

CHARTING ALASKA SEAS

BY FRANK G. CARPENTER

How Our Coast Survey is Exploring Them For Pinnacle Rocks

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KETCHIKAN.—It rose at 4 o'clock this morning to go out with one of the wire drag crews that are exploring the main channels of Southern Alaska for pinnacle rocks. Our boat was the steamer Equator, the tiny craft upon which Robert Louis Stevenson made his tour through the South Sea Islands, and we had a second vessel, a little tug called the Roosevelt, to carry the other end of the wire. They move along on each side of the channel and carry with them, far down under the water, so far that the deepest ship that sails the course could not be caught by it, a taut strand of telephone wire. This wire sweeps the channel. It is so balanced by weights and buoys that it moves through the water as the boat goes on until it catches some rock that reaches above the depth for which it is gauged. The depth we used today was about 50 feet, and our boats steamed slowly along without striking a pinnacle.

But before I describe the wonderful workings of our coast survey ships let me give you some idea of the seas of Alaska, which our Department of Commerce is trying to make safe for the hundreds of ships that go north and south every season. These waters are sometimes called the graveyard of the Pacific. They are among the most dangerous parts of the ocean. Within the past 40 years 300 vessels have gone down upon their rocks, and cargoes and lives are lost every season. I have before me a list of 59 vessels, ranging in value up to \$300,000, which have been sunk since we took possession of the territory, and there are many others that have suffered great damage, but have still gone on their way. The California, which was lost in 1913, carried down with her 31 men and a cargo of \$300,000.

The Tahama, a revenue cutter, lost in 1914, was worth a quarter of a million dollars, and within recent years the losses in property alone are estimated at more than \$5,000,000. The loss in lives has been more than 500, all told.

Nevertheless, the travelers increase in number every season. Last year they were about 50,000, and they will soon be doubled and trebled. The cargoes are worth more from year to year. There are ships now going to Ketchikan that have each more than a half million dollars' worth of copper ore on board, and single cargoes worth a million dollars are brought down every season. When the new Government railroad from Seward to Fairbanks is completed there will be a caravan of tourists moving back and forth from Alaska, and the seas must be made more safe in order that the territory may be opened to traffic.

Have you any idea of the extent of the Alaska coast line? The shores of the territory are washed by three great oceans. There are the Arctic Ocean on the north, Bering Sea on the west and the Pacific on the south. The Aleutian Islands, off the Alaska Peninsula, are separated from each other and the mainland by a network of rocky straits, and much of Southwestern and Southeastern Alaska is made up of mountainous islands that are really the tops of mountains half lost in the water. They rise in spires and cathedrals, some of which are thousands of feet above the water and others hidden beneath it, lying there concealed and ready to rip open the hulls of ships as the iceberg ripped the Titanic.

The extent of the Alaska coast, with its windings, surpasses that of the United States proper. It is greater than that of all our states on the Pacific from Puget Sound to the boundary of Mexico, added to that of our states on the Atlantic, including the gulf. All told, it is more than 25,000 miles long, or longer than the distance around the world at the Equator, and in proportion to its length it has perhaps more dangers than any other coast line on earth.

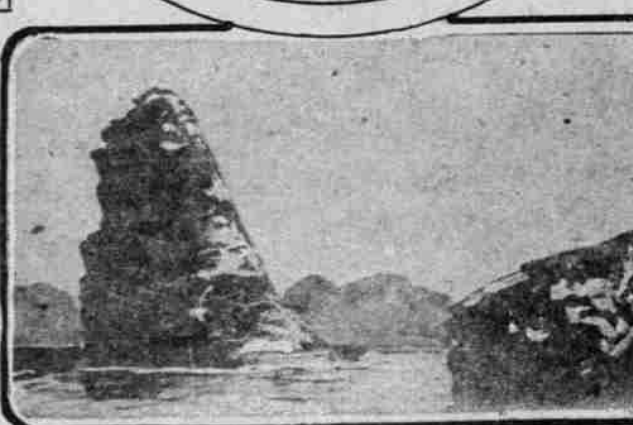
Nevertheless, not one-half of it has yet been sounded by the coast survey vessels, and more than half of the general coast line is not marked by light or by any aids to navigation. As to the rivers, there is not a light or mark on the great winding Yukon except at its mouth, and it is the same of its many navigable tributaries. It was only last year that the Department of Commerce opened up the navigable channel of the Kuskokwim. That river is the second in size of the rivers of Alaska. It is nine miles wide at the mouth, and is now navigable for 600 miles inland. The coast surveyors have spent the past five open seasons in charting its waters, and the great Kuskokwim Valley has now been opened by them to navigation. In surveying the delta within an area of 100 square miles something like 14,000 soundings were taken.

The lighthouse service of Alaska leaves a great deal to be desired. The



Crew of the M. Arthur
Capt. Quillian
at the right

Taking
Observations
on the
M. Arthur



Photograph of Channel
Typically Alaskan

first buoy was floated in 1884 and the first light erected 10 years later. There are now on the whole Alaskan coast line only 323 aids to navigation, and these include about 140 lights, of which 28 were established in 1915. There are but few lighthouses, and only three on the main travel route from Icy Strait to Nome, a distance as far as from New York to London.

At the present time the Government is awake to the dangers of Alaskan navigation. It was only last year that President Wilson called attention to the necessity of exploring the waters and erecting lighthouses, and today Secretary Redfield, of the Department of Commerce, has a number of new movements to that effect under way. He is constructing a first-class coast light on Cape St. Elias. This light house is being erected on the south end of the island of Kayak, one of the most important points on the Gulf of Alaska. It is where the boats, after leaving the Inside Passage, pass on their way into Prince William Sound and Seward, the terminus of our new railroad. The lighthouse is to cost \$115,000. It will rise 90 feet above the level and will be equipped with a lamp of 100,000 candlepower, which can be seen more than 15 miles away. The light is a double flash which bursts forth every 20 seconds.

The Government is building several new vessels for the improvement of the Alaskan waters. One of these is to be for the lighthouse service, and it will be ready for work in May, 1915. It is being constructed at Long Beach, Cal. It is to be called the Cedar. The boat will be a double-bottomed, schooner-rigged vessel 200 feet long, 36 feet wide and with a displacement of 1750 tons. It will draw 12 feet of water and have a speed of 12 knots an hour. It will be constructed of steel throughout. It will be lighted by electricity and will have a radio outfit of the most modern type.

Secretary Redfield is having a new coast survey vessel built on the Great Lakes, especially for the Alaskan waters. The boat will be taken down the lakes, out into the Atlantic Ocean and by way of the Panama Canal to

Alaska. It will be called the Surveyor and will take the place of some of the old tubs, known as the coast survey vessels, now in the service.

Another Government ship which will be in Alaska next season will be devoted to the protection of the fishing rather than navigation. This is the Roosevelt, the vessel made famous by Peary in his north polar explorations. So far the Coast Survey has charted only about half of the water of Alaska. The area to be surveyed is bigger than the State of Texas and the amount already sounded is only a little larger than the State of Missouri. I had no idea of the work required to explore and mark the waters of the ocean until I came to Ketchikan. This is the headquarters of the Coast Survey Service for Alaska and there are several ships now engaged in work in the waters near here. I went out yesterday on the M. Arthur, which has been making surveys in the Tongass narrows and in and about Prince of Wales Island. The M. Arthur is one of the older ships in the service. It was built in 1876 to survey the bar of San Francisco Bay and has been in the coast survey work ever since. Its commander is Captain C. T. Quillian, a native of Georgia, who has been connected with the Coast Survey since 1902. It was beside him that I watched them charting the ocean.

In the coast survey work it is necessary to ascertain the exact depth and character of every foot of the channel over which the ships are to sail. This is done by dropping heavy pieces of lead, to which piano wire is attached, down to the bottom. The wire runs around a reel or drum on board ship, and it is so fine that it moves out like a thread as the lead sinks quickly to the bed of the sea. The drum has machinery connected with the engine, and the lead can be drawn up and the exact depth automatically registered.

The work goes so fast that from ten to 20 soundings were taken in an hour, the lead rising and falling like clockwork. The boat has to stop for two minutes when each sounding is taken. I took out my watch and timed

the lead as it rose and fell. It took only one minute and a half to go from the boat to the bed of the sea and back. When it returned it brought with it gravel and shells, showing the character of the bottom of the ocean, 500 feet below. The lead is smeared with grease in order that it may catch the gravel.

The depths of the ocean vary greatly, and the coast survey ships make many soundings that are 1000 and upward of feet in depth. They often explore waters a mile deep, and just off the shore of our island of Guam they have made deep-sea soundings as far below the level of the ocean as Mount Everest is high above it. All of the soundings have to be corrected for the rise and fall of the tides. On board the M. Arthur the surveyors used sextants and took observations to determine just where they were and to aid them in surveying the waters.

Surveying like this has been already done in the Alaskan waters over a territory as big as the State of Missouri. In some parts of this area the waters have been tested at every few feet, and you can tell the exact depth over which your ship has to sail. In other places the soundings are far apart, leaving a large part of the water unexplored. It is the duty of the coast survey ships to determine just where they were and to aid them in surveying the waters.

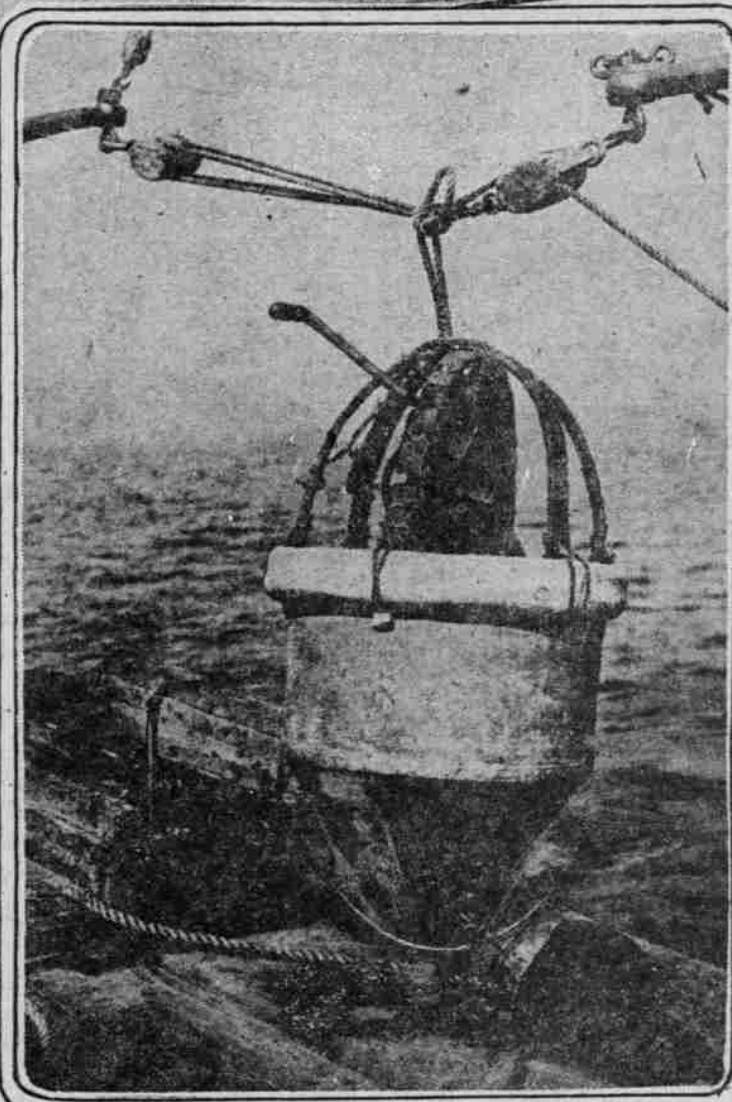
They are defended by armies animated with the spirit of offensive. They have fulfilled the role expected of them and must be considered as inexpensive, even should the fortune of war cause them to be blockaded.

So fortifications have come to stay, though it is agreed that the present war will lead to a series of modifications in design and armament. The small fort of circular shape, with its batteries, powder magazines and garrison crowded over a limited area, may be considered a thing of the past. The new French fort of the future will aim at being superior to all comers for range, and it ought to be when it is considered that its armament can be transported and fitted at leisure in time of peace. Its long guns of naval type of extreme caliber and range will command, with the help of aeroplanes, a radius of some 18,000-20,000 yards around. They will be placed under impervious armor and be made proof against aerial projectiles. An elaborate system of trenches for infantry at long distance from the central position, safe garrison shelters dispersed over a vast area, together with quick means of transportation for smaller garrisons, are also to be adopted. But superiority for range over field armies must remain the first desideratum in all places-forts worth that name.—Army and Navy Journal.

John Didn't Bring One.
Toronto Mail and Empire.
Five young men trooped into a shop each to buy a new hat. Scouting him, the man behind the counter waxed jocular.
"Are you all married?" he inquired.
"Yes," they chorused.
"Then I'll give a hat to the man who can truthfully say he has not kissed any woman but his own wife since he was wedded."
"Hand over the hat," said one of the party. "I was married yesterday."
"One of the others was spinning the yarn to his wife when his laughter suddenly gave way to fear.
"I say, John," he asked, "how was it you didn't bring one?"



Showing
Construction
and Operation of
The Wire Drag.
The Two
Boats at the
Ends Move
The Drag



One of The Floats or Buoys That
Uphold The Wire Drag

ship that comes in its path. These rocks are often of such small area that they escape the soundings of the coast survey. They can be detected only by a wire drag, which, sweeping along at a given depth, is sure to strike against them if they rise above the height at which it is gauged.

The first wire-drag vessel used in American waters began its work about 10 years ago on our Atlantic Coast and the Government surveyors have

been working there ever since. In this time they have discovered more than 3000 rocks with less water over them than shown by the charts and about 1000 of these are dangerous to navigation. All were in waters that had been previously charted by the Coast Survey.

Here in Alaska a large number of the pinnacles rocks have been unearthed by the wire drag. Captain John A. Daniels, the engineer with whom I went

out this morning, has located 21 great stone spires along 42 miles of this channel and right in the course of the steamer. One of these rocks is of the shape of a pyramid and it rises from the bottom of the channel to a height of 600 feet, or almost 50 feet above that of the Washington monument. It comes within 17 feet of the surface of the water and is surrounded by deep water on all sides. The channel had been charted by the Coast Survey, but this rock was not marked. If the lead struck the rock it probably slipped off into deep water, at the side, or it may have come in between two soundings and have been missed altogether.

It is interesting to see how the wire drag works. The chief boat has a windlass operated by the engine. About this windlass is the telephone wire which is to be let down and stretched across between the boats far below the depths at which ships sail. This wire is several miles in length and it is out according to the width of the channel which is to be tested. The wire used here is stretched across a channel up to two miles in width. The horizontal dragging wire is supported by vertical wires which fall from large buoys and it is held at the proper depths by sinkers and floats. The buoys are really galvanized iron buckets of perhaps 10 gallons capacity. The buckets are sealed and, being full of air, they float while supporting the weight of the wire beneath. The floats are of cedar. They look like the rolling pins with which bread is made. They hang to the wire and aid in keeping it at the right level.

It takes boats of about 40 horsepower to move this submerged wire through the sea, the average speed of the drag being about a mile and a half per hour. Notwithstanding this, as many as 15 shoal spots and rocks are sometimes found in one day.

When the drag strikes a rock the place is marked and another surveying party develops the area about it. A buoy or float of some kind is then anchored there to show the danger and a new record is made on the chart.

Up to the present between one-third and one-half of the main channels of Southeastern Alaska have been explored by the wire drag. The work will be prosecuted steadily and as fast as the appropriations by Congress will warrant.

Most of the vessels in the coast survey service in Alaska are only fit for the scrap heap. Secretary Redfield has rightly called them "unseaworthy old tubs." They are without wireless equipment, deficient in modern appliances, and some are so poor that they can be safely used only in protected waters. The M. Arthur, to which I have referred, is over 40 years old. She has been nicknamed the "Chinese Shoe" on account of her shape. She is only 20 feet wide and 120 feet long, and her speed is about seven miles an hour. She has to use a steam launch for her surveying work, but it is so frail that she cannot hold it on board.

The Godney and the Endeavor are in the same class with the M. Arthur. They have no electricity and no condensing and refrigerating plants. The accommodations for the men and officers are bad. The Endeavor was used in the Civil War as a Confederate gunboat. The Godney was constructed in 1875 on the Atlantic Coast, and she came around South America, to Alaska 35 years ago. She is 140 feet long and 24 feet wide. She is now charting the waters about the Prince of Wales Island.

The Patterson, which aided in rescuing the wrecked steamer Tahama, is making surveys in the neighborhood of the Shumagin Islands and the Yukon is the ship of which I wrote as surveying the Kuskokwim River. She was built in Nome by Captain Pratt 18 years ago and was used in surveying the Yukon. She has also surveyed about Kodiak Island and Cook Inlet.

The Taku, which was originally built to be used in making surveys at the mouth of the Yukon, is now laid up in Prince William Sound, as she is too small to make the trip farther south. She is only 75 feet long. Her captain is G. T. Rude, who has been long in Alaska. The captain of the Yukon is R. R. Lukens.

As to the wire drag parties there are two of them. One is under Captain Daniels, who, boat, the Equator, I have described. The other party is commanded by Captain L. O. Colbert, who has the King and Wing, a power boat that rescued the survivors of the Karluk, the Canadian Arctic exploring ship. Captain Colbert has been working this season in the vicinity of Point Baker.

Uncle Sam's Big Wheat Farm.
Christian Herald.
The total acreage of wheat this year is 60,000,000 acres. This is equivalent to the total acreage of the following states: Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York and Pennsylvania.

On this great wheat farm it is estimated that 150,000 men have been employed this season, who have received at least \$1,000,000 for each week's service in the fields. At this writing wheat is quoted in the Chicago market at \$1.05 a bushel, but to call it \$1 will make it easier figuring. That would give us for the 1915 crop a value of \$550,000,000.

SAYS FORTS VALUABLE

THE case with which the Germans successfully captured Lille, Loos, La Perle and Rheims, all very strong positions on paper, has proved rather damaging to the prestige of permanent fortifications. Yet there is no case for a wholesale condemnation of forts when circumstances are carefully examined. Both Belgian and French fortresses were sadly out of date in armament as well as in defensive organization, and were crushed at long range by an artillery of superior caliber (208, 285 and 420 millimeters), to which they could make no effective reply. To the admirably handled German heavy ordnance that fired with incredible accuracy at ranges of 10 to 15 kilometers, the French fortresses artillery could only oppose, together with obsolete mortars and insufficient field guns, weapons of 155 millimeters, with a range of a little over 8000 yards. No attempt was made to defend Lille, Loos and Rheims, totally out of date and not thought to be worth the huge garrisons which they would have absorbed. Maubeuge alone offered a stout resistance, though perhaps not so long as could have been expected from her new (but under-gunned) forts and from her garrison of 20,000 men, including nine infantry regiments and a few artillery battalions, mostly reservists. That place, besides having no long range cannon, was filled by 1000 machine guns, mostly of the type of the Maxim, which constituted a source of weakness. After a ceaseless night and day bombardment lasting from August 22 to September 7, in the course of which the garrison did its duty, attacking continuously and inflicting over 20,000 casualties on the enemy (so much was admitted by German officers), the German General Pournelle, surrendered a town on fire, full of dead and wounded, the forts of which were reduced to heaps of ruins. Only a few thousand men of the gar-

risson succeeded in breaking through the lines of the besiegers. It is estimated that Maubeuge rendered considerable service in delaying for two weeks the advance of an important portion of the hostile artillery and in preventing the enemy using the most direct railway line from Liège to Paris. The siege was thus also of the most direct military value. The 2000 Frenchmen stopped for 21 days part of the Kronprinz army, winning war honors from the victor, and of the old (1874) fort of Troyon, with a garrison of 470 men, which the enemy confident of reducing in a few hours, but which resisted an intense bombardment of five days, repulsed three brave attacks of German infantry and cost nearly 3000 casualties to the besiegers. Thus even obsolete fortresses can give a good account of themselves when not handicapped by the presence of civilian population, which confirms some of the lessons of the 1870 conflict.

But, of course, reliable information as to the value of fortifications can only be derived from a study of the way modern fortresses have stood the test of war. Now the camp retranchés of Verdun, Loul, Epinal and Belfort are the only ones that deserve at all to be called modern, having been the object of ceaseless improvements in recent years, though at the beginning of the war they were not quite up to date in armament, not having received the long-range naval guns that now arm them. And it is a fact that they have up to the present defied the whole might of heavy German guns and the repeated and well-aimed attacks of the masses of German infantry, especially Verdun, which is yet partly encircled, though at very long distance, over 20,000 yards. These camps retranchés, which have been wonderfully improved both in armament and in defensive qualities since the war, have got rid of their civilian population and

OLD STYLES ARE REVIVED

FASHIONS 4000 years old are now being revived, according to archaeologists who have made studies of women's dress down the ages. A scholar well versed in the characteristics of the great civilization which has been laid bare by the excavations in Crete in the last 15 years, was strolling down the avenue the other afternoon when he stopped in amazement before the window of a well-known Fifth Avenue customer. There on a form in show window was one of the newest fashions—a bodice drawn in to fit tight around the waist, with a deep V at the throat and a high collar rising behind the neck and a flaring skirt with four or five ruffles over each other in almost the shape of a bell.

"Amazing," he exclaimed to his companion. "Almost an exact replica of the false figures of the earth goddess which Sir Arthur Evans discovered at Knossos!"

The companion, who had never heard of Sir Arthur Evans, Knossos or an earth goddess (outside of Wagner), demanded that he be shown, so the archaeologist took him back to his figure—a copy of the original found in Crete—which has a strange similarity to the waxen lady in the window. There was a short-sleeved, tight-waisted bodice of dark orange, with purple ribbons, a heavy belt and a flaring skirt with seven flounces, made in a checker-board pattern of dark purple and light blue. There were, to be sure, some differences—the goddess had a snake in each hand, and the decollete of her jacket was such as to bring out Anthony Comstock's reserves, but she had worn it on Fifth Avenue, but in the main the costumes were identical.

"That lady," said the archaeologist, "is either the earth goddess or one of her priestesses and the figure was made probably 2000 years before Christ."

"Hats were usually made with rather low crowns and wide brims, but, while in classical Greece and Rome there was little variation on that model, the Crete had about as many kinds as conditions of hats as any are up to the present. Usually the brim was turned up before or behind, or all around, and here was considerable use of ribbons and other trimmings. A conical hat surrounded by a rolled brim and decorated with three rosettes sounds modern, but the model is 3400 year old."—New York Times.

What Is on Your Mind.
Washington (D. C.) Star.
"I'm just beginning to understand why they label this 'window information.' Can you find out what you want to know?" "No. But it's a place where you can always go and inform somebody about what you happen to have on your mind."