salmon is taken. To assure the continued yield of this resource, commercial fishing along many rivers is prohibited, and the season of fishing and the amount of the

catch are closely regulated by the State. Fisheries scientists of several agencies are constantly at work to improve the means of harvesting the fish, and in learning the details of their life cycles. Knowledge of the salmon's needs is the basis for management that will improve and perpetuate this valuable resource.

28. SALMON CANNERY

Peril Straits

On the north side of our channel you may see the remains of a salmon cannery, one of over a hundred that have operated in Southeast Alaska. This cannery was built in 1918 by the Todd Packing Company and was closed in 1953. The canneries were usually built in a protected harbor, near good fishing waters, and accessible to a source of a seasonal cannery labor. At relatively isolated situations such as this, a village of temporary housing was built for the use of Indians, whites, and, at some canneries, crews of orientals that were brought here by the cannery companies for the short period of the canning season. The docks and the cannery itself were generally built out over the water for easy unloading of the fish and equally easy disposal of fish refuse. The tide, in effect, was the garbage remover.

The purchase of Alaska from Russia, back in 1867, was made in part because commercial fishermen down in the lower 48 knew about the richness of the salmon resource in Alaska waters. Following the purchase, for the first eleven years the tremendous salmon runs were hardly touched. Then in 1878 the first two canneries were built in Sitka and Klawock. By 1949, 134 canneries had been built. Many of them burned and others were dismantled or abandoned.

Today, 23 plants are able to handle the pack, by much more speedy and efficient methods than before. The earliest canners had to make their own cans from sheet metal and solder. The fish were eviscerated and sliced by hand, handpacked into cans, and then boiled for hours to insure preservation. Today the catch is cleaned and sliced by machinery, put up in ready made cans, and cooked by instrument controlled steam pressure. The assembly line can handle 250 cans or more per minute.

But the fish must still be caught by men, with nets and lines, in sometimes dangerous waters. Salmon fishing and canning, like potato farming in Idaho or Maine, is a short



season business. To make a living in this business it takes a lot of faith in nature that the runs will be large, courage to face the dangers, and skill to handle the gear — as well as a sizeable investment in equipment, buildings, and machinery.

The fisheries industry, including salmon, halibut, herring, crab, and other seafoods, long was the first ranking industry of Alaska, followed closely by timber products, mining, and recreation. In several of our seaport cities and villages, you may visit canneries to observe the entire canning process, from fresh fish to the final canned product. And along streams emerging from the forested coast, you may see the very beginning of the salmon story. For in our forest streams the young of the next generation are spawned and nurtured until ready to migrate to the sea.

29. POISON COVE AND SEA OTTERS

Opposite Poison Cove

Directly to the west of the ferry from this position lies Poison Cove. It received this name as the result of an incident back around 1800.

At that time, Alexander Baranof, the Chief Manager of the Russian American Company, was extending the fur

enterprise throughout Southeast Alaska. One of his sea otter hunting expeditions, consisting of about 100 Aleut hunters and their Russian overseers, stopped in this bay. The men gathered mussels for food, not knowing that mussels were in that season highly poisonous. Many men died. It is reported that others were saved when they were fed large quantities of soapy water mixed with gun powder. What a purgative that must have been!

This is but one example of the hardship suffered by enslaved Aleut hunters and Russian overseers alike during more than a century of exploitation of the rich fur resources of Alaska. No fur exceeded the value of the sea otter, and apparently human life meant little in comparison.

How would you recognize a sea otter if one were to appear in our view? Likely it would be floating on its back, forelegs crossed on its bosom, webbed toes turned upward, tail straight out. When the sea otter discovers you, it rises upright in the water, and, according to one mammalogist, looks like a quizzical old man with his bewhiskered apparently toothless mouth hanging open.

The sea otter is about five feet long, including its furred tail, and weighs about 90 pounds. Its beautiful fur, rich dark brown to black in color, is dusted with silver or gold. The otter fur, unlike that of most other fur-bearers, is always prime, so there was no let up from the hunting.

The mother gives birth to single pups at any time of year. Her faithfulness and affection for her offspring is described as infinite.

The rocky open coast with plenty of kelp or sea weed is the sea otter's home. Its three meals per day include shellfish, crabs, an occasional smelt, and sea urchins — ever try to handle one, much less eat it? The sea otter's table is its chest or abdomen. In order to break hard-shelled food, it may bring up a rock from the bottom, against which it smashes the shell.

The sea otter was once common in oceanic waters from lower California around the curve of the continental shelf all the way to the islands of Japan. When Russia sold Alaska to the United States, possibly a hundred thousand sea otter remained. Under our flag, the slaughter was not effectively halted until around 1910. The sea otter by then was almost extinct, but under complete protection is slowly recovering. Sea otter have recently been reintroduced to Southeast Alaska by the Alaska Department of

Fish & Game. They are getting along very well and we can look forward again to the thrill of observing these bewhiskered, quizzical aristocrats of the pelagic realm.



30. NEVA STRAIT

We are now passing through the waters of Neva Strait. Sounds like a nice name doesn't it? . . . and you may well be curious about its origin. Therein lies a fascinating story, which in a few minutes we can barely touch upon. It only begins our story to say that the Neva is a river in Russia, flowing through the city known as St. Petersburg at the time of Alaska's early history. since changed to Leningrad. St. Petersburg was the new capital of Russia, built in the early 1700's during the enlightened reign of Peter the Great — the czar who wanted to modernize his country and make it an intellectual and scientifically progressive world power.

NEVA also became the name of a ship, which for both Imperial Russia and Russian America, made history. She had been built in England, where Captain Lisianski purchased her for the Russian government. Loaded at Kronstadt Harbor, not far from St. Petersburg, the ship weighed anchor in July 1803. Here began a bold new undertaking. America was to be reached by going around the world. After eleven months on the high seas the NEVA arrived at Kodiak Island in the Gulf of Alaska.

Two years before the NEVA arrived at Kodiak, the fort established by the Russian American Company at Sitka

SITKA SOUND looking north through NEVA STRAIT



had been attacked by the Sitka Tlingits and most of the occupants massacred or captured. Baranof, who was the manager of the Russian American colony, had left word at Kodiak for the ship NEVA and crew to give assistance at Sitka. Arriving at Sitka, the NEVA with the assistance of other company owned ships, after a battle of several days, recaptured the fort from the Sitka Indians. Baranof immediately began to build a new fort near the site of the native village and called it Novo Archangelsk.



After loading with furs collected at both Kodiak and Sitka, the NEVA set sail for Canton, China in August of 1805. After selling them profitably to the Chinese merchants and loading cargoes of tea, spices, and other Chinese merchandise, the NEVA headed around Africa. Arriving at her home port of Kronstadt in July 1806 she had completed the first Russian voyage around the world. In honor of the success of this voyage, the Royal family visited and lunched aboard the vessel.

The NEVA served in the fur trade between America and China for a few years. Then on January 9, 1813 the residents of Sitka were aroused by the approach from seaward of a small boat containing a few Russian sailors, half dead with cold and hunger. The good ship NEVA, enroute from Okhotsk on the Siberian coast had been wrecked near Mt. Edgecumbe at the entrance to Sitka Sound. Thirty-six had drowned, including the man who was to have replaced the aging Baranof. During the Pacific crossing fifteen others had succumbed to scurvy and other diseases.

This would seem to have been the end of the NEVA, but not quite. Alexander Baranof, the manager of the Russian American Company, salvaged some of the wreckage and

used it in the construction of Sitka's famous church, the Greek Orthodox Cathedral of St. Michael.

As you who have followed the news of Alaska know, the Cathedral of St. Michael was destroyed by fire in January 1966. Among the relics saved from that fire was an icon—the icon of St. Michael which had been carried to Sitka aboard the NEVA and salvaged from her wreckage.

You see, then, why the name NEVA is important in Alaskan history and geography.

31. HIGHWATER ISLAND AND FUR RANCHING

Approaching Highwater Island in Neva Strait



For a few minutes we will be in sight of a building ruins on Highwater Island and will pass very close to it. This structure was a military checkpoint occupied by our troops during World War II, that is from 1941-1945, to check traffic by water north of Sitka. During this period many enemy subs were sighted in Alaska waters and because of Alaska's strategic location and vulnerability to attack, the Territory was on the alert.

During your trip, you may see other abandoned buildings on other islands in southeastern Alaska. Most of them, however, are the ruins of fox farm structures. Back in the early part of the century, fox farming was a large enterprise here. Ranchers lived on the islands under permit from the U.S.D.A. Forest Service and let their foxes run loose until pelts were ready for market. The laws of supply and demand, however, killed the industry; that is, fur fashions changed. Now only a few remains of buildings, fences, and pens on many islands in south and southeast Alaska remain as a reminder of the fox farming era.

32. MT. EDGECUMBE AND VOLCANOES

On approach to Sitka Sound, when Mt. Edgecumbe comes into view

Did you expect to see a volcano in Southeast Alaska? There's one in view right now, an inactive volcano called Mt. Edgecumbe. Look for the somewhat irregular cone-shaped mountain off in a southwesterly direction from here. As we get closer to the dock, the mountain will become more symmetrical. When you arrive in the city of Sitka, it may remind you of Japan's famed cone, Fujiyama.

An explorer passing through these parts in 1827 was told that the mountain erupted in 1796 and again in 1804. It has been quiet since. But we know that in order for the cone to have been built to its present 3,271 feet height, there must have been a lot of action there in the past.

Notice the streaks down the side of the cone? They're eroding gullies. In some of them the snow remains unmelted until late in summer.

The reddish color of the cone is due to oxidation of the iron in the volcanic ash. You can have a close look at these features if you care to do a little hiking. A Forest Service trail begins at Fred's Creek and terminates at the

crater. The seven mile trail passes through some rough country, including muskeg, so you'd best be prepared.

Volcanic mountains are quite the exception in Southeast Alaska, where most mountain growth is caused by diastrophism — the deforming of the earth's crust by faulting and folding, and by uplift caused by the upwelling of molten granite from deep within the earth.

There is one other place in Southeast Alaska where volcanic activity took place at about the same time as the latest out-burst at Edgecumbe. That's near the Canadian boundary about 50 miles due east of Wrangell, near the Blue River. An interesting thing about that action was that a forest was flooded by the slowly moving molten rock. As the cooling lava surrounded the tree trunks it hardened into tree molds. This is one of the more unusual ways of preserving a National Forest.

The most extensive volcanic area in Alaska is the Aleutian Island Chain and the Alaska Peninsula. There, in a stretch of about 1,600 miles, 80 volcanoes dominate the landscape. Over 40 of these have been active since 1760, and almost yearly we have news of one or more volcanic outbursts.

Volcanoes, in a sense, are like young people. They're both somewhat unpredictable, and they both shape the future of the land.



33. LOG RAFTS AND PULP PLANTS

During the trip you might see a raft of logs being hauled by a tug.

If that raft is made up of high quality Sitka spruce logs, it's going to a mill to be sawn into lumber.

If that raft is made up of both Sitka spruce and western hemlock, of many sizes down to a 10 or 12 inch butt, it's headed for a pulp mill.

Southeast Alaska now has two large pulp plants, one at Sitka and one at Ketchikan. Each of these digests in its pulp vats two or three rafts of logs per day, each of which consist of 500 to 700 logs. The daily production of raw pulp is over 500 tons. Now that's a lot of raw paper—except that most of this pulp is not used for paper. The virtually pure cellulose — which is what wood is made of — is converted in factories in other parts of this country to many of the objects around you: rayon for cloth or tire cord, band aids and medical swabs, cellophane, cord strapping, photographic film, and many other items.

To keep each of these pulp plants operating it takes about 15 acres of timber per day. You'll see a few of the timber harvest areas in various stages of logging or reforestation during the course of your trip, but most of them are out of sight of the steamer lanes. The operation of the lumber and pulp mills depends on a volume of timber of such extent that by the time the last block is cut, the one cut 90 or so years previous will be ready again for harvest. The part of the forest that grows the timber for these mills is like a farm, which is being managed to produce one timber crop after another without fail, indefinitely.

34. PIGEON GUILLEMOT AND BLACK OYSTERCATCHER

In learning to recognize birds, we usually look for distinctive markings, such as the white head and tail of the bald eagle, the black wing tips and flesh colored legs of the otherwise pearly gray herring gull, or the black stockinged neck and white chin of the Canada goose.

Now there are two kinds of birds sometimes in sight from this vessel which feature red and black in their coloration. Both live here year around, both are waterfowl.



The black oystercatcher is the large dark bird with the long bright red bill. It lives only among the outer rocks and islands above the pounding surf. Just along the water's edge it finds its food—mussels, barnacles, and a variety of the other marine life, which it neatly pries from the rock, or opens with its unique chisel-shaped beak.

The pigeon guillemot is also a dark colored bird, but it has a white patch on its shoulders, a pointed bill, and bright red feet. Also, the inside of its mouth is red. During the mating season rival males really do see red as they face each other in open-mouthed defiance.

The guillemot, unlike the oystercatcher, captures most of its food of small fish, mollusks and crustaceans by diving and flying — that's right, flying — under water.

Watch for these two birds — the pigeon guillemot and black oystercatcher — which are so beautifully adapted to their life in Alaskan coastal waters.

35. SITKA DEER

What large land mammals might you see from on board this vessel? With binoculars — or very sharp eyes — you may see mountain goats up in the area above timberline. Both brown and black bear patrol the beaches for food, and you can be sure that several hundred Sitka blacktail deer have watched from the shadow of the forest as this ferry passes by.



Sitka deer are an abundant animal here. About 200,000 of them live on the Alaska Panhandle, which constitutes almost its entire natural range. Closely related blacktail deer live down the coast to California and in the Cascade and Sierra Nevada mountains.

Typical pictures of most deer show them leaping high as they escape the hunter. Not so the Sitka deer. When danger is sensed our species may slink away, staying close to the ground, even crawling under tree trunks and branches.

Sometimes, if pursued — or for reasons known only to it — the deer will swim from one island to the next, regardless of water temperature or currents.

During a severe winter when the snow falls deep making foraging difficult, many deer may die from starvation. Then, with fewer deer using the land, the food supply recovers rapidly, and the population of deer may double in two years.

We think of deer as animals of the deep forest. But their best habitat is forest edge, clearings, cut-over areas, and even old burned areas. In the open sunlight is where the most nutritious foods grow and also the most deer. It's a fact that in the deep forest, with only the low quality food of the shaded forest floor available, deer may die of starvation with a full stomach.

36. GOLD AND WINDHAM BAY

Opposite Windham Bay

Are you folks interested in gold? I'll bet that most of you remember a few names connected with that part of Alaska history names like Klondike, Trail of '98, Cassiar Treadwell. But have you heard the name Windham Bay?

Right about now our vessel is opposite Windham Bay, where, in 1875, or thereabouts, the first gold of any consequence was mined in Alaska after it became United States territory. John Muir, the famed naturalist, who had a unique disinterest in gold as a mineral of wealth, passed through here about that time searching for and exploring glaciers. The men whom he encountered here were very secretive about their activities, figuring maybe that Muir was a claim jumper. Legally they had reason to be concerned because it wasn't until nearly ten years later



that a prospector was able to get title to a mineral claim in Alaska. But they didn't know Muir. Muir, however, knew something about geology and gold-bearing formations. In 1879 he expressed the opinion that an extension of the gold belt in the Windham Bay area would be found north of the Taku. This prediction led to the discovery of gold by Richard Harris and Joe Juneau in 1880 at the present location of Juneau, and subsequently to the fabulous Glory Hole diggings of the Treadwell Mine on Douglas Island opposite.

How come the Klondike rush of 1898 became so well known? Thanks to the miracle of newspaper communication, that part of the gold saga became as well known as the story of the San Francisco earthquake and fire. Apparently there were reporters all over the place. Only obscure historians mention Windham Bay.

37. ICEBERGS

Your vessel is now passing through a stretch of channel which it frequently shares with icebergs. Usually an iceberg can be seen from the boat. Where did it come from? How big and old is it? Where will it go?

Icebergs are but one stage in a long chain of events involving water: water which vaporized on the ocean surface and formed the clouds aloft; clouds which drifted over the mountains and changed to falling snow—hundreds of feet of snow which under its own weight became ice, the ice of a glacier. Some glaciers flow all the way to the sea, where the rising and falling tide, acting like a lever, breaks off the chunks which we call icebergs.

From the time the snow falls until as glacial ice it reaches the sea takes from two hundred to five hundred years.

That iceberg is a wondrous object. It is evidence of physical principles that make our very lives possible. Let me tell you about just one.

You are able to see only about one-sixth of the total bulk of an iceberg. Ice floats because water expands when it freezes. How fortunate that this happens; otherwise ice would settle to the bottom of rivers, lakes, and streams—which would then freeze from the bottom up. All water life would perish. In summer, only the surface would melt and there would be no movement of ocean currents to modify the world's climates. Alaska's coastal climate is mild because of a warming ocean current.

In south and southeast Alaska, there are about 30 glaciers that reach tidewater. The most spectacular of these places is Glacier Bay, where at least 14 tidewater glaciers feed icebergs into salt water. Many of the icebergs which we see in this channel originated in Holkham Bay, and in LeConte Bay, into which flows the southernmost of the tidewater glaciers on the North American continent.

When you have visited one of the calving grounds of icebergs, you will understand why Indians called the LeConte Glacier "Hutli" — which means "The Thunderer."



38. GLACIAL SCULPTURE OF TRACY ARM

Tracy Arm, Inward Bound (Special Tour)

What proof have you seen that this passage is indeed a fjord—a channel carved by a glacier? The U-shaped outline typical of glaciated valleys is under hundreds of feet of water, and therefore, not apparent to us. The steep walls could be caused by faulting or by rapid river down-cutting. The icebergs—well, they could be coming from a glacier that only recently reached tidewater.

Instead of looking for big evidences, watch closely the walls of this flooded canyon. There's no other natural

agency that could have carved the evidence recorded there—those horizontal flutings, grooves, chatter marks, scratches, and polished surfaces along the near vertical rock walls. Such evidences are typical in bedrock over or along which a glacier has moved. The rock and grit held in its icy grip is the tool of the glacier's carving. Consider the weight, erosional power, and time involved in the shaping of this mile deep, 24 mile long valley.

Weather permitting, you can often see 8,000 foot high jagged mountain pinnacles beyond the head of Tracy Arm. Below these jagged peaks, the summits are rounded and subdued in relief. Here is evidence that a massive ice sheet once over-rode most of the Coast Range. Reminiscent of the Pleistocene era—which we may never have left—an ice field still covers hundreds of square miles of the country above us. This ice field feeds more than 30 glaciers flowing from it. Four of these reach tidewater, two of which we've come to see.

You're seeing a lot of new land around you—rising mountains that have been ice-covered for a million years, and a sculptured valley shaped by a glacier whose tracks we are following to their very source.



39. THE SAWYER GLACIERS

Tracy Arm

(Special Tour)

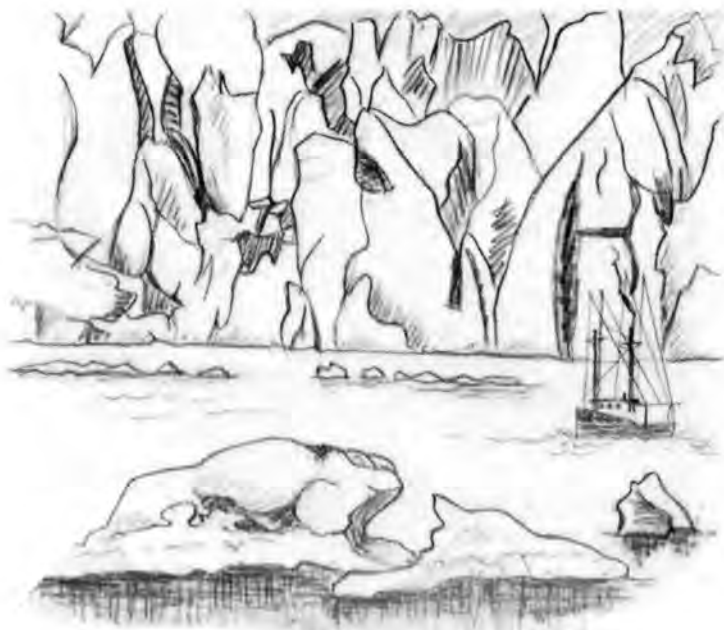
There they are, Ladies and Gentlemen, the two glaciers that spawned all those icebergs we've been threading through.

The Sawyer Glacier is to our left. Off our bow and further distant is the S. Sawyer Glacier, sometimes called the Denali out of respect for its size and grandeur.

The little island now near the ship shows us something of the history of the Sawyer Glaciers.

Notice how little vegetation grows there. That's because the island has seen the light of day—life giving light—for only a hundred years out of the last eon or two. A hundred years ago, the Sawyer Glaciers were joined into one and covered the island. I'm sure you would find on the island many glacier tracks, like gouges, scratches, glacial plucking, and maybe polishing too.

The fronts of the glaciers are still retreating because of a warming trend in the climate, but the ice comprising the glacier continues to move forward—not fast enough



though to equal or exceed the rate of melt at the face and on its surface. We don't know the rate of flow, but considering the amount of iceberg calving, it must be something like 10-20 feet per day.

Based on studies that have been underway on the Juneau Icefield for about 20 years—studies which are interpreted for the public interest at the Forest Service Mendenhall Glacier Visitor Center near Juneau—a cooling of the climate will begin in this decade so we can begin to watch for the change from glacial recession to advance.

Possibly within a hundred years, the two Sawyer Glaciers will again be combined into one.

40. SOME NATURAL HISTORY OF GLACIERS

Tracy Arm (Special Tour)

Did I hear someone ask, "Why is the ice so blue?" — or words to that effect. Well, that is the color of solid crystalline ice. The blue of the sun's spectrum is reflected so you see the blue, while the other colors are absorbed by the ice. The ice cubes in your refrigerator do not show the blue color because they contain so many fine air bubbles.

Because of these air bubbles, too, your ice cubes float high in the water. Icebergs in fresh water are about 9/10 submerged. In salt water, which is denser, only about 5/6 of an iceberg is under water.

So, if we should come upon a berg that looks five times as big as your ship, it actually will be thirty times as large.

Occasionally you may see an iceberg with distinct ice layers — or former melt lines tilted at a crazy angle. Nature's abstract sculpture is produced by differential melting of the rolling shifting iceberg. Only seals, birds, or scuba divers should ever try to ride one because it may roll at any time.

Have you noticed the pattern of crevasses on the glacier surface? This pattern reflects the topography of the bedrock over which the glacier is flowing; and also it shows differential in glacier movement from edge to middle, or around curves. The terminal quarter mile or so of the Sawyer Glacier is flowing over a steep slope. We're seeing an ice fall, which accounts for the strong pattern of later-

al crevasses — the surface adjustment to the abrupt change in the incline of the bedrock.

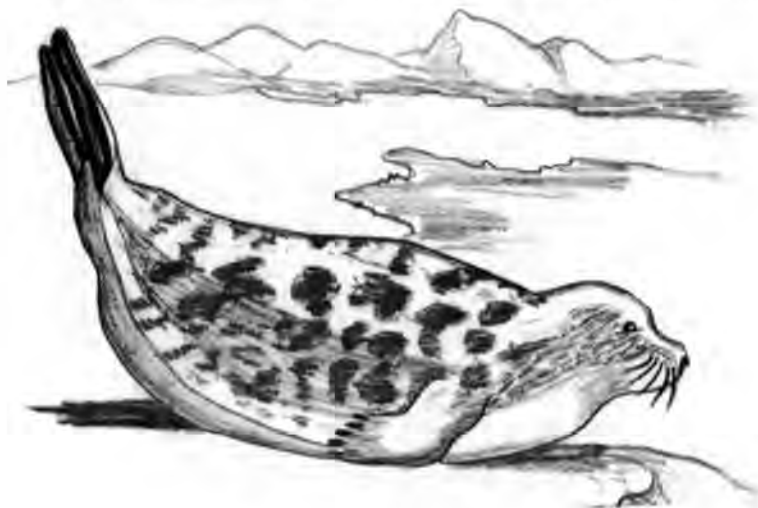
While you are watching the glacier face, we hope you may be so fortunate as to see the calving of an iceberg. Your ship will stay well clear of the face because bergs may be loosed upward from the foot of the glacier a couple hundred feet or so under water as well as from the glacier's face above water. The birthing process is quite noisy and violent. When finally the iceberg is released, after a 25 mile, centuries long journey from the icefield of its origin, as if in the exuberance of freedom it generates a series of high waves as it bobs and rolls before its mother glacier.

During the survey of the International Boundary in 1908-09, a survey party in Endicott Arm had hauled a canoe to a ledge fully 35 feet above highwater mark. The swell from one large berg washed away the canoe and all its contents. No lives lost, but a costly, convincing lesson.

41. HAIR SEALS

Have you seen the leopard-skinned marine mammals resting on the ice? Perhaps by now the ferry has approached very near some of them.

It is the nature of hair seals to be curious. With large eyes in a dog-like face they watch as the ship approaches—un-



til they are frightened or satisfied by the sight.

Hair seals, also called harbor seals, prefer isolated bays where they may hunt—or I should say fish, since that is their main food—and loaf unmolested. Here, too, they are safest from their main enemies, the killer whale and shark, which could swallow one of the five foot long, 200 pound adult pinnepeds in one gulp.

You won't see the hair seal moving around much on shore or on the ice because his hind flippers turn backward and are no help at all. His locomotion out of water, therefore, is half angleworm, half caterpillar.

In the water, though, the seal is like a fish, rolling and turning adeptly, and swimming up to 15 miles per hour if necessary.

Serious family life begins in May when the young are born, one pup per mother. Dad is not likely to be around for the event for he has no interest in domestic responsibility. Dad wouldn't know his offspring anyway since he's quite polygamous. In fact, except for being the father, he's of little apparent use around the place. The mother teaches her young to hunt and swim, beginning the lessons in shallow water. When the young one tires, it'll climb on mama's back for a rest.

Hair seals are not gregarious except when they come ashore to rest. Then scores may herd together, preferably on a sunny shore or sandbar. This is when they are most vulnerable to the hunter. The hide is used for mukluks and other items of apparel by Indians, Eskimos and other Alaskans. Very attractive parkas, caps, and other items too are made.

In the past, hunting of seals was instigated by the belief that the seal destroys many salmon, and damages fishermen's nets. But fact is that stomach analysis of hundreds of hair seals proves that this species feeds mostly on fish and other seafood of little value to man — like the tomcod, shiner, and squid

Man is gradually learning that the sun shines for every creature. We hope it has shone for you often during this trip—and especially here in Tracy Arm where, with hair seals and icebergs, we get pretty close to our wilderness home.



42. NORTHERN BALD EAGLE

Did you see that large bird with the white tail and white head? During this trip many bald eagles will be in sight from this vessel, but for your immediate reference you might take a look at the coat of arms or Great Seal of the United States on the back of a dollar bill or a quarter.

The bald eagle, our National bird, makes its home only on the North American continent and the Arctic coast of nearby lands. As a symbol of freedom, of majesty, and power, what better place could the bald eagle choose as its favored home than Alaska, where it is found in greatest numbers?

The eagle may be seen along Alaska's maritime coast throughout the year. We may like to think of him as a great hunter, and indeed the eagle was once believed to

destroy great numbers of wildfowl and mammals that were considered the fair game only of man. For that reason, for many years, a bounty was paid for its destruction here in Alaska. But the fact is that the eagle is mainly a scavenger, taking that food which comes easiest—like spawned-out salmon, and unwary or weakling mammals or birds, whenever they are found.

The eagle nests in tall trees, usually snags where available, or on rocky crags. The nest may look like a pile of brush, and in part it is made of many sticks individually placed by the nest building pair. The center portion is cushioned with softer material — seaweed, grass, sod, and feathers. Here, each year in May, the female lays two eggs. The fledglings may not leave the nest until September and not until three or four years later will they wear the adult plumage with the white head and tail that so conspicuously identifies them.

Eagle nesting trees on National Forest land in Alaska are protected from logging, road building or similiar development through a cooperative agreement between the Fish and Wildlife Service and the Forest Service. The Fish and Wildlife personnel find and map the site of eagle nest trees. The Forest Service then marks out a buffer zone of almost 8 acres around the nest tree (that will not cut). This is intended to reduce undue disturbance to the birds.

In Seymour Canal of Admiralty Island, several islands have been set aside as the Seymour Eagle Management Area. The purpose of this is to provide an area where the bird can be observed and studied (by the public and scientists). No commercial development or activity will be allowed under the cooperative management by the three agencies involved: the Fish and Wildlife Service, the Alaska Department of Fish and Game, and the Forest Service. With the help of local citizens, visitors, industry, State and Federal agencies, the bald eagle will keep its rightful place in Alaska.

If you have a sharp eye you will see one or many northern bald eagles during your trip.

43. COAST RANGE AND TAKU INLET

For the full length of the Inside Passage the Coast Range of mountains looms to the east. How difficult a barrier it must have seemed to early explorers, and perhaps more so to us.



But these mountains can be crossed, fairly easily in a few places. Right now we're passing Taku Inlet, into which the Taku River flows. The Taku, along with the Stikine, Chilkat, and a few other rivers have their headwaters in Canada and cut through the coastal mountain ranges to salt water.

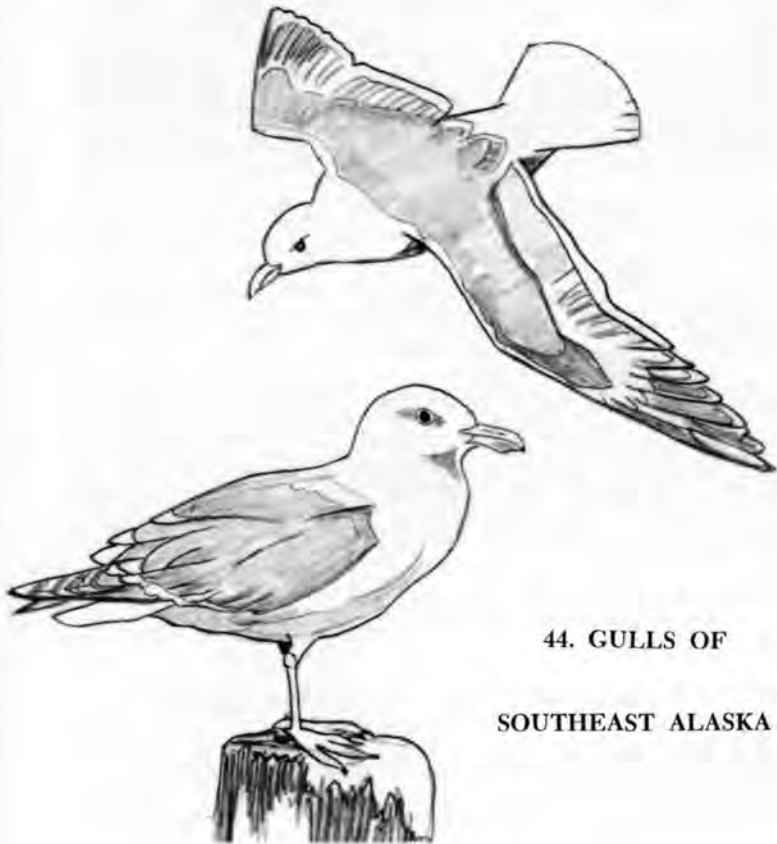
These rivers have been used for hundred of years as arteries from and into the interior. It is believed that when the continental ice sheet melted back, the ancestral Tlingit Indians followed the rivers and their wealth of salmon to the coast. Here they settled. Some of the Tlingit tribes, such as the Chilkats and the Sitkines, became traders — the middlemen — between the Indians of the interior and those of the coast. Later, when Russian, British, American and other fur traders came to this area, the same tribes continued to control much of the trade with the interior.

Within a few years after the 1849 gold rush to California, prospectors began searching northward to new and unexplored lands. They too, with or without guides, found these rivers and made their way inland. Others, as Hudson's Bay Company trappers-turned-gold hunters, worked downstream. Gold was found in every mountain-

crossing river — enough to keep a man in beans for a long time. A few made it rich — a few.

The Taku, like the other rivers crossing the Coast Range, receives much of its water from melting glaciers, some of which reach right down to the river. The river transects a wealth of scenery, rich with forest, wildlife, waterfowl, and imposing mountain heights. In its course from headwaters to mouth it connects the high plateau boreal region of Canada with the coastal rain forest of Alaska.

Some day a highway may take us to see these things, making them accessible and useful to many more of us. But maybe the Indians' and adventurers' way is better, by river boat and foot. Depends on what each generation considers most valuable to mankind in the long run.



44. GULLS OF
SOUTHEAST ALASKA

You've seen them often during your voyage, possibly so often that you take them for granted. I'm talking about sea gulls, that common group of long-winged, web-footed, and mostly white-plumaged birds of graceful flight and watchful attitude.

In these waters, about five kinds may be seen during one cruise. Which of these have you seen?

The most common, year round, is the *Glaucous-winged Gull*. This gull is generally white in color with gray or pale brown wing tips, and dark eyes—if you get that close. The glaucous-winged gull is the most conspicuous species in the aviary sanitary squad — the birds you see most frequently around fish canneries and dumps waiting for the refuse which they know from experience will be unloaded there. Then, while the salmon spawning runs are on, the glaucous-winged gulls, together with many other birds, bears, and other scavengers, swarm to the salmon streams to gorge on dead spawned-out fish.

Maybe the gull you're trying to name doesn't meet the description of the glaucous-winged. Consider these: The *Herring Gull* is a large all-white bird with black wing tips. This species is very common along inland streams and lakes. A small version of the herring gull is the *Short-billed Gull* with greenish-yellow bill and legs.

The *Bonaparte Gull* has a bluish black head which distinguishes it from all other Alaskan gulls. This little gull does not nest here but is present in migrating colonies in spring, summer, and fall. Frequently during migration, flocks of Bonaparte gulls may be seen around the faces of glaciers, as the Mendenhall, Taku, and LeConte.

Let's go over these descriptions once more:

The *glaucous-winged gull* has the grayish wing tips.

The *herring gull* has distinct black wing tips.

The small gull resembling the herring gull, but with greenish bill and legs, is the *short-billed gull*.

The *Bonaparte gull* has a nearly black head.

I mentioned that gulls are scavengers. They are hunters as well, seeking and devouring practically any food the sea and shore may provide. They capture fish, too, not by diving but by plucking them from near the surface. In this way, sea gulls help you fishermen by showing where the herring are coming to the surface. Right below them, likely as not, is the school of feeding salmon that chased them to the top. A good place to try your own brand of salmon bait.



45. MENDENHALL GLACIER AND VISITOR CENTER

Auke Bay Vicinity

The Mendenhall Glacier is now coming into view over Auke Bay in the direction of the mainland coast.

Near the face of that glacier is a visitor center which was established by the U.S.D.A. Forest Service to help visitors gain an understanding of glaciers and their effect on this environment. We invite you to visit this famous glacier whenever you are in the Juneau area. While scientists here and elsewhere are learning some fascinating things about glaciers, the Forest Naturalists on duty at the center are interpreting the information for the public interest. Let me give you an example:

If the climate of the continent were to cool off just six degrees, we would soon be heading south in the face of another glaciation that could cover half the continent.

Up there in the Juneau Ice Field, beyond the Mendenhall

Glacier and about 4,000 feet above it, a program of glaciological studies has been under way for over 20 years. Students from all over the world are learning to read glaciers — somewhat like a book. The pages in this book are the annual layers of snow, ice, and the accumulation of dust, pollen, and spores between the layers. These scientists have figured that it takes about 250 years for the snow which falls up there in the snowfield to change to glacial ice, move down the valleys draining the ice field, and eventually wind up as meltwater as the glaciers melt. To say it in an other way, the snow that fell in the ice field about the time the Russians discovered Alaska, in 1741, is only now reaching the melting face of the Mendenhall and other glaciers draining the ice field.

Understanding the whole scene around us involves more than reading snow and ice layers, however. The land forms that the glacier shapes, the moraine soils that it deposits, the rivers that begin as glacial meltwater, and the plants and animals that live all around it, all are chapters in the book of scenery and resources interpreted at the Mendenhall Glacier Visitor Center.

46. GLACIER BAY NATIONAL MONUMENT

Opposite Icy Strait

In a northwest direction from our present position, 50 miles out over Icy Straits, is Glacier Bay National Monument. This is the nearest view we'll have from on board the ferry of this important area so I'd like to tell you something about it.

During the course of this voyage, you've seen or will see a hundred examples of glaciers and glaciated landscapes along with vast forests and many other of nature's resources. What is considered the most spectacular glacier-dominated landscape in Alaska is represented in Glacier Bay National Monument. That's why it was set aside by authority of the Congress as a unit of the National Park System — to preserve forever a segment of the Alaska Coastal scene in its natural condition for the enjoyment and inspiration of the people.

The Monument contains over 20 magnificent glaciers of every stage: actively moving, nearly stagnant, and slowly receding. Of these, the Muir Glacier, named for the famed naturalist who was known to the Indians as the Great Ice Chief — the Muir Glacier moves the fastest, 20 to 30 feet per day.

Two of the continent's loftiest mountain ranges, the St. Elias and the Fairweather, begin in the Monument and feed their rivers of ice from perpetually snow covered flanks.

The Monument may be considered a museum of the outdoors or an outdoor laboratory, where not only the phenomena of glaciation but the whole natural environment is being studied. It also is a prime recreational area.

Accommodations at Glacier Bay are provided by a lodge built in 1965. For more information contact the Park Superintendent at Juneau, Alaska.

47. BERNERS BAY

Opposite Berners Bay

The Alaska Panhandle has literally thousands of them: bays, coves, ports, sounds, inlets — the kinks in the shoreline of islands and mainland. From our vessel one such indentation may look like most any other. But every one



of them has a unique natural history and for many the ventures of Indian, explorer, and settler are on record.

Berners Bay, which is on the east side of the channel from our present position, is rich with both natural and human history.

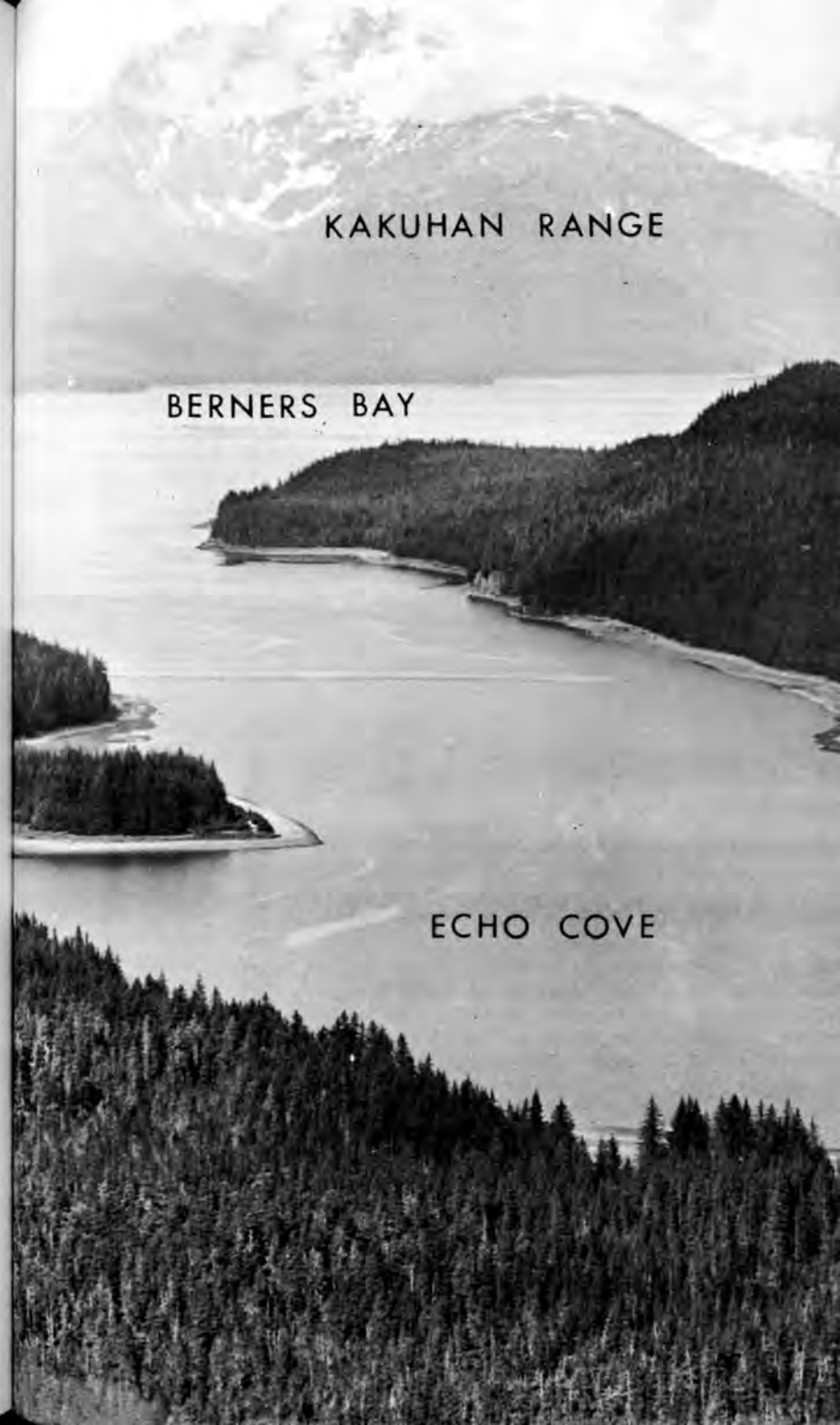
As a place on the map Berners Bay received its name in 1777 from Captain George Vancouver, an English explorer, still hopeful of finding a northwest passage. For another 110 years the bay continued its quiet existence, the sounds only of forest, wildlife, and the summer camps of Tlingit Indians breaking the silence. Then gold was discovered at the head of Johnson and Sherman Creeks flowing into the Bay. The boom gold town of Comet was born, and between 1890 and 1900 five stamp mills were in operation pulverizing the goldbearing quartz. But the cost of production soon exceeded the value of the gold. About \$1,100,000 worth was produced, and by 1910 the mills were idle and the town turned back to the wilderness.

Since the gold fever died, Berners Bay has been the setting for harvest and husbandry of renewable resources: occasional commercial fishing, small logging operations, sport fishing, seal hunting, and, more recently, moose hunting too.

Before 1958 there were no moose here — there had not been enough time since the glaciers receded for moose to spread by natural means to this area. So, wildlife biologists figured, why not give nature a hand?

Between 1958 and 1960, twenty-six moose calves that had been captured in the Anchorage area were transported and released here. So suitable was the habitat for the moose, that in three years it was possible to open the area to hunting. This successful wildlife management project had been handled by the U. S. Fish and Wildlife Service, the Alaska Dept. of Fish and Game, the Alaska Territorial Sportsmen, — and a bunch of children. The moose calves, while enroute to Berners Bay, were taken first to the Minfield Home in Juneau where the children — many of them orphans — took care of the orphaned moose so they would be healthy when released in their new forest home.

That's the sketch story of one southeast Alaska bay — another bay with a wealth of resources that will be renewed constantly as we manage and use them wisely.



48. MOUNTAIN GOATS

In Lynn Canal when goats are in view.

How sharp is your eyesight today?

There are in view right now one or more white animals up along the steep slopes to the east of us. They're about the size of a domestic goat, which from this distance is not very large. In fact, maybe those white objects are patches of snow, or granite boulders. You'll have to look closely to make sure that what you're looking at is a mountain goat.

At times we see whole families, or several families, of mountain goats — billies, nannies, and kids. Generally, when only one animal is spotted it'll turn out to be a billy. The mountain goat is well equipped for what looks like a very difficult place in which to live. During the many months of severe cold weather, it keeps warm in a suit of underwear of very fine wool three to four inches long, under a long shaggy overcoat of hair. This is the wool



from which the Chilkat and other Indians made their famed blankets, one of which, I understand, would take two or three years to weave. When the goats were shedding, the Indians were able to gather bushels of this hair in a small area.

To survive in so rugged an environment, an animal must be sure-footed. The goat's crampons consist of hard rimmed hooves enclosing tough, spongy, crepesole-like inner pads. Pretty good equipment for either rock or ice. The goat's senses of sight and smell are excellent, too, but if, despite these, a wolf or bear, lynx or coyote should attack, the sharp black dagger-like horns are effective defenses. Both males and females have horns.

Mountain goats do love salt. Occasionally, particularly in the spring, they'll come down to the coast to nibble on salty plants and other salt sources. But that's pretty risky business, to get so far from the protection of their rugged high-country habitat.

Outside of this area, the mountain goat's range extends north and west to the Chugach Mountains and south down the Rocky Mountain chain to Montana.

It shares the northern part of this range with the Dall sheep. Unfortunately, Dall sheep do not occupy the seaward side of the coast ranges so we won't be able to point out any of these animals for you.

The mountain goat is quite secure in its high country, wilderness domain, where it has felt the impact of civilization less than any other big game animal. Any mountain that has a mountain goat in its alpine gardens is nobler for it.

49. LYNN CANAL — CHATHAM STRAIT FAULT

The next opportunity you have to look at a map of Southeastern Alaska, notice the alignment of Chatham Strait and Lynn Canal through which your vessel is now passing. This colossal straight trench is believed to be a great fault or break in the earth's crust, along which the rocks on either side shifted. At least the rock formations on one side of the waterway do not match those on the other side as they would if this were an ordinary river and glacier cut channel.

This is a region of rising mountains. And mountain uplift is accompanied by such phenomena as faulting, along

with earthquakes and volcanoes. This active mountain building zone continues along the Alaska coast out to the Aleutians and into the interior of the State. The mountain building zone includes more than 80 active volcanoes in the Aleutian chain and some of the continent's highest mountains, such as Mt. McKinley, 20,300 feet above sea level, the highest above its base in the entire world. This zone of mountain building includes the magnificent St. Elias Range of which the Chilkat mountains just to the west of us are a part. The St. Elias Range, which incidentally is the highest coastal range in the world, is a very active area of mountain uplift. Its jagged pinnacles include Mt. St. Elias, 18,008 feet high. Neighbor to it in Yukon Territory is Mount Logan, Canada's highest peak, whose 19,850 feet makes it a close second among the peaks of North America. Eleven other peaks in this spectacular range are higher than any in the lower 48.

The fault trench of Lynn Canal, through which you are now traveling, does not end at Skagway. Geologists have traced it along a great arc all the way to the Alaska Range, and relating fault systems continue the same arc southwesterly toward Bristol Bay north of the Aleutians. When you first looked out on Lynn Canal, did you have any idea that its story would take you so far?

50. HANGING GLACIERS

Lynn Canal

High on the wall of the channel through which we are passing, you may see an occasional mass of ice which appears as though it might plunge down the steep slope below it. Those are hanging glaciers — with an interesting story.

Probably most of you remember what Yosemite Falls and Bridal Veil Falls of Yosemite Valley look like. Both cascade from hanging valleys high on the rim of glacier-carved Yosemite Valley. If the climate here in southeast Alaska warmed enough to cause the glaciers to melt away, we would have similar type waterfalls here. As it is, we have hanging glaciers.

At one time, the channel through which we are passing was filled with ice, a mile thick glacier that flowed toward the south, deepening its bed and steepening its walls. Glaciers on the rim of the valley walls were tributaries to this major river of ice. Their small volume of ice and, consequently, erosive power were able to cut notches in the

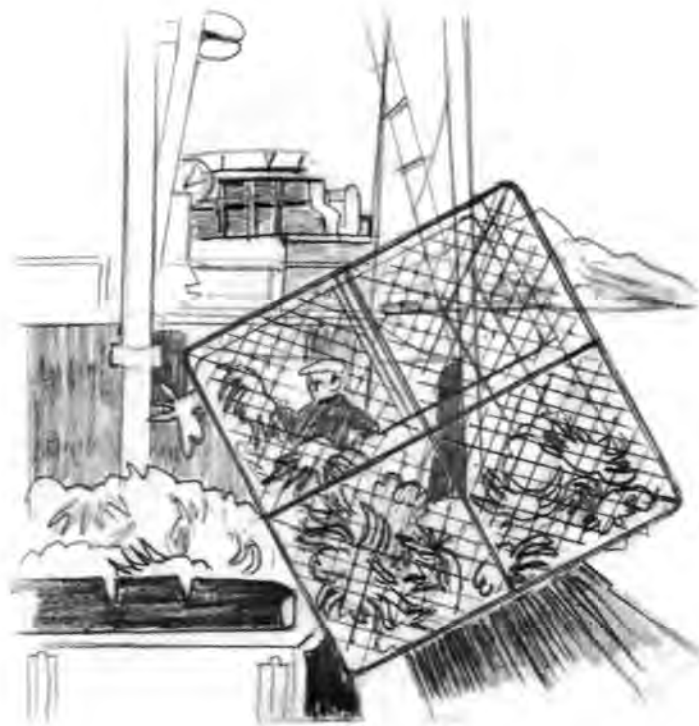
valley rim. Compare these with the work of the main glacier tongue which, with tremendous weight and carrying power, carved the fjord which is our deep water channel.

That's how the hanging glaciers happened. There will be others in view — watch for them.

51. CRAB POTS

We are approaching a brightly colored float which is not a navigational aid, but, rather, a marker to show a commercial fisherman where he set his crab trap or pot. Possibly at this very moment a ten pound king crab is crawling through one of the funnel-shaped entry ports toward the bait hanging inside.

These waters are the habitat of two species of crab, the dungeness and the king. Of these, the king provides most of the world's canned crab. It occurs in waters of the



northern Pacific rim, from North Japan to Southeast Alaska. King crabs as large as 20 pounds and five feet leg span are taken. Both Russian and Japanese fishermen are actively exploiting the king crab of the Okhotsk and Bering sea areas.

The dungeness crab is much smaller than the king — up to 3½ pounds but the body weight is greater, proportionate to size, than that of the king. It ranges from Unalaska, in the Aleutian Islands, to Magdalena Bay, in lower California.

Should you have a chance to visit one of the wharves where crab fishermen tie up, you're likely to see crab pots stacked on the dock; or you may see them aboard vessels engaged in the fishery. The pots, or traps, are round or square — 6 feet in diameter and 3½ feet high, made of steel rod and wire mesh. Look especially for the funnel shaped openings, the one-way streets along which the king and dungeness crabs take their last walk, enroute perhaps to your dining room table.

52. NORTHERN LIGHTS

Some of you may have observed northern lights from as far south as Mexico, but that would be rare indeed. Folks living in Kansas, say, might see them five times each year, but up here in the north latitudes where the magnetic field surrounding the earth dips down to the North Magnetic pole, the northern lights play fifty or more nights per year.

The cause of northern lights is only in this generation coming out of the realm of mythology. They are not fires over northern oceans, nor reflections from polar ice fields. Rather, they are the neon lights of the heavens.

About two days ago, 93,000,000 miles from here the surface of the sun exploded with sunburst activity. Streams of atomic particles of hydrogen reached the magnetic field of the earth, and right now those hydrogen electrons are bouncing right and left off of the molecules of gases in the earth's upper atmosphere.

The light of the aurora results from this atomic bombardment. With an instrument called a spectroscope we can identify the kinds of gases that are involved. The most common color is yellow-green, which is glowing oxygen gas. Red is the color of glowing nitrogen. Other colors that may be seen are violet, white, and orange, resulting



from bombardment with other gases.

How high up there are they? And do they make a sound? There are folks who've lived where the aurora plays at its best, up in the interior of Alaska and Yukon, who swear they've seen the auroral curtain sweep to the ground, and have heard it rustle.

Scientific instruments haven't been able to trace the aurora closer than about 40 miles from the earth's surface, which also is not close enough for hearing. But science hasn't yet explored all the possibilities, even though it has succeeded in creating a man-made aurora. This was accomplished by exploding a hydrogen bomb high in the atmosphere. The hydrogen electrons that were liberated by the atomic fission, were caught up in the earth's mag-

netic field, swept to the south polar regions, and, sure enough, created an *aurora australis* right on schedule.

It satisfies our curious minds to learn the physics, the mechanics, and the chemistry of phenomena that man has wondered about since his creation. But then it's pleasant, too, sometimes to have the freedom to wonder, to enjoy a scene, without needing an answer.

I wonder what makes the northern lights move around like they do??

53. PORPOISE

If you are fortunate, you may see some porpoise swimming near the boat as we move through these waters. This is the Dall porpoise, recognized by the white of the underside reaching up the sides of the otherwise black, sleek rounded body. The porpoise, like the whale, is a mammal. The female nurses her young for nearly one year before they learn to eat fish which is their main food.

The porpoise is fish-like in appearance except that its tail fluke is horizontal instead of vertical. The playful por-



poise action serves the purpose of enabling them to breathe as they arch above the water. It is approximately 30 seconds between breaths but they can stay submerged for five to seven minutes. Although the porpoise has teeth, it prefers to feed on fish small enough to be swallowed whole.

The adult Dall porpoise is about six feet long and weighs 200 pounds. It can swim as fast as 30 knots or about 35 miles per hour.

54. IN CLOSING . . .

Were you aware of all the human drama that was part of the Tongass National Forest? These are just some of the things that have happened around this scenic area. This land doesn't unfold itself easily to a person passing through in a few days, so these little vignettes are intended to whet your appetite to learn more about this great country through which you're passing. The following list of selected references will give you further information to supplement your slides and other mementos of your trip to Alaska.

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 Specific information pertaining to the Tongass National Forest is available from the Regional Forester, P. O. Box 1628, Juneau, Alaska, or from Forest Supervisor offices in Ketchikan and Juneau.

