

2.—REPORT ON THE WORK OF THE FISH COMMISSION STEAMER ALBATROSS, FOR THE YEAR ENDING JUNE 30, 1893.

By Commander Z. L. TANNER, U. S. Navy, commanding.

The *Albatross* was lying in the harbor of Port Townsend, Wash., at the close of the fiscal year ending June 30, 1892, ready for sea, and sailed at 12.55 a. m. July 1 for Unalaska.

Taking an approximate great-circle course from Cape Flattery to the Fox Islands Passes, light to moderate winds were encountered until the 5th, boisterous weather and heavy seas during the 7th, and smooth, pleasant weather thence to port. The usual lookout was kept for seal life, and a single individual was seen between the Sannaks and Unimak Pass. Whales and the usual varieties of sea birds were frequently noticed; floating kelp and driftwood were observed nearly every day, and, on the 8th, about 350 miles from Unalaska, the trunk of a tree was seen with roots attached, but without branches or bark. The high land of Ugamok Island was sighted at 7.30 p. m. July 9, and at 6.40 a. m. on the 10th we anchored in Unalaska.

The boiler in use, the only one available, was leaking badly, and was so much salted up that it was difficult to maintain a speed of 6 knots. The condition of the boilers had been rapidly growing worse during the cruise, and it was now obvious that they had nearly reached their limit of usefulness; indeed, their condition was so serious that the chief engineer requested a survey. The request was promptly complied with, and the report of survey condemned the boilers as unsafe without extensive repairs, which could not be made on the station.

The only course open was to make temporary repairs and return to San Francisco; so, with our own crew and the assistance of a boiler-maker from the *Yorktown*, we made such repairs as were practicable.

The unexecuted portion of our orders was turned over to Captain Evans, who detailed the revenue steamers *Corwin* and *Rush* to carry them out as far as possible. A seal-hunter and a naturalist were sent to each vessel to assist in the work, and they took with them everything requisite for the capture and preservation of specimens.

Two bidarkas with complete hunting outfits were received from the Alaska Commercial Company for the World's Columbian Exposition, the outfits including hunting and fishing implements, clothing, etc. The boats were built under the personal supervision of Mr. Gray, and the outfit was collected by Mr. Rudolph Neumann at St. Michaels. These gentlemen gave their services freely, and without their cooperation it would have been impossible to collect so complete an exhibit. The

articles obtained in St. Michaels were transported to Unalaska on the steamer *St. Paul* without charge.

When it became evident that the *Albatross* would be unable to continue her work, arrangements were made for Professor Evermann and Mr. Miller to visit the Seal Islands. The North American Commercial Company's steamer *Bertha* was about to sail on her regular annual supply trip, and, through the courtesy of Mr. Tingle, the superintendent of the company, they were furnished transportation on that vessel, sailing July 17 and returning August 1, having made headquarters on board during the whole trip. Professor Evermann reported that they had made a careful inspection of the rookeries and had taken an extensive and valuable series of photographs, illustrating various phases of seal life. Mr. Tingle declined to accept compensation for the transportation and subsistence of the party.

An order was received from Commander R. D. Evans, commanding the United States naval force in Bering Sea, dated August 1, directing me to take charge of the British schooner *Winifred* and deliver her to the collector of customs at Sitka, Alaska. This small sealer, of 11 tons register, was captured July 29 in Bering Sea. She leaked badly about the decks and rudder, and was hardly seaworthy. Ensign E. A. Anderson was ordered as prize-master when the schooner was turned over to us, and soon had her in fairly good condition for the trip.

Steam was raised on the after boiler August 1, with reduced pressure of 40 pounds, and as it stood the test fairly well we decided to start, although the forward one was not quite ready for service. Accordingly, at 7.10 a. m. August 3, we took the prize in tow and proceeded to sea, entering the Pacific via the Akutan Pass. Our speed was necessarily slow under one boiler and reduced pressure, but we were obliged to reduce it still more to accommodate the diminutive craft in tow, although the sea was smooth.

The volcano of Akutan presented an interesting display during the early part of the afternoon. Dense volumes of smoke were intermittently ejected from the crater high into air, rising like ever-growing plumes, until finally all shape was lost in cloudlike drift. The puffs were accompanied by detonations which were distinctly heard on board. Shishaldin, Pavlof, and Agihleen volcanoes were in sight the following day, but none of them gave evidence of activity.

Nothing occurred worthy of note until the morning of the 6th, when a fresh southeast wind, with short, irregular sea, compelled the schooner to cast off and heave to under storm sail. She made some headway as the wind veered, and we finally took her in tow again the next morning.

The working boiler began leaking seriously on the 8th, and became so badly salted that we were obliged to let the fires die down on the 10th and get steam on the other one, which by that time was ready for use. The remainder of the trip was uneventful, and with pleasant weather and smooth seas we made good progress, arriving in Sitka at 7.40 a. m. August 11. The *Winifred*, together with her papers, person-

nel, and equipment, was delivered to the collector of customs. The papers of the whaling bark *Lydia* were turned over also, that vessel having been seized for infraction of the revenue laws.

A small quantity of coal was taken on board and preparations made for the run to Departure Bay. We were nearly ready for sea, when, on the morning of the 17th, a boat came alongside from the whaling bark *Lydia* with a message from Lieutenant Dodge, U. S. Revenue Marine, in charge, saying the vessel had been drifting helplessly off the coast, becalmed for four days, and asking assistance. We had steam on one boiler, fortunately, and went out and brought her into a safe anchorage.

Our preparations having been completed, we left Sitka at 4 p. m. August 18, and, after a smooth and uneventful run, entered Goletas Channel at 2 p. m. on the 21st, arriving at Departure Bay on the morning of the 23d, when the bunkers were filled with coal. At 9 a. m. on the 24th we left for Port Townsend, arriving at 10 p. m. the same day. The boilers had again become badly salted, the back connections being filled in places with solid masses, which had to be cut out with hammer and cold chisel.

A telegram from the Secretary of the Treasury was received on the 24th, as follows:

Telegraph Department extent of repairs necessary to fit *Albatross* for two months' cruise, estimating time and cost of expeditious work.

To which I replied, August 25:

Temporary repairs can not be made. Time to fit vessel for two months' cruise, four months. Expense, \$15,000.

This estimate was based on the renewal of tube sheets and other repairs on the old boilers, including necessary work on the engines which would be largely of a temporary nature. The following telegram was received from the Secretary of the Treasury, dated August 27:

Steamer *Albatross* will be returned to Fish Commission on 31st instant. Submit without delay vouchers for all bills payable by Revenue-Cutter Service to that date inclusive.

At 8.50 a. m. August 30, we got underway and proceeded to sea, en-route for San Francisco. We were off the coast of Oregon at midnight on the 31st, when, by the telegram of the Secretary of the Treasury, the *Albatross* reverted to the control of the Fish Commission. Her service under the Treasury Department extended over a period of 5½ months, during which time she visited 26 ports and steamed 14,848 miles, mostly in northern waters.

The trip down the coast was uneventful; fair winds and pleasant weather were the rule, sail being carried most of the time. We reached the navy-yard, Mare Island, at 10.05 a. m. September 3, with machinery and boilers, particularly the latter, in wretched condition, and we congratulated ourselves upon reaching our destination without serious disaster, which was liable to occur at any moment while the vessel was under steam,

I was called to Washington by the Commissioner on business connected with repairing and refitting the *Albatross*, and, leaving San Francisco September 17, I arrived at the capital ten days later. Formal application was made by the Commissioner to the Secretary of the Navy for the transfer of two boilers originally constructed for the *Monadnock*, but which, owing to change in type of engines from compound to triple expansion, were no longer available for use on that vessel. The requisite legal formalities having been completed, the boilers were transferred on payment of \$2,500.

Instructions were wired to the *Albatross* to make preparations for removing the old boilers and for general repairs to the machinery, the work to be done with the crew as far as practicable. I returned to the vessel October 27, and found preparations well advanced in the engineer's department for the removal of the old boilers. The machinery was generally overhauled during the winter. New propellers of bronze were made, new boilers put in, a Baird evaporator added to the engineer's department, and the electric plant of the vessel rewired. A new spar deck was laid, and minor repairs made to the hull and rigging.

Passed Assistant Surgeon T. A. Berryhill reported for duty January 5, 1893, and Passed Assistant Surgeon F. W. F. Wieber was detached on the 6th. Lieut. A. F. Fechteler reported January 7, and Lieut. C. G. Calkins was detached the same day. Ensign W. G. Miller was detached January 25.

The vessel was docked January 13 to change propellers, line shafts, renew stern bushings, overhaul outboard bearings, clean and paint bottom, etc. The work of tearing up and relaying the spar deck commenced January 31 and was completed March 3. The vessel's bottom was scaled and painted, and on March 4 she was hauled out of dock and moored at the wharf.

Passed Assistant Paymaster J. S. Carpenter was stricken with snow-blindness during the northern cruise, and after suffering for months without apparent improvement was examined on March 10 by a medical board, which recommended that he be given six months' sick leave. Assistant Paymaster Eugene D. Ryan reported for duty April 11, relieving Passed Assistant Paymaster Carpenter, who was detached the following day, April 12.

Seventy-three tons of Conox coal were taken on board on the 17th and 18th (April), and on the 20th we had a dock trial of the engines, which was considered satisfactory. Changes and repairs had been so extensive that it was deemed advisable to have a sea trial before sailing for northern waters, where we would be entirely dependent upon our own resources, and with this object in view we left the navy-yard at 9.55 a. m., April 25, with light fires under both boilers. No attempt at high speed was made, but we ran from 8 to 10 knots an hour with everything working satisfactorily, until 8.10 p. m., when we anchored off Santa Cruz for the night.

Got under way at 6.40 a. m. on the 26th and swung ship under steam,

observing azimuths of the sun on every point for compass errors, then stood to the cable trough off Salinas, and tested the sounding and dredging apparatus, also the maneuvering qualities of the vessel with her new propellers. The trial was satisfactory as far as it went.

The new form of Tanner intermediate tow-net, tested for the first time, performed all that was expected of it after the weights for operating the drawstring had been increased to 30 pounds each; they were first tried at 15 pounds, and closed the net properly when both were brought into action, but one alone failed to close it securely under conditions of actual service. The engines worked very satisfactorily, and the new bronze propellers of modern type reduced vibration to the minimum.

We anchored off Monterey for several hours to readjust valves, finally getting underway at 8.15 p. m. for the return trip. At daylight the following morning the deep-sea apparatus was again tested in from 200 to 300 fathoms, and, having satisfied ourselves that the vessel and her appliances were in good working order, we returned to the navy-yard, Mare Island, mooring to the wharf at 5.30 p. m. April 27. A crack in the shell of the main condenser was discovered during the trip and repaired at small cost after our return.

The following telegram was received from the Commissioner of Fish and Fisheries May 13:

In obedience to instructions from the President you are directed to report by telegraph to the Honorable Secretary of the Navy for such duty as he may assign you.

Having reported as directed, the following message was received from the Secretary of the Navy, dated May 15:

Proceed with the vessel under your command to Port Townsend, Washington, and report to Commander Nicoll Ludlow, U. S. N., for duty in connection with the United States naval forces in Bering Sea.

On the 16th instructions were received at the navy-yard, Mare Island, to furnish the *Albatross* with coal and such other supplies as were necessary to perform duty with the Bering Sea fleet.

Final preparations were promptly made, and on May 20 the *Albatross* sailed for Port Townsend, arriving on the 24th, when I reported to Commander Ludlow in obedience to the order of the Secretary of the Navy. We carried up a draft of men and a quantity of stores for the U. S. S. *Mohican*, which were delivered on our arrival.

The vessels of the fleet rendezvoused at Port Townsend, where general instructions were issued by the senior officer commanding the United States Bering Sea force, and the vessels were then dispatched singly as occasion required. The orders of the *Albatross* contemplated the performance of patrol duty until the middle of July, or such time as her services could be dispensed with, the remainder of the season to be devoted to scientific work under direction of the Commissioner of Fish and Fisheries. Patrol duty was in reality performed throughout the season, but during the progress of scientific work it was limited to the boarding of vessels encountered within our field of operations.

We left Port Townsend May 28, reached Vancouver, British Colum-

bia, the same evening, and crossed to Comox the following day; coaled ship, and at 10.15 a. m. May 31 we sailed for the north, taking the inland passages to the northern end of Vancouver Island.

The Comox mine has been opened recently, and consequently little is known concerning it or its product. The wharf is in Union Bay, west side of Baynes Sound, 12 miles from its southern entrance. It is easy of approach, the chutes are adjustable, and the delivery of coal is under perfect control. The mines are about 13 miles from the shipping-point, the output being transported by rail through a wild and densely wooded country. Union, the nearest settlement, is 11 miles from the wharf; the company's offices are located there. A telegraph line has recently been opened to Victoria, and they are in telephonic communication with the mine and wharf.

The weather was fair and pleasant after our departure from Comox, and the trip up the Strait of Georgia was without incident. Passed through Seymour Narrows at 6.15 p. m., and anchored for the night two hours later in a snug cove on the east side of Pender Island, where we were out of the strength of the current. Getting under way at 4.15 next morning, June 1, we resumed our course through Johnstone Strait to Alert Bay, where we left a mail; thence through Queen Charlotte Sound and Goletas Channel, and at 3 p. m. took our departure from Mexicana Point and laid a course for Cape St. James.

Patrol duty commenced upon our reaching the open waters of the Pacific; masthead lookouts were stationed with instructions to report vessels, seals, whales, driftwood, kelp, etc. The general course was designated by the officer commanding the Bering Sea force, the vessels of the fleet being so disposed as to cover the usual track of the northward-bound seal herd and the sealing vessels following it.

Strong westerly winds were encountered on the 2d, making progress under one boiler rather slow, but it moderated next morning and the speed increased accordingly.

The *Albatross* had a western or offshore route, which carried her outside the usual track of seals; in fact, we saw none between Vancouver Island and Kadiak, and the first sealing schooner was boarded on the morning of June 6 in latitude $57^{\circ} 48' N.$, longitude $148^{\circ} W.$, not far from the 100-fathom line on the southern edge of Portlock Bank.

A detention of two hours occurred on the 5th by the breaking of the piston springs in the port H. P. cylinder, which, leaving the rings without proper support, also gave way. No further damage resulted, and after wedging the latter in place we steamed ahead again.

The sealing schooner *Annie E. Paint* was boarded on the afternoon of the 6th, when the master reported seeing much wreckage in the region assigned to Pamplona Rocks; also that from among it a whaleboat had been picked up a few days before with a dead man lying under the thwarts, all of which he considered good evidence of the existence of those dangers. It was subsequently ascertained that the whaling bark *Sea Ranger* had been wrecked off Cape St. Elias, thus accounting for boat and wreckage.

At 5.10 a. m. June 7 arrived in St. Paul, Kadiak. The only vessel in port was a small sloop used as a tender at one of the trading stations. Copies of the proclamation of the President of the United States, and instructions of the Secretary of the Navy to the senior officer commanding the United States naval force in Bering Sea, were delivered to the deputy collector of customs and agents of trading companies with the request that they be posted in public places. We took on board 73 tons of coal, and at 11 a. m. June 8 cast off from the wharf and proceeded to sea. Cruising to the westward in the track of sealers, we continued to board and warn them against sealing in Bering Sea, until our arrival at Sand Point, Popof Island, Shumagins, on the afternoon of June 10. No sealing vessels had yet reached that point; the fleet was expected during the latter part of the month.

Our first fur seal was seen near Kadiak Island on the afternoon of June 8, only one being observed that day; but the following morning several were sighted off Chirikof Island. The sealers reported very poor success since leaving the vicinity of Middleton Island.

In U. S. Hydrographic Notice to Mariners, No. 46, of November 12, 1892, paragraph 925, is the following:

Captain Applegate, of the American schooner *Matthew Hale*, reports a shoal or bank, with 7 fathoms of water on it, extending 20 to 35 miles southeastward from Simeonof Island, Shumagin group. Cod fishermen anchored on the bank last year.

The position of this reported bank, remote from land and outside of the 100-fathom line as established by the soundings of this vessel, occasioned no little surprise to the officers engaged in the work; hence, we took the earliest opportunity to investigate the matter. Fortunately, Captain Gaffney was in Sand Point at the time of our arrival, and as he had spent many years in the cod fisheries of the Shumagins he was able to give us reliable information. He was shown the notice quoted, and in reply said that the only bank he knew of in that vicinity lies 15 miles ENE. (mag.) from the highest point of Simeonof, and has 27 fathoms, rough, rocky bottom, on which he has been in the habit of fishing. It is of small extent and difficult to find except by bearings and ranges; a depth of 23 fathoms has been reported $1\frac{1}{2}$ miles east of the 27-fathom patch, but he had never been able to find it. He had no knowledge of the bank reported by Captain Applegate, but knew positively that fishermen did not go so far from land in that region.

In a subsequent interview with Captain Applegate he said that the report to him was vague, and he was not confident as to bearing, distance, or depth of water, but he gave the report as he remembered it. In view of these facts I think we may safely conclude that there is no bank in the position indicated in Hydrographic Notice No. 46, 1892.

At 9.25 a. m. June 11, we left Sand Point for a cruise to the westward, following the general track of sealers, but saw none between the Shumagins and Amukta (or 172d meridian) Pass, through which we entered Bering Sea on the morning of the 13th; neither were any met with between there and Unalaska. We made Bogoslof Volcano at

12.35 the next morning, and reached Dutch Harbor at 6.40 the same evening, going at once to the coal wharf. June 15 we took on board 81 tons of coal, and at 6.10 p. m. proceeded to sea, entering the Pacific via Unalga Pass. Several vessels were boarded between there and the Shumagins, among them the American fishing schooner *Moonlight*, of Seattle, bound for Slime Bank, Bering Sea.

We arrived at Sand Point at 12.10 a. m. June 16, and found several of the sealing fleet at anchor, and others arrived from day to day. A constant lookout was kept for seals during the cruise to the westward, but none was seen except off Unimak Pass, and then but one or two at a time. We boarded and warned all vessels found in port, and those which arrived up to meridian of the 18th, when we left for a cruise among the islands of the Shumagin group. Communicated with the U. S. S. *Ranger* off Mountain Cape, and having received a mail, we proceeded on our course; the *Ranger* was bound for Sand Point. Having made a complete circuit of the southern islands and visited the principal harbors, we returned to Sand Point on the evening of the 20th, when we met the *Ranger* and received orders from the senior officer.

Getting under way again at 4 a. m. on the 22d, an examination was made of the southern portion of the group and anchorage was found for the night in Mist Harbor, east side of Nagai Island. It is protected on the sea face by two gravel spits, the ends of which slightly overlap, a narrow but deep entrance lying between their extremities. There is little known concerning this snug harbor, and, as we had no chart of it, a hurried reconnaissance was made next morning. Near the head of Mist Harbor, and separated from it by a narrow neck of land, is a large bay making in from the northward from 3 to 4 miles deep and about 2 miles wide at the entrance. It is not shown on the Coast Survey charts.

The examination of coasts and harbors of the group was continued on the 23d, and we returned to Sand Point in the evening. The sealing fleet were now leaving for the Japan coast, several being met during the day outward bound. We were away again at 2.45 a. m. June 24, and came to in Sanborn Harbor three hours later, where we remained until the following morning and then returned to Sand Point.

The naturalists availed themselves of the opportunity to examine the region about Sanborn Harbor during the day. The scarcity of land birds was soon remarked, and eventually traced to the presence of large numbers of foxes. Salmon had not yet commenced to run, and the beaches were almost barren of other species of fish. Better success followed the hauling of the seine in the lakes, where many trout and flounders were taken, besides other species, one, at least, new to science. Although trout were plentiful, the persistent efforts of anglers with rod and fly were ineffectual; nothing but salmon roe would tempt them. No directions are necessary for entering Sanborn Harbor, except to take a mid channel course and keep the lead going when approaching the anchorage, as the water shoals rather suddenly. The *Albatross* anchored in 10 fathoms with ample swinging room.

The mail steamer *Crescent City* was found at Sand Point on our return, but brought no additional orders. The U. S. S. *Mohican*, flagship of the Bering Sea fleet, arrived about noon June 25, followed a few hours later by H. B. M. S. *Garnet* and U. S. revenue cutter *Rush*, the latter short of coal. We gave her 40 tons from our bunkers.

At 5.30 p. m. June 26 we left for a second cruise to the westward. Although it was clear in the harbor there were unmistakable evidences of thick weather outside, and arriving off Delarof Harbor we ran into a dense fog which was carried with short intervals to Unalaska, where we arrived at 8.45 p. m. June 27. Seals were plentiful from the Sannaks to Unimak Pass. Coaled ship on the 28th, taking 167 tons. Dressed ship with the British flag at the main in honor of coronation day, having been invited to join in its celebration by Captain Huntingford, of H. B. M. S. *Nymphe*, which was lying at anchor in the harbor.

We were under way again at 7 p. m., and finding the passes blocked with fog took the Bering Sea side of the Aleutian Islands to Amukta Pass, through which we entered the Pacific. Fog met us off Cape Makushin, and with momentary intervals continued until we arrived in the Bay of Waterfalls, at 7.30 p. m. July 1. This beautiful bay takes its name from numerous streams which fall into it from the surrounding heights. A plentiful supply of pure fresh water from the snow-capped mountains, an ample store of driftwood—with which the beaches are lined—and its isolated situation, remote from the usual cruising grounds of the Bering Sea patrol fleet, made it the most desirable point west of the Shumagins for the sealing fleet to rendezvous. We found no vessels in the bay, but the remains of recent driftwood fires on the beach gave sufficient evidence of late visitors.

Three schooners were boarded off the bay a few days later, when the fog lifted, all bound in for water, and as they were among the last of the fleet destined for the Japan coast, it is more than probable that it had earlier been a port of call for vessels that did not rendezvous at Sand Point or touch at some other place farther to the eastward.

The *Albatross* was in latitude $51^{\circ} 39' N.$, longitude $172^{\circ} 22' W.$, at midnight June 30 (at which time this report properly closes), cruising on patrol duty under orders of the senior officer commanding the United States naval force in Bering Sea, the vessel having been temporarily transferred to the Navy Department May 13 for that purpose.

The first two months of the fiscal year were employed in seal investigations under the general direction of the Treasury Department, and the following eight months were spent at the navy-yard, Mare Island, putting in new boilers and making general repairs to hull and machinery. In this connection I wish to acknowledge the admirable facilities accorded us by the commandant and heads of departments, which enabled us to effect thorough and extensive repairs at moderate cost.

The scientific apparatus is in good working order, the mechanical appliances having been thoroughly overhauled while general repairs were in progress. The Tanner intermediate tow-net and improved dredging quadrant were the only additions of importance.

The improved dredging quadrant is a refinement of the instrument described on page 94, Report on the Construction and Outfit of the U. S. Fish Commission steamer *Albatross*. In its present form the frame A A consists of two pieces of black walnut 2 feet in length, half an inch thick, and 2 inches wide, screwed together with brass screws, forming a water-tight joint. One of the pieces has a semicircular extension at its center, which supports the scale C C.

Fig. 1 represents the quadrant ready for use. Figs. 2 and 3 show it with the two parts of the frame separated, bringing into view the method of construction. Fig. 4 is an end view at D, and Fig. 5 is a sectional view of rod D and spring E.

Nomenclature: A A, frame, of black walnut; B, pendulum, of brass; C C, scale, of brass; D, rod, brass, controlling elliptical spring; E, spring catch, of brass.

The pendulum, B, 4 inches in length, moves freely on a friction bearing, and has on its upper extremity a disk with milled surface. The rod, D, is attached to and controls an elliptical spring which, when in action, grips the milled surface of the disk on the pendulum and holds the latter in position while the reading is taken. The spring catch, E, holds the rod, D, in place when it is pressed in for the purpose of disengaging the elliptical spring to allow free movement of the pendulum. It engages a slot cut in the rod D, for the purpose. The scale, C C, is graduated on each side of the semicircle from a vertical to a horizontal position, the latter reaching 90° . The instrument is intended to measure the angle of dredge rope when operating in deep water, where a change too small to be noticed by the eye might carry the trawl many fathoms off the bottom.

To use the quadrant, take it in both hands, press the rod D with the right hand until the spring catch E engages the slot on D; take a favorable position and incline the instrument until its upper edge is in line with the dredge rope, then press spring catch E with the thumb of the right hand, disengaging the rod D, and thus locking the pendulum B, when the angle from the vertical can be read on the scale.

We have now the perpendicular (depth) and hypotenuse of a right-angled triangle (amount of dredge rope out and its angle). With these elements enter table 2 in Bowditch and obtain the third element necessary to complete the triangle, when it will be seen whether the trawl is on the bottom or not, due allowance having been made for catenary curve of the rope.

There have been several changes in the personnel during the year. Ensign C. M. Fahs, U. S. Navy, reported for duty September 5, 1892; Ensign W. B. Fletcher, U. S. Navy, was detached September 14, 1892; Passed Assistant Surgeon T. A. Berryhill, U. S. Navy, reported January 5, relieving Passed Assistant Surgeon F. W. F. Wieber, U. S. Navy, who was detached January 6, 1893; Lieut. C. G. Calkins, U. S. Navy, was detached January 7, being relieved by Lieut. A. F. Fechteler, U. S. Navy, who reported the same day; Ensign W. G. Miller, U. S. Navy, was detached January 25; Passed Assistant Paymaster J. S. Carpenter,

Fig.1

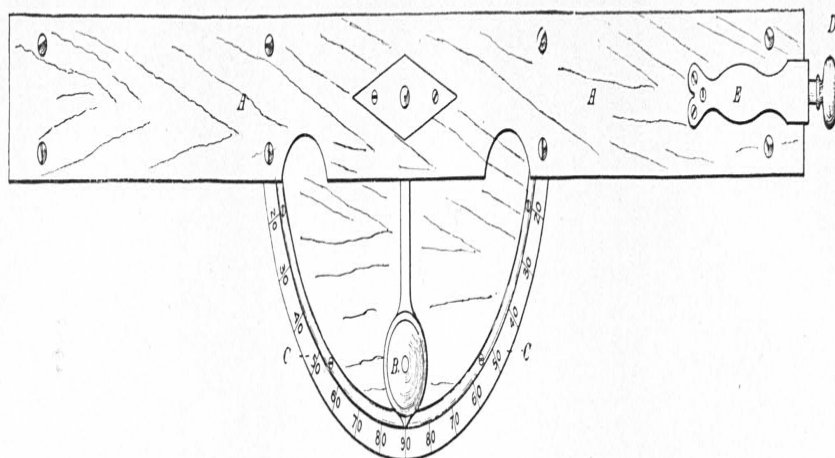


Fig.2.

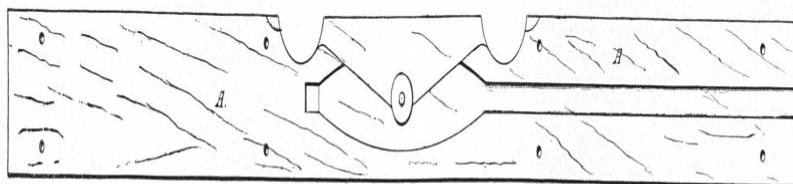


Fig.3.

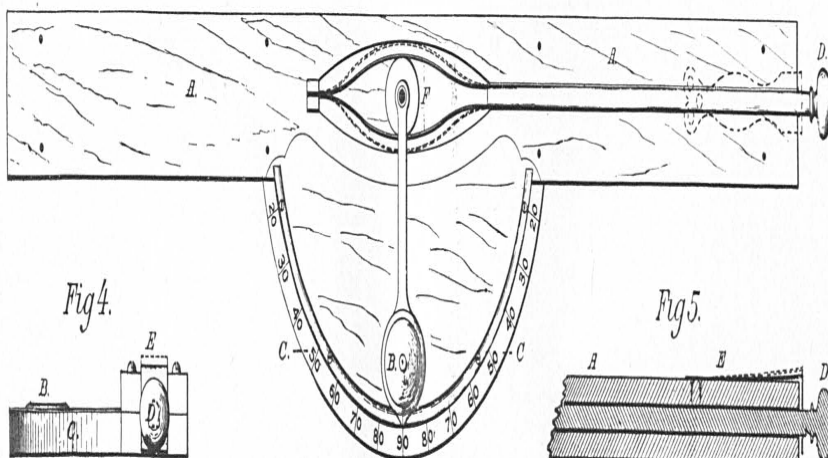


Fig.4.

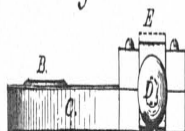
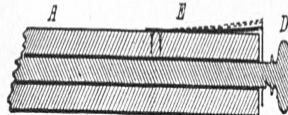
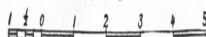


Fig.5.



Scale



THE TANNER IMPROVED DREDGING QUADRANT.

U. S. Navy, was detached April 11, Assistant Paymaster Eugene D. Ryan, U. S. Navy, reporting as his relief the same day; Ensign C. F. Hughes, U. S. Navy, reported May 5.

The following officers were attached to the *Albatross* June 30, 1893: Commander Z. L. Tanner, U. S. Navy, commanding; Lieut. A. F. Fechteler, U. S. Navy, executive officer and navigator; Ensign H. B. Wilson, U. S. Navy; Ensign E. A. Anderson, U. S. Navy; Ensign C. M. Fahs, U. S. Navy; Ensign C. F. Hughes, U. S. Navy; Passed Assistant Surgeon T. A. Berryhill, U. S. Navy; Assistant Paymaster Eugene D. Ryan, U. S. Navy; Passed Assistant Engineer A. M. Hunt, U. S. Navy.

The civilian staff consisted of C. H. Townsend, resident naturalist; A. B. Alexander, fishery expert; N. B. Miller, assistant in scientific department; Harry Clifford Fassett, captain's clerk.

The present crew-list of fifty-three enlisted men is totally inadequate for the performance of the ordinary duties of the vessel while engaged in the work of deep-sea exploration, and the practice of shipping a temporary force of civilians on the eve of sailing is still followed. The original number of enlisted men, sixty-eight, was based on the manual force required to carry on the work of the vessel, watch and watch, which is absolutely necessary when operations are continued night and day, as has been the custom on board this vessel.

The general health of officers and crew has been excellent, and the hygienic condition of the vessel continues most satisfactory.

The *Albatross* has been seventy-five days at sea and has steamed 9,610 miles during the year.

REPORT BY A. B. ALEXANDER ON FISHERY INQUIRIES.

The *Albatross* left Mare Island navy-yard on the morning of May 20, 1893. The first fishing was at Comox, Vancouver Island, on May 30. The beaches here are very poor for seine hauls; in most places they are rocky and generally unsuited for collecting with nets. No economic species were taken in the seine. Clams were fairly abundant.

These mollusks constitute one of the principal articles of food of the small Indian tribe which lives here during the summer months. This tribe, numbering about one hundred persons, camps here annually for the purpose of laying in a supply of salmon for the winter. All fish taken intended for future use are either dried or smoked. Fish to be smoked are hung on lines or poles near the roofs of the huts or houses, where the smoke freely circulates among them; those to be dried are thrown upon the rocks or sand and left until they are sufficiently cured to admit of being packed away and shipped to the winter settlement, which is near the town of Union, 13 miles from the coast.

I saw no seines or nets of any kind at the fishing settlement, and presume, from what information I could gain, that all salmon are taken by trolling. Salmon are sufficiently plentiful to supply the wants of both the white and Indian populations, but not numerous enough to induce capital to build canneries.

Our next stopping-place was at Pender Island, British Columbia, 77 miles north of Comox, where we anchored for the night. There being a fine working beach not far from our anchorage, a party landed upon it and made several hauls with a 135-foot drag seine. Nothing was taken. The current sweeps by the island with considerable velocity, which may account for there being no fish here. A day's trial might have resulted differently.

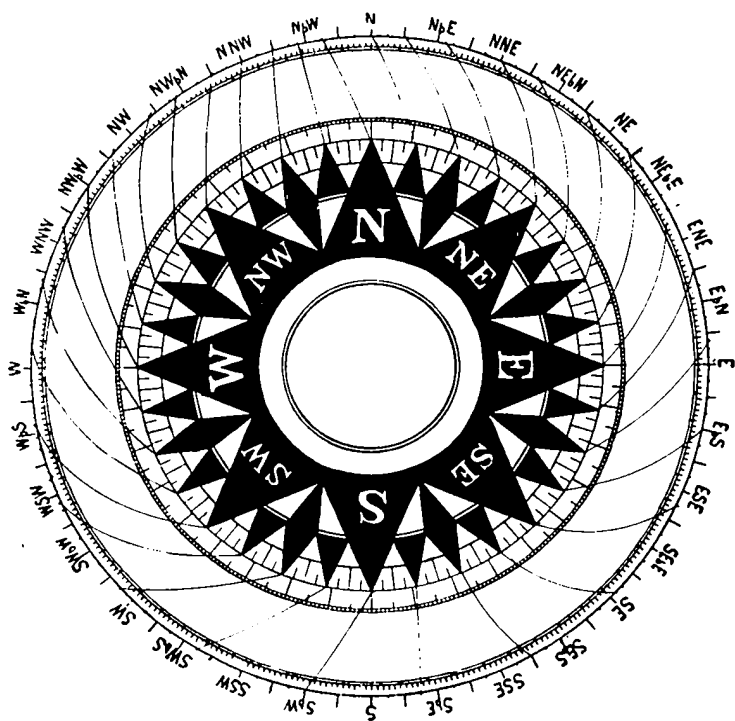
St. Paul, Kadiak.—Arrived here on the morning of June 7. Shortly after coming to anchor a fishing party landed upon a beach about $1\frac{1}{2}$ miles east of the town. A considerable number of flounders, sculpins, and salmon trout were caught in the drag seine. The following morning a second visit was made to the same place, thinking to lay in a supply of trout, but only one specimen was taken. A few cod were captured in the seine; they were very small and sickly looking. Several taken on hand lines by the crew, from the ship, were much more thrifty in appearance. Several native women and boys were noticed fishing with hand lines from the beach; the cod which they caught were small and emaciated. The white population of St. Paul always fish for cod and other bottom fish a mile or two from the islands, where plump and healthy fish are to be found.

Humboldt Harbor, Popof Island.—One hundred and fifty flounders and a few salmon (small fry) were caught in a drag seine at the mouth of a small creek. Two small halibut, weighing 5 pounds each, were taken on a hand line from the ship, the result of a day's fishing. Repeated hauls were made with the drag seine at Humboldt Harbor, but all species of fish except flounders were as scarce as they had been a week previous. A few cod and halibut were caught over the side of the ship; they were of fine quality, but too small for market.

Other islands of the Shumagin group.—Fishing was next carried on at Northeast Harbor, Sandy Cove, and Yukon Harbor. The first two places are situated on Little Koniushi Island, the last on Big Koniushi. At Sandy Cove cod were plentiful, 50 being caught in a short time; average weight, $7\frac{1}{2}$ pounds; the largest $16\frac{1}{2}$ and the smallest 4 pounds. At Northeast Harbor and Yukon Harbor only a few flounders were caught. The beaches being composed of large stones, it was difficult to find a place where the seine could be hauled.

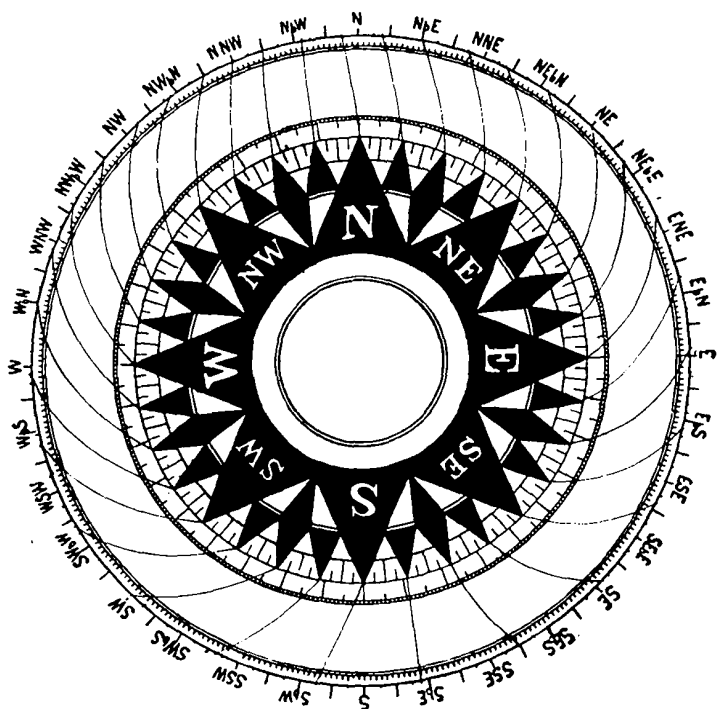
Mist Harbor, Nagai Island.—This is one of the finest harbors for a cod-fishing station in the Shumagin group. It is perfectly landlocked, and large enough to hold a large fleet of fishing vessels. The water is quite deep in all parts, with twenty odd fathoms within an eighth of a mile from the shore at the entrance. While cod are scarce in its near vicinity, it would nevertheless be a suitable place to establish fish-houses, wharfs, etc., for the curing of fish.

The drag seine was hauled in all parts of the harbor, but collecting was found to be poor. One salmon was seen to jump near the mouth of a small mountain stream, but repeated hauls failed to catch a specimen. It is very probable, however, that later in the season salmon strike here



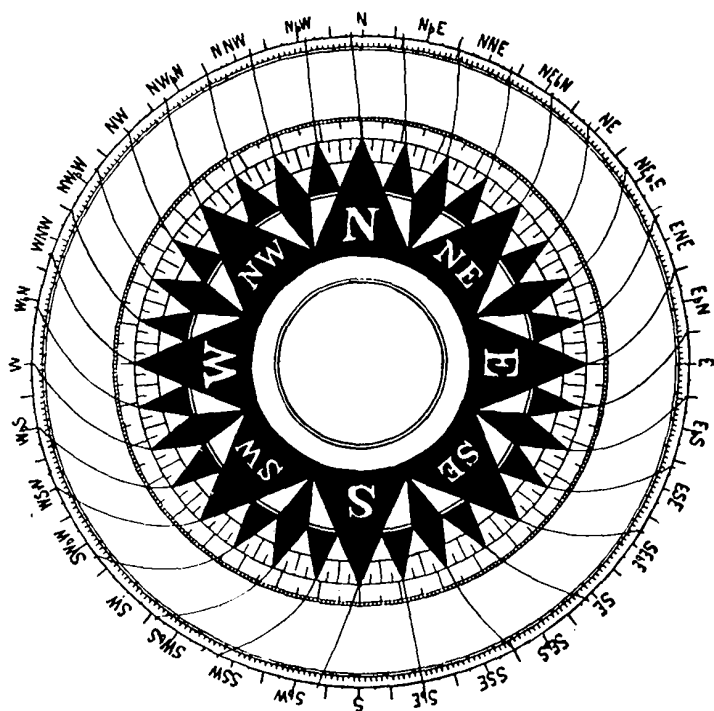
DEVIATION CARD. EAST OF ST. PAUL, KADIAK ISLAND.

Latitude 58° 00' N.; Longitude 152° 00' W. June 6, 1893.



DEVIATION CARD. OFF PORT TOWNSEND, WASHINGTON.

Latitude $48^{\circ} 06' N.$; Longitude $122^{\circ} 45' W.$ May 27, 1893.



DEVIATION CARD. OFF SANTA CRUZ, CALIFORNIA.
Latitude $36^{\circ} 57' N.$; Longitude $122^{\circ} 01' W.$ April 29, 1893.

in considerable numbers. The beaches near the water's edge are almost entirely destitute of animal life; it is only in depths of from 2 to 3 fathoms that life is found. The water is very clear, and the bottom can be distinctly seen at a considerable depth.

Finding it useless to haul the drag seine, I took the collecting boat and a couple of hand lines and anchored off a rocky point not far from the ship, where a number of bottom fish had been seen during the afternoon. I was rewarded by two cod weighing 3 pounds each. It was rapidly growing dark, and fishing was given up for the day. The two specimens taken answered every purpose, however, as they were sufficient to establish the occurrence of the species here. I see no reason why cod should not be plentiful about this harbor; it is possible that they may be in their season, for they may have times for visiting this locality.

The following morning we took a small drag seine in the dory, and rowed outside the entrance of the harbor about a mile to a beach across which the dory was dragged and launched into a small lake which had been observed from the ship the previous evening. Five hauls resulted in over twenty small trout and half a bucket of sticklebacks.

Sanborn Harbor, Nagai Island.—This harbor is situated on the west side of the island. It is well sheltered, and a good locality for establishing a fishing station. Hauls with the drag seine were made in every available place. Large numbers of flounders (two species), 6 salmon, 8 salmon trout, about a dozen sculpins, and a bucketful of young salmon were taken; the salmon were about 2 inches in length.

Several hundred small trout, a few tomcod, and a large number of starry flounders were caught in a small lake. The water from the lake had at one time emptied into the sea, but a dam composed of rocks and wood, built by fishermen, now prevents the sea from flowing in or the fresh water from flowing out, except what escapes under it. The water was perfectly fresh, but it did not seem to affect the salt-water species in the least, as those on board who sampled the flounders pronounced them equally as good as any previously taken in those waters.

No further fishing or collecting was carried on among the islands of this group.

Unalaska.—During the afternoon of June 28 the drag seine was hauled several times along the beach, or spit, which forms Dutch Harbor. Two flounders and four sea trout were the result of half a day's work. This has never proved to be a prolific beach for collecting. In 1888 several attempts were made to collect here, but each time we met with poor results. The beach in most places makes off very abruptly, and the bottom is nearly devoid of such life as attracts flounders and other food-fish. Clams are fairly abundant, and at low tide it is a common occurrence to see the crews of whalers, men-of-war, and other vessels on the beach with buckets and spades.

Record of hydrographic soundings, fiscal year 1893.

Date.	Serial No.	Time of day.	Position.		Depth.	Character of bottom.	Temperatures.			Machine and weight of sinker used.
			Lat. N.	Long. W.			Air.	Water.		
							Dry bulb.	Surface.	Bottom.	
1893.			° ' " "	° ' " "	Fms.					
Apr. 26	3240	10.00 a. m.	36 48 15	121 59 05	206	(No specimen)	58	54		Sigsbee, 35 pounds.
27	3241	8.33 a. m.	37 29 00	123 01 20	301	Stf. gy. M.	54	53		Do.

Record of dredging and trawling stations.

Serial No.	Date.	Time.	Position.		Temperature.			Depth.	Character of bottom.	Wind.		Instruments used.	Remarks.
			Lat. N.	Long. W.	Air.	Surface.	Bottom.			Direction.	Force.		
1893.			° ' " "	° ' " "	°	°		Fms.					
3477	Apr. 26	9.20 a. m.	36 50 00	121 59 45	54	51	46.5	80	Rky.	North	1	L. B. T.	
3478	do	11.24 a. m.	36 44 45	121 57 00	56	53		68	gy. S. M.	SW	2	L. B. T.	Surface tow net.
3479	Apr. 27	6.55 a. m.	37 28 00	123 00 00	52	50		276	gn. M. fin. S	WSW	3	L. B. T.	

Record of intermediate towing net.

Serial No.	Date.	Time.	Position.		Temperature.			Depth in fathoms.	Condition of sea.	Wind.		Appearance of sky.	Remarks.
			Lat. N.	Long. W.	Air.	Surface.	Bottom.			Direction.	Force.		
1893.			° ' " "	° ' " "	°	°							
*31	Apr. 26	10.11 a. m.	36 48 15	121 59 05	58	54		5 fathoms to surface	Smooth	North	1	Clear	Entire net open.
32	Apr. 27	8.30 a. m.	37 29 00	123 01 20	54	53	41.7	100 fathoms to surface	do	WNW	2	Clear	All specimens from upper net. Lower net closed, but empty.

* Serial Nos. 1-30, cable survey.

Meteorological and cruising record.

Date.	Meridian position.		Dis- tance run per log.	Barometer.		Temperature.		State of the weather.	Force and direction of winds.	Rain- fall (ap- prox.).	State of sea.	Currents.	Strength in knots per hour.	Number of hours sailing weather favorable.	Number of seals seen.				
						Air.													
	lat. N.	Long. W.		Max.	Min.	Dry bulb.	Wet bulb.									Water at surface.			
						Max. Min.	Max. Min.										Max. Min.		
1892.	° ' " ° ' "	Knots																	
July 1	48 37 00	125 01 00	97.3	30.40	30.26	59	53	58	53	59	52	Overcast and misty to clearing.	Variable, 2; Wly, 2	Misty.	Smooth	No account taken.	8	0	
2	50 13 30	129 41 00	211.9	30.38	30.35	57	51	56	49	56	51	Overcast and misty.	SE, veering to W., 2 to 4	Misty.	Smooth	East	0.3	14	0
3	51 23 00	134 17 00	192.9	30.35	30.14	51	48	50	47	54	51	Cloudy, misty, and foggy.	WSW, 4 to SSW, 5-6	Misty.	Moderate sea and swell.	South	0.4	0	0
4	52 18 00	138 26 00	172.1	30.23	30.00	50	48	50	47	50	48	Overcast and misty to air.	S'd, 7, veering to W. and NNW.	Misty.	Moderate	N. 46° E.	0.6	0	0
5	52 53 10	143 04 00	172.4	30.25	30.10	48	45	47	41	48	47	Overcast and foggy; drizzling at times.	SW., 4-5, hauling to S. and S. by W.	Light	Moderate	S. 12° W.	0.2	0	0
6	53 35 20	147 19 20	166.8	30.20	30.00	49	42	49	47	49	47	Foggy and misty; rain squalls in a.m.	S'd, 4-5	Light	Moderate chop.	N. 57° E.	0.5	0	0
7	53 55 00	151 50 10	164.8	30.50	30.17	49	47	48	46	49	48	Thick and misty; clear interval middle of day.	SW. by S, 4; S. by W., 3	Misty.	Moderate	S. 42° E.	0.2	0	0
8	53 57 00	156 56 00	188.4	30.50	30.22	51	48	50	47	50	48	Fair to misty; drizzling at times in p.m.	SSE, 2, to SE, 4; SE, 3	Light	Smooth; light swell.	N. 39° W.	0.4	16	0
9	53 50 00	162 24 20	179.0	30.29	29.90	50	45	50	45	50	44	Overcast, cloudy, and misty.	S. by E, 3, to SSE, 5	Misty	S' easterly swell.	N. 80° W.	0.6	0	1
10	Dudluk Harbor, Unalaska Island.		162.0	30.27	29.90	51	45	48	44	48	43	Fair and pleasant	S'd, 5-4; squally, 6	None.	Gentle	No account taken.	0	0	0
11	do		30.36	30.27	50	46	49	45	50	44	43	Generally pleasant; partly clear.	S., 3, shifting to NE, 2; calm.	None.					
12	do		30.34	29.82	54	46	53	46	51	47	45	Fair weather; cloudy at times.	Calm; S'd and E'd, 3 to 5; squally.	None.					
13	Dutch Harbor, Unalaska Island.		2.6	29.80	29.74	55	46	53	45	51	45	Fair and pleasant generally.	SE and S, 3 to 5; squally	None.					
14	do		29.80	29.57	53	46	51	45	49	45	45	Cloudy to misty and rainy in p.m.	Calm; S'd, 2-3	Light					
15	do		30.10	29.76	54	46	51	45	49	45	45	Fair and pleasant	S., 4-5; squalls, 6-7	None.					
16	do		30.40	30.12	64	46	57	45	50	45	45	Clear and pleasant	S. 5 to 3; squally in a.m.	None.					
17	do		30.44	30.28	57	46	57	45	51	47	47	Fair and pleasant; rain 10 to 12 p.m.	Calm generally; Ely, 1	Light					

Meteorological and cruising record—Continued.

Date.	Meridian position.		Distance run per log.	Barometer.		Temperature.				State of the weather.	Force and direction of winds.	Rain- fall (ap- prox.).	State of sea.	Currents.	Strength in knots per hour.	Number of hours sealing weather.	Number of seals seen.
						Air.		Water at surface.									
	Lat. N.	Long. W.		Max.	Min.	Dry bulb.	Wet bulb.										
						Max. Min.	Max. Min.										
1892.	° ' "	° ' "	Knots														
July 18	Dutch Harbor, Un- alaska Island.			30.26	30.14	56	50	56	49	51	48	Overcast, misty, and foggy.	Variable 1	Misty			
19	do	do		30.32	30.18	57	46	54	45	53	46	Overcast and foggy to fair and pleasant.	Calm; NE, 2 (1 to 7 p.m.); calm.	None			
20	do	do		30.43	30.32	56	43	53	42	54	46	Fair and pleasant	Ely, 1; occasional calms	None			
21	do	do		30.46	30.38	59	45	55	44	54	50	Fair and pleasant gener- ally; foggy to begin.	Calm; ENE, 3 (10 a.m. 2 p. m.); calm.	None			
22	do	do		30.40	30.29	58	48	57	47	55	51	Clear and pleasant	Calm; E, 1 (9 a.m., 7 p.m.); calm.	None			
23	do	do		30.29	30.14	66	49	63	48	57	50	Fair and pleasant gener- ally; foggy at times.	Calm; ENE, 3 (1 to 6 p.m.); calm.	None			
24	do	do		30.15	29.86	58	50	56	49	57	49	Generally pleasant; high fog.	Calm; S'd and E'd, 2 (11 a. m., 6 p.m.); calm.	None			
25	do	do		29.97	29.85	58	51	54	50	59	50	Fair and pleasant	S, 3	None			
26	do	do		29.95	29.76	58	51	56	51	59	53	do	S'd, 2-3	None			
27	do	do		29.89	29.75	60	51	58	50	56	51	Fair to overcast and misty.	E'd, 1; SSE, 2	Misty			
28	do	do		30.10	29.86	56	48	54	47	53	50	Fair and pleasant	NE, 3-2; calm	None			
29	do	do		30.20	30.10	54	46	52	45	53	50	Fair and pleasant to overcast.	Calm; NE, 3	None			
30	do	do		30.32	30.20	62	49	61	49	56	51	Misty and rainy to clearing.	E'd, 1 and 2	Light			
* 31	do	do		30.39	30.32	71	56	67	56	59	53	Fair and pleasant	S, 3 to 2; calm	None			
Aug. 1	do	do		30.42	30.33	63	55	61	54	59	53	Overcast and cloudy	NE, 2; calm	None			
2	do	do		30.35	30.20	59	52	57	50	58	50	Overcast, foggy, and misty.	E, 1	Misty			
3	54 01 30	165 58 30	30.6	30.19	29.85	57	51	55	50	55	46	Overcast and misty to fair and pleasant.	Calm; NW'd, 2; SW, 2	Misty	Smooth	No account taken.	16 0
4	54 00 12	161 18 00	169.4	29.82	29.70	59	52	57	51	55	52	Clear and pleasant	NW, by W. and NW, 3	None	Smooth	S. 36° W.	0.1 16 0
5	54 22 00	157 27 00	167.7	29.81	29.74	56	54	55	54	57	55	Overcast and misty	S'd, 2 to 4	Misty	Smooth	S. 65° W.	1.3 16 0
6	54 50 00	153 52 00	141.1	29.80	29.33	55	53	54	53	55	50	Overcast, misty, and rainy.	SSE, 4 to 7 to 4	Moder- ate.	Increasing to rough.	S. 78° W.	0.5 0 0

7	55 27 00	152 15 30	69.0	29.69	29.38	56 53 55 53	56	54	Overcast, foggy, and misty.	SW, 4; SSE, 3; variable, 2.	Misty. Choppy swell.	N. 15° E.	0.7	8	0	
8	55 53 00	147 42 00	174.0	29.72	29.67	55 53 54 53	56	53	Overcast and misty.	SW. to WSW, 4.	Misty. Moderate.	West.	0.8	0	0	
9	56 16 00	142 50 30	176.7	29.72	29.61	59 55 58 54	57	55	Cloudy to overcast and rainy.	W'd, 1-2 to 4 from 4 p. m.	Heavy. Moderate.	S. 69° W.	0.5	12	0	
10	56 46 00	138 05 00	168.5	29.73	29.60	63 55 60 54	60	56	Rainy to clear and pleasant.	W, 4; SSW, 3; WSW, 1.	Light. W. by swell.	S. 58° W.	0.4	16	0	
11	Sitka, SE. Alaska.		107.3	29.84	29.70	57 54 56 53	58	55	Overcast and rainy.	E. and ESE, 1.	Heavy. Smooth.	No account taken.		4	0	
12	do. do.		30.04	29.87	61 53 59 52	60	55	Misty to fair and pleasant.	Variable, 1; occasional calms.	Misty.						
13	do. do.		30.05	29.86	63 54 61 53	62	57	Clear and pleasant.	Calm; WSW, 3 (3 to 7 p. m.); calm.	None.						
14	do. do.		30.10	29.93	69 52 64 51	61	56	Fair and pleasant.	Calm; SSE, 1.	None.						
15	do. do.		30.31	30.11	63 56 61 56	62	58	Clear and pleasant.	Calm; SE by, 1 (8 a. m., 1 p. m.); calm.	None.						
16	do. do.		30.40	30.30	63 55 61 54	62	58	Cloudy to clear and pleasant.	Calm; W, 1 (8 a. m., 12 m.); calm.	None.						
17	56 50 00	135 28 30	18.0	30.47	30.40	64 54 62 53	64	57	Clear and pleasant.	Calm; S by, 1 (9 a. m., 6 p. m.); calm.	None.					
18	Sitka, SE. Alaska.		8.0	30.50	30.36	64 51 62 50	63	57	do.	S, 1; SSW, 2.	None.					
19	55 07 00	134 20 00	153.0	30.36	30.20	63 56 61 56	62	58	do.	E. veering to SE, 3 and 2.	None.	Smooth.	N. 17° W.	1.0	16	0
20	52 39 00	132 14 00	180.8	30.29	30.20	63 57 63 56	61	56	Misty to clear and pleasant.	SE to W, 3; WNW, 4.	Misty. Smooth.	N. 13° W.	0.5	16	0	
21	51 04 00	128 16 00	195.0	30.24	30.14	72 53 60 54	60	50	Clear and pleasant.	NW, 3; calm.	None.	Smooth.	N. 66° W.	0.7	12	0
22	50 24 00	125 28 00	139.6	30.14	29.88	80 53 69 53	70	50	Misty to clear and pleasant.	Variable, 1; occasional calms.	Misty. Smooth.	No account taken.				
23	Departure Bay, B.C.	105.5	30.10	29.93	66 60 64 58	66	61	Clear and pleasant.	ENE, 3; variable, 1.	None.	Smooth.					
24	48 59 00	123 25 00	28.0	30.24	30.10	66 55 65 54	66	52	do.	W'd, 2 to 4; calm.	None.	Smooth.				
25	Port Townsend, Wash.	79.7	30.26	30.16	62 51 59 51	52	50	Foggy to clear and pleasant.	Calm; WSW, 2 to 4.	None.						
26	do. do.		30.28	30.20	64 53 60 53	53	50	Clear to fair and pleasant.	Calm; WSW, 3-4.	None.						
27	do. do.		30.37	30.25	66 53 63 52	52	50	Clear and pleasant.	Calm; WNW, 3-2.	None.						
28	do. do.		30.31	30.05	69 53 66 52	53	49	do.	Calm; NW'd, 2; calm.	None.						
29	do. do.		30.08	29.93	68 55 65 54	53	50	do.	Calm; W'd, 1; WSW, 4.	None.						
30	48 11 00	123 11 00	23.0	30.19	30.05	57 54 55 53	51	50	Fair and pleasant.	S'd and W'd, 2 to 4.	None.	Smooth.	No account taken.			
31	46 35 00	125 02 00	193.2	30.25	30.15	70 54 64 53	60	50	Clear and pleasant.	W'd, 2; WNW, 4.	None.	Smooth.	North.	0.6	14	0
Sept. 1	43 04 00	124 46 00	207.1	30.15	30.02	62 51 59 50	53	46	Clear and pleasant to foggy.	N'd, 4; NNW, 2.	None.	Moderate.	S.	0.1	0	0
2	39 52 00	124 11 00	206.3	30.20	30.12	65 52 61 52	55	49	Fair and pleasant.	N'd and W'd, 3-5.	None.	Moderate.	N. 13° E.	0.5	0	0
3	Navy-yard, Mare Island, Cal.	185.5	30.15	30.05	66 54 63 54	61	50	Thick and hazy to fair and pleasant.	NW, 4; variable, 2; SW, 3.	None.	Smooth.	No account taken.		0	0	
4	do. do.		30.18	30.04	69 55 65 54	66	60	Clear and pleasant.	SSW, 2; WSW, 4.	None.						
5	do. do.		30.17	30.04	73 54 70 54	66	61	do.	SSW, 3-2.	None.						
6	do. do.		30.15	29.93	85 63 77 62	69	61	Clear and pleasant; cloudless.	SSW, 1.	None.						
7	do. do.		30.06	29.88	87 58 77 58	66	61	do.	SSW, 1-2.	None.						

Total distance steamed in July, 1,710.4 knots; total days under way at sea, 11.

Total distance steamed in August, 2,328.1 knots; total days under way, 20.

Meteorological and cruising record—Continued.

Date.	Meridian position.		Dis- tance run per log.	Barometer.		Temperature.						State of the weather.	Force and direction of winds.	Rain- fall (ap- prox.).	State of sea.	Currents.	Strength in knots per hour of prevailing weather.	Number of seals seen.
	Lat. N.	Long. W.		Max.	Min.	Air.		Water at surface.										
						Dry bulb.	Wet bulb.											
									Max. Min.	Max. Min.	Max. Min.							
1892.			Knots															
Sept. 8	Navy-yard, Mare Island, Cal.		30.06	29.93	65	56	64	56	66	63	Overcast to clear and pleasant.	SSW, 4	None.					
9	do. do.		30.14	30.01	67	57	65	57	66	61	do.	SSW, 2-3	None.					
10	do. do.		30.14	29.98	69	56	67	56	65	62	Clear and pleasant.	W, 2; SSW, 3; WSW, 4	None.					
11	do. do.		30.08	29.92	67	56	65	55	65	60	do.	SSW, 3	None.					
12	do. do.		30.00	29.88	66	55	65	55	65	62	Cloudy to clear and pleasant.	SSW, 2; WSW, 3	None.					
13	do. do.		30.00	29.89	68	58	66	57	65	60	do.	SW, 2-3	None.					
14	do. do.		30.12	30.00	70	58	67	56	65	59	Clear and pleasant.	WSW and SSW, 2	None.					
15	do. do.		30.18	30.06	71	60	69	59	65	60	Fair and pleasant.	S'd and W'd, 1	None.					
16	do. do.		30.18	30.09	67	58	65	57	64	60	Fair to clear and pleas- ant.	SW, 2-4	None.					
17	do. do.		30.22	30.10	68	58	66	57	65	60	Fair and pleasant.	SW 1/2, 1; SSW, 2	None.					
18	do. do.		30.18	30.10	71	57	70	57	67	59	Clear and pleasant.	SSW, 2-3	None.					
19	do. do.		30.18	30.02	77	60	73	60	65	61	do.	WSW, 2	None.					
20	do. do.		30.06	29.89	68	60	67	59	65	61	Fair to clear and pleas- ant.	SSW, 2	None.					
21	do. do.		29.96	29.87	65	57	63	56	64	62	Cloudy and unsettled to fair.	S'd, 1 to 3	None.					
22	do. do.		30.04	29.95	69	56	65	55	65	51	Clear and pleasant.	SW, 1; S to WSW, 2	None.					
23	do. do.		30.14	30.00	78	57	70	56	64	62	do.	SSW, 2	None.					
24	do. do.		30.17	29.98	79	60	73	59	67	62	do.	SSW, 2; SW, 1	None.					
25	do. do.		30.10	29.88	79	61	74	60	65	62	Fair and pleasant.	S'd and W'd, 1	None.					
26	do. do.		30.02	29.89	76	63	74	62	67	63	Clear and pleasant.	do.	None.					
27	do. do.		29.96	29.86	73	60	71	58	65	63	do.	S'd and W'd, 1; S, 4; S'd and W'd, 1.	None.					
28	do. do.		29.95	29.84	66	59	65	59	64	62	Clear and pleasant to cloudy.	WSW, 1; SSW, 2-4	None.					
29	do. do.		29.97	29.85	70	61	68	60	66	64	Cloudy, but pleasant.	S'd and W'd, 1	None.					
* 30	do. do.		30.16	29.93	68	59	66	58	67	62	Fair and pleasant.	SSW and W, 1 and 2	None.					
Oct. 1	do. do.		30.19	29.98	75	56	70	56	65	63	Clear and pleasant.	Calm; S'd and W'd, 1 and 2	None.					
2	do. do.		30.09	29.92	80	60	72	59	66	62	do.	Calm; SW, 1	None.					
3	do. do.		30.06	29.93	76	58	71	57	70	61	do.	Calm; SSW, 1	None.					
4	do. do.		30.08	29.94	73	62	70	61	78	63	Fair to clear and pleas- ant.	SSW, 1-2	None.					

5	do	do	29.99	29.90	73	60	70	58	67	63	Fair and pleasant.	Calm; SSW, 2-3.	None				
6	do	do	30.04	29.94	65	58	63	58	66	62	Overcast and cloudy, occasional showers.	S'd and W'd, 1 to 3 in squalls.	Light				
7	do	do	30.08	29.98	65	58	63	58	65	62	Clear and pleasant.	SW. and SSW, 1.	None				
8	do	do	30.09	29.98	67	58	65	57	65	61	Cloudy to overcast and rainy.	SSW, 2; to S'd and E'd, 4-5.	Light				
9	do	do	30.22	20.06	70	59	68	57	65	60	Cloudy and drizzling to clearing.	S'd and W'd, 2.	Light				
10	do	do	30.20	30.04	73	55	67	54	64	61	Fair and pleasant.	SSW. and WSW, 2-3.	None				
11	do	do	30.16	30.03	70	54	67	53	63	57	do	N'd and W'd, 2 to 4.	None				
12	do	do	30.09	29.97	76	60	69	57	67	58	Clear and pleasant.	N'd 4-3; variable, 1.	None				
13	do	do	30.06	29.90	78	53	67	52	63	58	do	Calm; SSW, 2.	None				
14	do	do	30.00	29.88	62	48	60	47	62	58	do	S'd and W'd, 1-3.	None				
15	do	do	30.00	29.93	59	48	56	47	60	54	Cloudy; rain and mist middle of day.	W, 1; SSW, 1-2.	Light				
16	do	do	30.23	30.00	60	52	59	51	60	54	Cloudy; occasional showers.	S'd and W'd, 1.	Light				
17	do	do	30.35	30.22	61	49	59	48	60	53	Fair and pleasant.	Calm; SSW, 1.	None				
18	do	do	30.20	29.99	65	50	64	49	60	55	Clear and pleasant.	Calm; SSW, 1; calm.	None				
19	do	do	30.06	29.90	69	51	67	50	60	55	do	Calm; SSW, 1 (9 a.m., 6 p.m.); calm.	None				
20	do	do	30.04	29.90	70	54	65	52	60	56	do	SSW, 1.	None				
21	do	do	30.18	30.02	62	50	61	50	59	54	Fair and pleasant; misty early morning.	SSW, 1-2.	Misty				
22	do	do	30.12	29.98	60	50	58	50	60	55	Clear and pleasant.	S'd and W'd, 1 and 2.	None				
23	do	do	30.16	30.03	60	49	59	48	58	53	Fair and pleasant.	W'y, 1.	None				
24	do	do	30.22	30.10	61	51	60	51	58	54	Foggy to fair and pleasant.	Calm; SSW, 1 (8 a.m., 4 p.m.); calm.	None				
25	do	do	30.19	30.00	67	52	65	52	60	55	Fair and pleasant.	Calm; SW, 1 (12 m., 4 p.m.); calm.	None				
26	do	do	30.10	29.88	70	53	67	53	62	55	Clear and pleasant.	Calm; SSW, 4.	None				
27	do	do	30.10	30.00	63	54	61	53	59	56	do	Variable 1; SSW, 2 to 4.	None				
28	do	do	30.14	30.06	63	55	61	54	59	56	Overcast to fair and pleasant.	W, 1; SSW. and SW, 2.	None				
29	do	do	30.17	30.08	62	53	60	52	60	56	Fair to cloudy, but pleasant.	WNW, 1; SSW, 2.	None				
30	do	do	30.22	30.13	58	54	58	54	59	57	Overcast and rainy.	N'd and E'd, 1 and 2.	Mod- ate.				
31	do	do	30.29	30.16	64	55	63	54	59	57	Overcast and misty to clearing.	Calm; NW, 2; S'd and W'd, 1.	Misty				
Nov. 1	do	do	30.24	30.10	65	52	66	51	60	57	Clear and pleasant.	SSW, 2; calm.	None				
2	do	do	30.23	30.16	68	52	65	52	59	57	do	E'y, 2; SW, 1; calm.	None				
3	do	do	30.22	30.06	69	55	66	55	61	57	Fair to clear and pleasant.	N'd and E'd, 2; calm.	None				
4	do	do	30.20	30.06	68	54	64	53	59	56	Fair and pleasant.	Calm; SW, 2.	None				
5	do	do	30.26	30.12	63	53	62	52	58	56	Foggy to fair and pleasant.	Calm; SW, 2; calm.	None				
6	do	do	30.18	30.07	60	52	59	52	58	56	do	Calm; SSW, 2 (10 a.m., 5 p.m.); calm.	None				

* Total distance steamed in September, 599.9 knots; total days under way, 3.

Meteorological and cruising record—Continued.

Date.	Meridian position.		Distance run per log.	Barometer.		Temperature.				State of the weather.	Force and direction of winds.	Rain-fall (approx.).	State of sea.	Currents.	Strength in knots per hour of southerly weather.	Number of seals seen.	
						Air.											
	Lat. N.	Long. W.		Max.	Min.	Dry bulb.	Wet bulb.	Water at surface.									
				Max.	Min.	Max.	Min.	Max.	Min.								
1892.			Knots														
Nov. 7	Navy-yard, Mare Island, Cal.			30.17	30.02	68	49	66	49	60	55	Foggy to fair and pleasant.	Calm; SSW, 1 (11 a. m., 4 p. m.); calm.	None.			
8	do	do		30.18	30.07	69	53	65	53	60	55	Clear and pleasant.	E., 2-1; calm.	None.			
9	do	do		30.30	30.17	70	57	65	56	60	55	Fair and pleasant.	Calm; E, 2 (9 a. m., 4 p. m.); calm.	None.			
10	do	do		30.31	30.13	68	54	66	54	60	56	Clear and pleasant.	Calm; SW, 1 (1 to 3 p. m.); calm.	None.			
11	do	do		30.25	30.09	69	53	64	53	60	56	do	Calm; SSW, 1.	None.			
12	do	do		30.30	30.16	64	55	63	54	58	56	do	Calm; SW by E, 1 (5 a. m., 4 p. m.); calm.	None.			
13	do	do		30.30	30.15	64	49	60	49	60	54	do	SSW, 1.	None.			
14	do	do		30.23	30.09	61	49	59	48	58	55	do	SW and SSW, 2; calm.	None.			
15	do	do		30.20	30.12	59	45	57	44	57	51	Clear to fair and pleasant.	W by E, 1-3.	None.			
16	do	do		30.36	30.21	59	44	55	43	57	51	Clear and pleasant.	W, 1; SW, 2; calm.	None.			
17	do	do		30.43	30.30	58	42	55	41	55	50	do	Calm; E, 2 (9 a. m., 3 p. m.); calm.	None.			
18	do	do		30.36	30.15	65	46	63	44	57	51	do	E. and ENE, 2; calm.	None.			
19	do	do		30.23	30.07	60	48	59	47	57	51	do	S by E and E by S, 1.	None.			
20	do	do		30.20	30.06	60	48	59	48	55	53	Foggy and misty to fair and pleasant.	SSW, 1-2.	Misty.			
21	do	do		30.26	30.12	63	46	60	46	58	51	Foggy to fair and pleasant.	Calm.	None.			
22	do	do		30.20	30.10	59	52	58	51	56	51	Fair and pleasant to overcast.	Calm; variable, 1; calm.	None.			
23	do	do		30.07	29.92	58	44	57	43	55	51	Overcast and rainy to clearing.	SW, 3; squalls, 4-5, frequent.	Moderate.			
24	do	do		30.24	30.08	50	40	48	40	52	49	Clear and pleasant.	SW by E, 1.	None.			
25	do	do		30.15	29.98	49	42	48	41	52	49	Fair to rainy to clearing.	Variable, 1.	Moderate.			
26	do	do		30.10	29.92	53	45	51	45	53	49	Fair and pleasant.	E. and SE, 1.	None.			
27	do	do		29.88	29.64	58	52	57	50	52	50	Overcast, rainy, and stormy.	S'd and E'd, 4; squalls, 6-7, frequent.	Heavy.			
28	do	do		29.85	29.60	58	54	57	53	53	50	Cloudy, rainy, and stormy.	S'd and E'd, 7.	Heavy.			

29	do	do	23.92	23.72	60	57	59	56	54	51	Cloudy and stormy; rain squalls.	SSE, 7, to SSW, 6.	Moderate.				
30	do	do	30.00	29.60	60	48	59	47	52	51	Stormy and rainy to moderating.	S'd and W'd, 10, moderating to 3.	Heavy.				
Dec. 1	do	do	30.14	30.02	55	48	54	47	53	49	Clear and pleasant.	E, 1.	None.				
2	do	do	30.01	29.84	58	53	58	52	52	51	Overcast and rainy.	S'd, 1.	Moderate.				
3	do	do	30.12	29.90	55	49	54	48	52	50	Cloudy and drizzly to clearing.	SSW, 1-2.	Light.				
4	do	do	30.22	30.09	51	44	50	44	52	50	Fair and pleasant.	W'y, 1-2.	None.				
5	do	do	30.32	30.16	52	41	51	40	50	48	Clear and pleasant.	Calm; variable airs occasionally.	None.				
6	do	do	30.38	30.27	50	41	49	40	50	44	Fair and pleasant.	NE, 2; E, 3.	None.				
7	do	do	30.34	30.17	51	41	50	40	48	43	Clear and pleasant.	Calm; E, 1-2; calm.	None.				
8	do	do	30.33	30.24	50	40	48	40	48	43	do	Calm; E, 2 (7 a. m., 6 p. m.); calm.	None.				
9	do	do	30.39	30.27	44	39	43	39	46	42	Foggy and misty to fair and pleasant.	E, and ENE, 2-3.	Misty.				
10	do	do	30.27	30.11	55	41	50	40	47	44	Overcast to clear and pleasant.	NE, 1; NW, 4.	None.				
11	do	do	30.22	30.07	58	45	53	42	48	45	Clear and pleasant.	NW, 1; NNE, 3.	None.				
12	do	do	30.23	30.24	48	39	47	38	46	44	Clear and pleasant; cold.	E, 2.	None.				
13	do	do	30.41	30.30	51	38	50	37	46	43	do	Calm; S, 1, veering to NNW, 3.	None.				
14	do	do	30.51	30.40	55	43	52	41	46	44	Clear and pleasant.	N'd, 4; E, 2; ENE, 3.	None.				
15	do	do	30.49	30.30	52	40	50	39	46	42	do	Calm; ESE, 2 (9 a. m., 4 p. m.); calm.	None.				
16	do	do	30.28	30.13	57	41	55	40	47	43	do	E'd, 3-2; variable 1.	None.				
17	do	do	30.32	30.18	55	42	53	40	46	44	do	N'y, 2; calm; NNW, 2; calm.	None.				
18	do	do	30.29	30.16	49	39	47	38	45	41	do	Calm; variable airs occasionally.	None.				
19	do	do	30.28	30.20	48	42	47	40	44	42	Overcast and cloudy; misty 1 to 4 p. m.	Calm; E, 2; variable, 1.	Misty.				
20	do	do	30.23	30.09	52	40	51	39	45	42	Overcast to fair and pleasant.	SSW, 1; calm; variable, 1 and 2.	None.				
21	do	do	30.13	30.02	49	36	48	35	45	42	Cold and foggy to overcast and rainy.	S'd and E'd, 2-4.	Light.				
22	do	do	30.12	30.01	58	51	56	50	47	44	Overcast and rainy.	SE, 4, to ESE, 3.	Moderate.				
23	do	do	30.00	29.58	60	53	59	52	47	43	Overcast, rainy, and stormy.	ESE, 2-3; SE, 4, with squalls, 6.	Heavy.				
24	do	do	30.24	29.63	63	54	61	53	51	46	Overcast and rainy to clearing.	S'd and E'd, 3-5; SW, 2; calm.	Moderate.				
25	do	do	30.32	30.22	60	53	60	53	52	48	Overcast and rainy.	E'd, 1-2; calm.	Moderate.				
26	do	do	30.43	30.32	62	58	61	57	53	49	Overcast and unsettled; showery in a. m.	S'd and W'd, 1-2.	Light.				
27	do	do	30.36	30.23	60	56	59	55	53	44	Overcast, misty, and foggy.	Calm; SW, 1.	Misty.				

Meteorological and cruising record—Continued.

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REPORT OF COMMISSIONER OF FISH AND FISHERIES.

Date.	Meridian position.		Distance run per log.	Barometer.		Temperature.				State of the weather.	Force and direction of winds.	Rain-fall (approx.).	State of sea.	Currents.	Strength in knots per hour.	Number of hours sailing weather.	Number of seals seen.
	Lat. N.	Long. W.		Max.	Min.	Air.		Water at surface.									
						Dry bulb.	Wet bulb.										
									Max.									Min.	Max.	Min.
1892.			Knots														
Dec. 28	Navy-yard, Mare Island, Cal.			30.34	30.24	58	50	57	49	54	47	Clear and pleasant.	W., 2; SW., 2.	None			
29	do.	do.		30.36	30.27	60	49	58	48	51	48	do.	W., 2	None			
30	do.	do.		30.43	30.34	56	48	53	44	50	46	do.	E. and NE., 2	None			
31	do.	do.		30.50	30.36	55	44	51	43	49	45	do.	NE., 2	None			
1893.																	
Jan. 1	do.	do.		30.43	30.30	48	43	47	42	50	44	Clear to cloudy and foggy.	Calm; NE., 2	None			
2	do.	do.		30.38	30.29	46	41	45	41	48	45	Foggy to clear and pleasant.	NE., 2-3	None			
3	do.	do.		30.43	30.31	45	42	44	41	46	43	Foggy to fair and pleasant.	ENE., 2-3	None			
4	do.	do.		30.38	30.28	44	40	43	40	46	44	do.	ENE., 3-4	None			
5	do.	do.		30.33	30.23	42	40	42	39	45	43	Heavy fog to fair a.m.	ENE. and E., 2-3	None			
6	do.	do.		30.25	30.16	43	39	42	38	45	42	Overcast, cloudy, and foggy.	ENE., 3; E., 2-4	None			
7	do.	do.		30.35	30.24	43	38	42	37	45	41	Cold and foggy to fair and pleasant.	E., 3	None			
8	do.	do.		30.44	30.32	43	37	43	37	45	41	Overcast and foggy; disagreeable.	E., 3; ENE., 4	None			
9	do.	do.		30.37	30.25	41	36	40	36	45	41	Cold, cloudy, and foggy; very disagreeable.	ENE. and E., 3	None			
10	do.	do.		30.30	30.21	43	36	43	36	45	44	Foggy to cloudy, to fair and pleasant.	ENE., 2	None			
11	do.	do.		30.31	30.20	45	38	44	37	46	42	Clear, but cold and disagreeable.	ENE. and E., 2-3; squalls 4, 1 a.m. to 4 a.m.	None			
12	do.	do.		30.32	30.22	44	39	43	38	46	43	Overcast and cloudy.	E., 4; ENE., 3	None			
13	do.	do.		30.24	30.12	53	42	53	41	50	41	Dry dock. Clear to fair and pleasant.	Calm; ENE., 1; calm	None			
14	do.	do.		30.23	30.16	55	47	54	46	50	46	Fair to overcast and drizzling.	Calm; E. and ESE., 1	Light			
15	do.	do.		30.28	30.16	55	50	54	49	50	49	Overcast and rainy.	ESE., 1	Heavy			
16	do.	do.		30.25	30.15	56	46	54	45	50	45	Fair to clear and pleasant.	Calm; W by., 1-2 (8 a.m., 5 p.m.); calm.	None			

17	do	do	do	30.31	30.17	50	44	55	43	do	Clear and pleasant	Calm; WSW, 1 (11 a.m., 5 p.m.); calm.	None				
18	do	do	do	30.30	30.15	55	41	54	40	do	Foggy to clear and pleasant.	Calm; E, 2 (8 a.m., 6 p.m.); calm.	None				
19	do	do	do	30.25	30.12	56	38	54	37	do	Clear and pleasant	Calm; E'ly, 2 (10 a.m., 6 p.m.); calm.	None				
20	do	do	do	30.29	30.19	52	38	51	36	do	do	Calm; E, 2 (7 a.m., 8 p.m.); calm.	None				
21	do	do	do	30.42	30.30	48	38	47	38	do	Foggy; partly clear, 10 a.m. to 5 p.m.	E, 2	None				
22	do	do	do	30.53	30.42	46	39	45	39	do	Fair and pleasant	E, 2-3	None				
23	do	do	do	30.50	30.32	49	37	48	37	do	Foggy to fair and pleasant.	E, 2	None				
24	do	do	do	30.32	30.09	45	38	44	38	do	do	ESE, 3	None				
25	do	do	do	30.08	29.99	44	38	43	38	do	Overcast and cloudy	E, 3-2	None				
26	do	do	do	29.94	29.60	58	42	55	42	do	Overcast and rainy	E, 3; SE, 5; S, 4	Heavy				
27	do	do	do	30.12	29.69	53	45	52	45	do	Overcast and rainy to clearing.	S, 4; squally, 6; WSW, 2	Heavy				
28	do	do	do	30.26	30.12	54	43	53	42	do	Fair and pleasant; light drizzle.	E, 1; S, 2	Light				
29	do	do	do	30.28	30.04	56	42	55	42	do	Fair and pleasant to drizzling.	E, 1 and calms; E, 2-3	Light				
30	do	do	do	30.09	29.75	49	41	48	40	do	Overcast and rainy to clearing.	N, 7 to ENE, 4; to SE, 2	Moderate.				
31	do	do	do	30.14	30.02	50	35	48	35	do	Clear and pleasant	Calm; variable, 1 (9 a.m., 6 p.m.); calm.	None				
Feb. 1	do	do	do	30.27	30.08	50	34	48	33	do	Clear and cold to cloudy and rainy.	S'd and W'd, 1-2	Light				
2	do	do	do	30.37	30.25	54	39	53	38	do	Clear and pleasant	S'd and E'd, 1	None				
3	do	do	do	30.27	30.06	53	40	52	39	do	Overcast and showery	E, 2; SE, 3-4; and squalls, 5-6	Light				
4	do	do	do	30.05	29.85	53	47	52	46	do	Stormy and rainy to fair.	SE, 4-6, and squalls, 7; WSW, 3-2	Moderate.				
5	do	do	do	30.42	30.06	50	43	50	42	do	Rainy to fair and pleasant.	SW and WSW, 2	Light				
6	do	do	do	30.48	30.33	51	36	49	35	do	Clear and cold	Variable, 1; E, 1	None				
7	do	do	do	30.32	30.00	48	38	47	37	do	Fair and pleasant to overcast and rainy.	E, 2-3	Light				
8	do	do	do	30.20	29.93	53	46	52	45	do	Overcast and rainy	SE, 2; SW, 2; SE, 2	Moderate.				
9	do	do	do	30.26	29.98	53	46	52	45	do	Overcast and rainy to fair and pleasant.	E, 2-3	Moderate.				
10	do	do	do	30.49	30.30	55	45	54	44	do	Cloudy and misty to fair and pleasant.	Calm; S, 1 (1 p.m., 8 p.m.); calm.	None				
11	do	do	do	30.51	30.32	53	47	52	47	do	Foggy, misty, and cloudy.	Calm; ESE, 1-3	None				
12	do	do	do	30.30	30.18	54	42	52	41	do	Overcast and rainy to fair.	SSE, 3; WSW, 3; W, 4	Light				
13	do	do	do	30.32	30.18	52	38	49	38	do	Clear and pleasant	W and WSW, 2	None				
14	do	do	do	30.42	30.25	57	42	50	41	do	do	N'd and W'd, 3	None				
15	do	do	do	30.46	30.32	59	37	55	36	do	Clear to fair and pleasant.	Calm; E'ly, 2 (2 p.m., 5 p.m.); calm.	None				

Meteorological and cruising record—Continued.

Date.	Meridian position.		Distance run per log.	Barometer.		Temperature.				State of the weather.	Force and direction of winds.	Rain-fall (approx.).	State of sea.	Currents.	Strength in knots per hour of surface wind.	Number of hours of bad weather.	Number of seals seen.
	Lat. N.	Long. W.		log.	Max.	Min.	Air.		Water at surface.								
							Dry bulb.	Wet bulb.									
1893.																	
Feb. 16	Navy-yard, Mare Island, Cal.			30.44	30.33	58	40	57	39	Dry dock.	Fair and pleasant.	Calm; Ely. 1 (6 a. m., 6 p. m.); calm.	None.				
17	do.	do.		30.39	30.27	62	45	58	44	do.	do.	Calm; ENE. 1 (8 a. m., 4 p. m.); calm.	None.				
18	do.	do.		30.40	30.29	61	42	58	41	do.	do.	Calm; S'd and W'd, 1.	None.				
19	do.	do.		30.47	30.30	64	46	62	45	do.	Clear and pleasant.	Calm	None.				
20	do.	do.		30.35	30.20	68	44	63	43	do.	do.	Calm; Ely. 1 (3 p. m., 7 p. m.); calm.	None.				
21	do.	do.		30.36	30.23	63	43	59	42	do.	do.	Calm; S'd and W'd, 1.	None.				
22	do.	do.		30.39	30.20	71	44	60	43	do.	do.	N'd and W'd, 1.	None.				
23	do.	do.		30.39	30.18	70	45	62	43	do.	do.	Calm; W'd, 1 (in forenoon); calm.	None.				
24	do.	do.		30.38	30.09	71	49	68	47	do.	do.	Calm; variable, 1; calm	None.				
25	do.	do.		30.17	29.95	65	46	62	44	do.	do.	Calm; S'd and W'd, 2 to 7.	None.				
26	do.	do.		30.09	29.96	60	43	56	41	do.	do.	WNW, 4; W., 2-1.	None.				
27	do.	do.		30.18	30.06	61	40	58	39	do.	do.	Calm; W'ly. 1 (4 a. m., 8 p. m.); calm.	None.				
28	do.	do.		30.18	30.02	56	42	54	41	do.	Fair and pleasant; cloudy.	Calm; SW'ly. 1 (9 a. m., 7 p. m.); calm.	None.				
Mar. 1	do.	do.		30.04	29.92	62	44	59	43	do.	Clear and pleasant.	Calm; S'd and E'd, 1 (8 a. m., 6 p. m.); calm.	None.				
2	do.	do.		30.06	29.90	65	43	61	42	do.	do.	Calm	None.				
3	do.	do.		30.09	29.88	62	53	59	52	do.	Overcast and cloudy.	Calm; ESE, 2-3.	None.				
4	do.	do.		29.87	29.70	57	48	55	47	do.	Overcast and rainy.	S'd and E'd, 3-2.	Moderate.				
5	do.	do.		30.00	29.89	56	47	54	46	51	48	Overcast and drizzly to clearing and fair.	East, 2, hauling via S'd, to W.	Light			
6	do.	do.		30.08	29.97	60	45	58	44	52	47	Clear and pleasant.	Calm; S'd and W'd, 1.	None.			
7	do.	do.		30.09	29.77	58	49	56	48	52	50	Overcast and cloudy to rainy.	SSW, 2; SSE, 2.	Light			
8	do.	do.		29.90	29.78	54	44	51	42	51	47	Overcast and cloudy to fair.	SW., 2-3.	None.			
9	do.	do.		30.18	29.90	54	38	53	37	50	48	Fair and pleasant.	W., 2-3.	None.			
10	do.	do.		30.24	30.03	56	45	54	44	51	48	Fair to overcast and threatening.	Calm; S'd and E'd, 2-3.	None.			

11	do	do	30.37	29.89	53	44	52	42	51	47 Stormy and rainy to clearing.	SE, 3; W'd 5-9-3	Heavy
12	do	do	30.57	30.39	56	39	54	38	52	45 Clear and pleasant.	W'd 1-2	None
13	do	do	30.53	30.02	55	41	54	40	52	47 do	Calm; ENE, 3	None
14	do	do	30.01	29.71	49	48	48	47	50	47 Overcast to rainy to cloudy.	ENE, 4-2; calm	Light
15	do	do	30.31	29.86	56	47	55	46	52	47 Cloudy; frequent passing showers.	S'd and W'd 1-2	Light
16	do	do	30.42	30.32	59	48	57	47	52	49 Cloudy and showery to fair.	Variable; 1; SSW, 2; calm	Light
17	do	do	30.39	30.27	62	52	60	50	57	50 Fair and pleasant.	Calm; SW, 1-2 (7 a.m., 9 p.m.); calm	None
18	do	do	30.29	30.09	60	52	59	51	53	50 Fair to drizzly and rainy.	S, 1; SSW, 2	Light
19	do	do	30.08	29.94	62	54	60	53	53	50 Overcast, drizzly, and misty.	SSW, to S, 2	Light
20	do	do	29.91	29.68	62	52	60	50	55	51 Overcast, drizzly, and rainy.	S'd 2-3	Moderate
21	do	do	29.94	29.71	62	47	61	46	56	50 Cloudy and rainy to clearing.	WSW, 2; W, 3	Light
22	do	do	30.15	29.94	57	44	55	43	53	48 Fair and pleasant.	W, 2	None
23	do	do	30.25	30.14	56	47	55	46	52	50 Fair to misty and rainy.	W, 1; SE and E, 2	Light
24	do	do	30.29	30.20	63	50	61	49	55	51 Overcast and cloudy to fair.	Calm; W'y. 1 (12 m., 8 p.m.); calm	None
25	do	do	30.33	30.23	64	50	62	49	56	50 Cloudy, but pleasant.	Calm; W'd 1	None
26	do	do	30.35	30.21	65	54	63	53	57	53 Overcast and cloudy to fair.	S, 1; SW, 2; calm	None
27	do	do	30.26	30.06	70	50	69	49	59	53 Fair and pleasant.	Calm; E, 2 (10 a.m., 8 p.m.); calm	None
28	do	do	30.12	29.95	74	55	72	53	61	54 do	Calm; E, 2 (6 a.m., 5 p.m.); calm	None
29	do	do	30.22	30.03	68	55	65	54	61	55 Fair and pleasant to overcast.	SW, 2-4; SSW, 3	None
30	do	do	30.33	30.22	61	51	60	50	60	56 Overcast to fair and pleasant.	SSW, 2-3	None
31	do	do	30.39	30.22	65	46	62	45	62	53 Clear and pleasant.	SW, 2; SSW, 2-1	None
Apr. 1	do	do	30.27	30.06	72	46	70	45	60	55 do	S'd and W'd 1-3	None
2	do	do	30.26	30.09	63	48	60	46	59	53 Fair to overcast and drizzly.	W, 3; SW, 4; squally at times	Light
3	do	do	30.32	30.26	68	54	61	52	59	54 Fair and pleasant.	S, 2; SSW, 2	None
4	do	do	30.29	30.10	67	56	65	55	61	57 Fair to cloudy to overcast.	Calm; S, 1-2	None
5	do	do	30.10	29.71	63	50	60	48	59	50 Overcast, rainy, and stormy.	SSE, 3; S'd 3, and squalls, 7	Moderate
6	do	do	30.30	29.79	58	46	55	44	56	53 Boisterous and rainy to clearing.	S'd and W'd, 3, and squalls, 7; W, 3	Moderate
7	do	do	30.35	30.28	58	45	55	43	56	52 Cloudy and rainy.	Calm; S, 1-2	Moderate
8	do	do	30.40	30.32	64	50	61	48	56	54 Overcast and cloudy to fair.	E, 1; calm; S. to W, 2	None
9	do	do	30.38	30.13	62	45	60	44	57	53 Fair to overcast and drizzly.	Calm; S, 1; SSW, 2-3	Light

Meteorological and cruising record—Continued.

Date.	Meridian position.		Dis- tance run per log.	Barometer.		Temperature.				State of the weather.	Force and direction of winds.	Rain- fall (ap- prox.).	State of sea.	Currents.	Strongest wind, knots per hour.	Number of hours sailing weather.	Number of seals seen.
						Air.		Water at surface.									
	Dry bulb.	Wet bulb.															
				Max. Min.	Max. Min.	Max. Min.											
Lat. N.	Long. W.	Max.	Min.	Max.	Min.	Max.	Min.										
1883.	° ' "	° ' "	Knots														
Apr. 10	Navy-yard, Mare Island, Cal.			30.28	30.13	58	43	55	42	59	52	Fair and pleasant	W., 4-6	None			
11	do.	do.		30.27	30.18	63	48	61	47	57	52	Cloudy but pleasant	W., 3; SW., 2; W., 3	None			
12	do.	do.		30.42	30.28	65	43	63	42	56	51	Clear and pleasant	S'd and W'd, 3; calm	None			
13	do.	do.		30.43	30.30	64	46	61	43	57	52	do	NW., 4; W., 3; S., 1	None			
14	do.	do.		30.35	30.16	73	49	69	47	60	53	do	Calm; W., 1 (12 m. 7 p. m.); calm.	None			
15	do.	do.		30.22	30.06	69	49	65	47	60	54	do	Calm; SW., 1	None			
16	do.	do.		30.30	30.16	65	45	62	46	59	53	do	S'd and W'd, 1-2	None			
17	do.	do.		30.38	30.28	63	49	59	47	58	53	do	WSW., 2-3	None			
18	do.	do.		30.42	30.30	63	47	62	45	59	50	do	WSW., 1-2	None			
19	do.	do.		30.36	30.20	68	49	65	47	60	54	do	Calm; S'd, 1-2	None			
20	do.	do.		30.25	30.07	70	56	67	53	61	54	do	S'd and W'd, 1-2	None			
21	do.	do.		30.11	29.94	72	57	70	54	61	55	Fair to overcast and drizzling.	do	Light			
22	do.	do.		30.10	29.94	66	53	64	50	61	55	Overcast and rainy to clearing	S'd and W'd, 2-3	Moder- ate.			
23	do.	do.		30.20	30.12	76	48	74	47	60	53	Clear and pleasant	S'd and W'd, 3	None			
24	do.	do.		30.22	30.12	67	45	63	44	61	50	do	S'd and W'd, 2	None			
25	37 52 00 122 28 40	21.0	30.29	30.20	74	51	72	50	62	62	49	Fair and pleasant gen- erally.	SW'y, 2; E., 2	None	Smooth	No account	
26	36 46 00 121 57 00	87.0	30.24	30.14	59	50	57	48	56	49	49	Cloudy but pleasant	Variable 1; SW., 2	None	Smooth	No account	
27	37 43 00 122 43 40	108.5	30.23	30.08	60	50	58	48	59	50	50	do	WNW., 4; W., 3	None	Smooth	No account	
28	Navy-yard, Mare Island, Cal.	41.5	30.14	30.06	65	46	63	42	58	50	50	Fair and pleasant	W'd, 3	None			
29	do.	do.		30.19	30.08	77	50	76	49	62	53	Clear and pleasant	W., 2; SW., 3	None			
30	do.	do.		30.20	30.10	73	50	72	48	63	53	do	S'd and W'd, 1	None			
May 1	do.	do.		30.22	30.12	71	52	68	51	61	53	do	do	None			
2	do.	do.		30.24	30.15	71	55	66	53	61	53	do	S'd and W'd, 2	None			
3	do.	do.		30.19	29.99	73	50	69	50	61	53	do	S'd and W'd, 1-2	None			
4	do.	do.		30.03	29.96	71	52	68	51	61	54	Cloudy and showery.	SSW., 2; SSW., 4, and squalls, 6.	Light			
5	do.	do.		30.08	29.97	73	52	72	51	62	54	Clear and pleasant	SSW., 2; WSW., 1	None			
6	do.	do.		30.05	29.91	88	57	84	55	64	58	do	W'd, 1	None			

7	do	do	30.06	29.92	80	58	76	56	64	59	do	SW., 1; SW., 3, and squalls, 5; SW., 2	None					
8	do	do	30.00	29.89	68	57	65	53	63	60	Cloudy and threatening to fair.	S'd and W'd, 1-2	Light					
9	do	do	30.03	29.91	73	54	73	53	64	59	Fair and pleasant	S'd and W'd, 1	None					
10	do	do	30.09	29.90	82	58	77	56	65	59	Clear and pleasant	Calm; S'd and W'd, 1	None					
11	do	do	30.07	29.95	80	60	74	58	67	60	do	SW., 2	None					
12	do	do	30.01	29.78	83	53	78	52	66	55	Clear and pleasant to cloudy.	S'd and W'd, 2-3, and squalls, 5.	None					
13	do	do	30.06	29.87	71	53	68	51	65	54	Clear and pleasant	S'd and W'd, 3	None					
14	do	do	30.07	29.96	73	55	69	54	66	58	do	W., veering to SSW., 3	None					
15	do	do	30.09	30.01	72	57	67	56	67	61	Cloudy and drizzling to clearing.	S'd and W'd, 1-3	Light					
16	do	do	30.12	30.02	69	58	67	52	65	59	Cloudy, with passing showers.	S'd and W'd, 2	Light					
17	do	do	30.18	30.06	64	52	62	50	65	59	Cloudy and unsettled; showery.	S'd and W'd, 2-3	Light					
18	do	do	30.26	30.13	68	50	64	49	65	57	Clear and pleasant	WNW., 1; WSW., 2	None					
19	do	do	30.18	30.10	71	53	68	51	63	57	do	W., 2; SW., 3-1	None					
20	38 03 00	122 19 00	6.0	30.42	30.19	78	52	72	51	52	Fair to showery to clearing.	SW., 2; W., 3; SW. to WNW., 4	Light	Smooth to moderate	No account			
21	39 48 30	123 59 00	180.4	30.50	30.42	57	52	54	50	54	Clear and pleasant	N'd and W'd, 4-3; S., 4	None	Moderate	No account			
22	42 25 00	124 39 00	186.1	30.50	30.46	55	49	53	48	53	Clear to drizzling to clearing.	N'd and W'd, 3-4	Light	Moderate	No account			
23	45 58 00	124 19 00	232.6	30.46	30.34	52	49	49	46	53	Cloudy and showery to fair.	N'd and W'd, 4	Light	Moderate	No account			
24	48 10 00	123 00 00	248.8	30.40	30.19	60	49	56	48	54	Fair to clear and pleasant.	NW. and W., 2; E'd, 2	None	Smooth	No account			
25	Port Townsend, Wash.	10.1	30.24	30.10	62	48	58	47	51	46	Fair generally; some fog.	Calm generally; NW., 2	None	Smooth				
26	do	do	30.24	30.12	61	49	57	49	52	46	Foggy to clear and pleasant.	do	None					
27	do	do	30.18	30.02	59	50	57	49	51	48	Foggy to fair and pleasant.	Calm; W., 2, to SW., 4	None					
28	48 32 00	122 11 00	32.7	30.14	30.00	55	50	53	49	54	Misty, foggy, and drizzly.	S'd and W'd, 2; NE., 2; calm	Light	Smooth				
29	Vancouver, B. C.	56.5	30.22	30.03	60	50	58	49	58	50	Cloudy, but pleasant.	E'd, 2-3	None	Smooth				
30	Union Bay, Baynes Sound, B. C.	76.0	30.16	30.05	57	53	55	51	56	52	Cloudy and drizzly; disagreeable.	E., 2; calm	Light	Smooth				
June 1	49 30 00	124 43 00	14.0	30.15	30.06	57	53	56	51	56	Cloudy, but pleasant.	ESE. to S'd and W'd, 1; calm	None	Smooth				
	50 44 00	127 21 00	140.8	30.28	30.13	54	49	53	48	49	Overcast and drizzly; disagreeable.	S'd and W'd, 2-5	Light	Smooth to moderate	No account	0	0	
2	51 28 00	130 55 00	152.1	30.52	30.28	49	48	48	46	49	Fair and pleasant	S'd and W'd, to W., 5-4	None	Moderate to rough	S. 12° E.	0.5	16	0
3	53 04 00	134 46 00	177.0	30.55	30.40	50	47	48	45	49	Clear to cloudy; pleasant.	W. to SW., 3; S. by E., 3	None	Moderate	N. 70° E.	0.2	14	0
4	55 06 00	139 17 00	219.0	30.42	30.37	48	45	46	44	46	Drizzly to fair	S. by E., 3; to S'd and W'd, 3	Light	Smooth	N. 72° E.	1.0	18	0
5	57 37 00	143 11 00	212.0	30.36	30.20	48	45	46	43	47	Overcast and cloudy.	S'd and W'd, 3-2	None	Smooth	N. 74° E.	0.9	18	0
6	57 51 00	146 34 00	193.0	30.18	29.95	47	43	43	42	46	Cloudy to clear and pleasant.	SSW. to S. by E., 3	None	Smooth	N. 74° E.	0.6	0	0

* Total distance steamed in April, 258 knots; total days under way, 4.

† Total distance steamed in May, 1,043.2 knots; total days under way, 10.

Meteorological and cruising record—Continued.

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REPORT OF COMMISSIONER OF FISH AND FISHERIES.

Date.	Meridian position.		Distance run per log.	Barometer.		Temperature.				State of the weather.	Force and direction of winds.	Rain-fall (approx.).	State of sea.	Currents.	Strength in knots per hour.	Number of hours sailing weather.	Number of sails seen.	
						Air.		Water at surface.										
	Dry bulb.	Wet bulb.																
				Max.	Min.	Max.	Min.											
Lat. N.	Long. W.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.									
1893.	" " " "	Knots																
June 7	St. Paul, Kodiak Island, Alaska.	145.0	29.96	29.83	50	44	48	43	50	43	Cloudy, but pleasant.	SE. to E., 3	None.	Smooth	N. 15° W.	0.3	9	0
8	57 44 00 152 19 00	5.5	29.84	29.64	50	45	48	44	49	44	Cloudy to drizzly and rainy.	N. 2; NE. and ENE., 3-4	Light	Smooth	No account	13	1	
9	55 41 00 155 19 00	179.0	29.86	29.62	47	43	45	42	45	42	Rainy and drizzly to fair.	NW'd to W. and SW., 4	Light	Smooth	West	0.7	0	2
10	55 19 00 159 41 00	191.0	29.88	29.88	46	43	45	42	44	42	Clear and pleasant generally.	SW., 6-5; W., 5-4	None.	Moderate	S. 58° E.	1.0	8	0
11	55 02 00 160 33 00	68.0	29.98	29.79	50	43	48	41	43	42	Fair and pleasant; cloudy.	W. to WSW., 3-4	None.	Smooth	S. 45° W.	1.0	14	0
12	53 07 00 166 15 00	240.0	30.10	29.93	44	43	43	42	44	42	Fair, to overcast and misty.	WSW. and SW., 2-3	Light	Swell from south'd; smooth.	S. 83° E.	0.3	4	3
13	52 48 00 170 58 00	241.8	30.37	30.11	44	43	43	41	42	41	Overcast and cloudy; misty at times.	WSW. to NW. to WNW., 3	Light	Swell, S'd and W'd; smooth.	S. 71° W.	1.3	3	0
14	Dutch Harbor, Unalaska Is. land, Alaska.	185.0	30.46	30.36	57	40	55	42	49	42	Overcast and misty; clear at intervals.	N., 2; S., 2	Light	Smooth	N. 65° E.	0.1	15	1
15	54 19 00 162 10 00	194.2	30.50	30.42	48	44	47	43	45	42	Cloudy to clear and pleasant.	N'd and W'd, 4	None.	Swell from westw'd; smooth.	S. 87° W.	1.0	0	1
16	Sand Point, Popof Island, Alaska.	116.0	30.50	30.44	53	44	51	43	45	41	Clear and pleasant.	NW., 4-2; calm	None.	Smooth	S. 45° W.	0.9	0	0
17	do do		30.43	30.31	58	47	50	46	47	43	Fair to rainy and drizzly.	Calm; W. to NW., 1-2	Moderate.					
18	55 18 30 160 32 45	1.8	30.34	30.30	51	46	50	45	44	42	Drizzly and foggy; disagreeable.	S. to SSW. to S. by W., 6-5	Light	Moderate	No account		0	0
19	Sandy Cove, Little Konishi Is. land, Alaska.	166.2	30.31	30.23	46	45	45	44	43	42	Overcast, misty, and drizzly; thick.	S'd., 4, and squalls, 6	Light	Rough to moderate	No account		0	0
20	54 38 00 159 37 00	94.0	30.38	30.29	47	45	45	44	44	42	Drizzly and foggy to clear and pleasant.	S'd., 4, to SW., 5, and squalls, 6	Light	Moderate	No account		0	0
21	Sand Point, Popof Island, Alaska.	67.0	30.39	30.31	59	46	56	44	46	43	Clear and pleasant.	SSE., 2; WSW., 2-4, and squalls, 6	None.					

22	54 54 00	159 50 00	70.0	30.36	30.24	62	49	59	47	50	44	do	Sd and W'd 2-3	None	Smooth	No account	14	0	
23	54 51 00	160 06 00	68.7	30.36	30.27	54	47	52	43	48	44	do	W'y., 3; NW., 3-2	None	Smooth	No account	8	0	
24	Sanborn Harbor, Nagai Island, Alaska.	62.0	30.33	30.10	59	50	57	48	52	44	Fair to drizzly and rainy.	SW., 2 and squalls, 4		Light					
25	Sand Point, Popof Island, Alaska.	26.2	30.21	30.08	58	49	56	46	46	48	Drizzly and foggy, to fair.	WSW., 2; N., 3		Light	h	No account	0	0	
26	do		30.24	30.20	54	48	52	47	47	44	Overcast to thick and foggy.	Calm; W. to SSE., 2		None	Smooth	No account	2	0	
27	54 06 00	164 31 00	196.5	30.22	30.09	51	46	50	45	52	44	Overcast and foggy; thick.	S. by E. and SSE., 1	None	Smooth	N. 34° E.	0.5	17	58
28	Dutch Harbor, Unalaska Is.	82.7	30.08	29.92	56	51	55	50	50	48	Overcast and rainy	SSE. to SE., 3. and squalls, 4		Light					
29	do		23.96	29.92	59	53	57	51	50	46	Overcast and cloudy	SE., 3. and frequent squalls, 4-5.		None	Smooth	No account	0	0	
30	53 01 00	170 37 00	166.0	30.10	29.96	47	42	46	41	45	40	Overcast and foggy; thick.	S'd and W'd to SE., 2	None	Smooth	N. 31° E.	0.3	16	0

* Day.

† Total distance steamed in June, 3,670.5 knots; total days under way, 27.

Record of animal life, driftwood, kelp, etc.,

FROM PORT TOWNSEND, WASH.,

Date.	Meridian position.		Mean temperature.		Fur seals.	Whales.	Auks.	Cor-morants.	Ducks.
	Latitude north.	Longitude west.	Air.	Water.					
			Dry bulb.	Surface.					
1892.									
July 1	48 37 00	125 01 00	56	55					
2	50 13 30	129 41 00	54	53					
3	51 23 00	134 17 00	49	52		One.			
4	52 18 00	138 26 00	49	49		One.			
5	52 53 10	143 04 00	46	47					
6	53 35 20	147 19 20	48	48		Two			
7	53 55 00	151 50 10	48	48		Two			
8	53 57 00	156 56 00	49	49		Four.			
9	53 50 00	162 24 20	48	47	One.	Two	Few		
10	Iliuliuk Harbor, Unalaska Island.								

FROM UNALASKA, ALASKA.

Aug. 3	54 01 30	165 58 30	54	50		One.	Few		
4	54 00 12	161 18 00	50	54		Three.	Several		
5	54 22 00	157 27 00	55	56		Two	Several		
6	54 50 00	153 50 00	54	55					
7	55 27 00	152 15 30	55	55					
8	55 53 00	147 42 00	54	55		One (dead)			
9	56 16 00	142 50 30	57	56		Two			
10	56 46 00	138 05 00	59	58					
11	Sitka Harbor, Alaska.								

FROM SITKA, ALASKA, TO PORT TOWNSEND,

Aug. 18	Sitka Harbor, Alaska.		58	60		Several	Few	Few
19	55 07 00	134 20 00	60	60		Many	Few	Few
20	52 30 00	132 14 00	63	59		Several		
21	51 04 00	128 10 00	64	55		Several	Many	Several
22	50 24 00	125 38 00	66	60			Several	Few
23	Departure Bay, B. C.		63	64				Few
24	48 50 00	123 25 00	61	59				
25	Port Townsend, Wash.							

FROM PORT TOWNSEND, WASH.,

Aug. 30	48 11 00	123 11 00	56	51					
31	46 33 00	125 02 00	62	55					
Sept. 1	43 04 00	124 46 00	57	50		Four			
2	39 52 00	124 11 00	59	52		Two			
3	Navy-yard, Mare Island, Cal.								

SEA TRIAL: NAVY-YARD, MARE ISLAND,

1893.									
Apr. 25	37 52 00	122 28 40	63	56					
26	36 46 00	121 57 00	55	53					
27	37 43 00	122 43 40	55	54					
28	Navy-yard, Mare Island, Cal.								

observed from deck of Albatross at sea.

TO UNALASKA, ALASKA.

Gulls.	Goneys.	Guillemots.	Petrels.	Puffins.	Terns.	Drift-wood.	Kelp.	Remarks.
Many...	Many...	Few...	Several			Several logs.	Much..	
Few...	Many		Several			Much..	Much..	
	Several		Several				Little..	
	Several		Several			1 log.		
One...	Several		Many..	Several		Little..	Much..	
Many...	Many		Many..	Few			1 piece.	
	Few	Few	Many..	Many..		1 tree		Trunk of large tree; roots attached.
Many...	Few...	Many..	Several	Many...	Few		Much..	

TO SITKA, ALASKA.

Several		Many..	Many..	Many..	Several	Little..		
Few		Many	Many	Many		Much..		
Several	Few	Many	Many	Many	Few	Much..		
Few	Few	Several	Several	Few				
Few	Few	Few	Few	Several		2 logs		
Few	Few		Many			1 log		
Few	Few		Several	Few		Little	Little	
Few	Few		Several	Few	Few	Little	Much..	Several jagors; 1 coot.

WASH, VIA DEPARTURE BAY, B. C.

	Several				Few	Little..	Much..	School of porpoises.
Several	Several		Many..	Several		Much..	Much..	Several phalaropes and divers.
Few			Several	Several		1 log		Several phalaropes.
Several	Few	Few	Few	Few	Several	Much..	Much..	
Several			Few	Few	Few	Much..	Much..	
Few					Few	Little	Little	
					Few	Much..	Little	

TO NAVY-YARD, MARE ISLAND, CAL.

Few...	Few...		Few			Little..	Little..	
Several	Several		Several				Much..	
Several	Several		Several				Much..	School of porpoises.
Many..	Several		Few					Do.

TO MONTEREY, CAL., AND RETURN.

Many...	Several	Many..	Few...					
Many...	Few...	Many..	Several					
Many		Few	Few					

Record of animal life, driftwood, kelp, etc., observed

FROM NAVY-YARD, MARE ISLAND,

Date.	Meridian position.		Mean temperature.		Fur seals.	Whales.	Auks.	Cor-morants.	Ducks.
	Latitude north.	Longitude west.	Air. Dry bulb.	Water. Surface.					
1893.	° ' "	° ' "	°	°					
May 20	38 03 00	122 19 00	65	50					
21	39 48 30	123 59 00	55	52		Several			
22	42 25 00	124 39 00	52	52		Several			
23	45 58 00	124 19 00	51	52				Few	
24	48 10 00	123 00 00	55	51				Few	
25	Port Townsend, Wash.								

FROM PORT TOWNSEND, WASH., TO ST. PAULS HARBOR.

May 28	48 32 00	123 11 00	53	50					Few
29	Vancouver Harbor, British Columbia.		55	54					
30	Union Bay, Baynes Sound, British Columbia.		55	54					Few
June 31	49 30 00	124 43 00	55	51				Few	
1	50 44 00	127 21 00	51	48		Several		Many	
2	51 28 00	130 55 00	48	48					
3	53 04 00	134 46 00	49	47		One			
4	55 06 00	139 17 00	47	45					One
5	57 37 00	143 11 00	47	46		Two			
6	57 51 00	148 34 00	45	45		Nine			Two
7	St. Paul Harbor, Kadiak Island, Alaska		47	46					

FROM ST. PAUL HARBOR, KADIAK ISLAND,

June 8	57 44 00	152 19 00	47	46	One	Several		Many	
9	55 41 00	155 19 00	45	43	Two	Two		Many	
10	55 19 00	159 41 00	45	43		Three	Many		Several

FROM SAND POINT, POPOF ISLAND, TO

June 11	55 02 00	160 33 00	46	42		Several	Few		
12	53 07 00	166 15 00	43	43	Three	One			
13	52 48 00	170 58 00	43	41		Many		One	
14	Dutch Harbor, Unalaska Island, Alaska.		50	45	One	One			

FROM DUTCH HARBOR, UNALASKA ISLAND, TO SAND POINT, POPOF ISLAND,

June 15	54 19 00	162 10 00	46	43	One	One			
16	Sand Point, Popof Island, Alaska.		49	43					
17	do.		53	45					
18	55 18 30	160 32 45	49	43		Few	Myriads		
19	Sandy Cove, Little Konishli Island, Alaska.		45	42			Myriads		

from deck of Albatross at sea—Continued.

CAL., TO PORT TOWNSEND, WASH.

Gulls.	Goneys.	Guillemots.	Petrels.	Puffins.	Terns.	Drift-wood.	Kelp.	Remarks.
Several Several	Few Many	Many Few	Few Several				Little	Large patches of velella. Do.
Several Many Many	Several Several Few	Several Few	Few Several Few			Much Little	Little	

KADIAK ISLAND, ALASKA, VIA BRITISH COLUMBIA PORTS.

Few						Much		Several porpoises. Several phalaropes. 2 white goneys.
Many					Few	Little		
Few							Little	
	Several Many		Few				Little	
Several	Several		Few Several	One		1 large log.		
Several Many	Several		Many	Several	Many		Much	

TO SAND POINT, POPOF ISLAND, ALASKA.

Many Many Many	Many One Many	Many Many Many	Many Many Several	Many Many Many	Many Many Many		Much
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UNALASKA, ALASKA, VIA AMUTKA PASS.

Few	Several	Many	Several	Many				Observed many sea lions on and about Unga Seal Rocks. Several white goneys. Many killer whales. 1 white goney.
Few	Many	Several	Few	Several		1 large log.	Much	
	One	Many	Few	Many			Much	
	One	Many						

CRUISING ABOUT SHUMAGIN ISLANDS, AND RETURN TO DUTCH HARBOR.

Few	Few	Many	Many	Many				1 white goney. Several white goneys.
Several Many	Many	Many	Several Many	Many Many	Several		Little	

Record of animal life, driftwood, kelp, etc., observed

FROM DUTCH HARBOR, UNALASKA ISLAND, TO SAND POINT, POPOF ISLAND,

Date.	Meridian position.		Mean temperature.		Fur seals.	Whales.	Auks.	Cor. morants.	Ducks.
	Latitude north.	Longitude west.	Air.	Water.					
			Dry bulb.	Surface.					
1893.									
June 20	54 38 00	159 37 00	46	43		Four	Myriads		
21	Sand Point, Popof Island, Alaska.		52	44					
22	54 54 00	159 50 00	55	47		Several	Many	Few	Several
23	54 51 00	160 06 00	50	46		Two	Few		Several
24	Sanborn Harbor, Nagai Island, Alaska.		54	48			Few		Several
25	Sand Point, Popof Island, Alaska.		53	46					
26	do.		51	45					
27	54 06 00	164 31 00	48	48	Sixty-eight.	Many			
28	Dutch Harbor, Unalaska Island, Alaska.		53	40					

FROM DUTCH HARBOR, UNALASKA ISLAND, TO

June 29	Dutch Harbor, Unalaska Island, Alaska.		56	48					
30	53 01 00	170 37 00	44	42	Six	Six			

from deck of *Albatross* at sea—Continued.

CRUISING ABOUT SHUMAGIN ISLANDS, AND RETURN, ETC.—Continued.

Gulls.	Goneys.	Guillemots.	Petrels.	Puffins.	Terns.	Drift-wood.	Kelp.	Remarks.
Many...	Many...	Many...	Many...	Many...	.....	.....	Little..	
Several Many...	Few Few...	Many Many...	.....	Several Many...	Few .....	.....	Little Little..	3 oyster catchers in Mist Harbor. 1 oyster catcher in Sanborn Harbor.
Few...	Few...	Many...	.....	.....	.....	.....	Little..	
Many...	Several	Several Many...	Many...	Few Many...	Many...	.....	.....	1 goose. Many phalaropes.
.....	

BAY OF WATERFALLS, ADAK ISLAND, ALASKA.

Few...	.....	.....	.....	.....	.....	.....	Much..	
Many...	.....	Great many.	Many...	Several	.....	.....	Much..	Several white goneys.

Record of temperatures and specific gravities.

Date.	Time of day.	Station.	Lat. N.	Long. W.	Depth.	Temperature by attached thermometer.	Temperature of the air.	Temp. of specimen at time specific gravity was taken.	Specific gravity.	Specific gravity reduced to 60° F.	Specific gravity reduced to 15° C.
1892.			° ' "	° ' "		°	°	°			
Aug. 3	12 m.		54 01 50	165 58 30	Surface.	47	53	66	1.0234	1.024240	1.023420
3	6 p. m.		54 00 10	164 48 00	do.	50	51	66	1.0234	1.024240	1.023420
3	12 p. m.		54 30 00	163 36 00	do.	52	52	66	1.0236	1.024440	1.023620
4	6 a. m.		54 02 00	162 30 00	do.	53	52	66	1.0236	1.024440	1.023620
4	12 m.		54 02 12	161 18 00	do.	54	55	66	1.0238	1.024640	1.023820
4	6 p. m.		54 07 00	160 20 00	do.	55	58	66	1.0238	1.024640	1.023820
4	12 p. m.		54 13 00	159 26 00	do.	54	55	66	1.0240	1.024840	1.024020
5	6 a. m.		54 19 00	158 30 00	do.	56	55	66	1.0240	1.024840	1.024020
5	12 m.		54 22 00	157 27 00	do.	56	55	66	1.0241	1.024940	1.024120
5	6 p. m.		54 29 00	156 33 00	do.	57	55	66	1.0240	1.024840	1.024020
5	12 p. m.		54 36 00	155 39 00	do.	55	54	66	1.0240	1.024840	1.024020
6	6 a. m.		54 45 00	154 45 00	do.	55	54	66	1.0241	1.024940	1.024120
6	12 m.		54 50 00	153 52 00	do.	55	53	66	1.0240	1.024840	1.024020
6	6 p. m.		54 59 00	153 28 00	do.	55	54	66	1.0240	1.024840	1.024020
6	12 p. m.		55 10 00	153 04 00	do.	55	54	66	1.0240	1.024840	1.024020
7	6 a. m.		55 16 00	152 41 00	do.	55	53	66	1.0239	1.024740	1.023920
7	12 m.		55 27 00	152 15 00	do.	55	55	66	1.0240	1.024840	1.024020
7	6 p. m.		55 34 00	151 07 00	do.	56	55	66	1.0240	1.024840	1.024020
7	12 p. m.		55 42 00	149 59 00	do.	54	54	66	1.0240	1.024840	1.024020
8	6 a. m.		55 47 00	148 52 00	do.	53	53	66	1.0241	1.024940	1.024120
8	12 m.		55 53 00	147 42 00	do.	55	54	66	1.0240	1.024840	1.024020
8	6 p. m.		55 59 00	146 29 00	do.	56	54	66	1.0239	1.024740	1.023920
8	12 p. m.		56 05 00	145 16 00	do.	56	55	66	1.0238	1.024640	1.023820
9	6 a. m.		56 12 00	144 03 00	do.	55	55	66	1.0239	1.024740	1.023920
9	12 m.		56 16 00	142 50 30	do.	57	59	66	1.0238	1.024640	1.023820
9	6 p. m.		56 23 00	141 39 00	do.	56	55	66	1.0238	1.024640	1.023820
9	12 p. m.		56 29 00	140 27 00	do.	56	55	66	1.0236	1.024440	1.023620
10	6 a. m.		56 35 00	139 19 00	do.	58	55	66	1.0234	1.024240	1.023420
10	12 m.		56 46 00	138 05 00	do.	59	57	66	1.0234	1.024240	1.023420
10	6 p. m.		56 55 00	137 01 00	do.	59	59	66	1.0232	1.024040	1.023220
10	12 p. m.	Sitka Bay			do.	55	55	66	1.0236	1.023840	1.023620
11	8 a. m.	Sitka, Alaska			do.	56	54	66	1.0228	1.023640	1.022820
11	12 m.		55 07 00	134 20 00	do.	61	61	66	1.0230	1.023840	1.023020
20	12 m.		52 39 00	132 14 00	do.	60	59	66	1.0233	1.024140	1.023320
21	12 m.		51 04 00	128 16 00	do.	58	61	66	1.0230	1.023840	1.023020
22	12 m.		50 24 00	125 38 00	do.	52	58	66	1.0180	1.018840	1.018020
23	12 m.	Departure Bay, B. C.			do.	54	58	66	1.0172	1.018040	1.017220
1893.											
May 20	7 p. m.	Off Point Reyes, Cal.			do.	54	54	64	1.0248	1.025211	1.024391
20	12 p. m.		38 30 00	123 39 00	do.	52	52	64	1.0248	1.025211	1.024391
21	6 a. m.		39 09 00	123 48 00	do.	51	55	63	1.0250	1.025411	1.024501
21	12 m.		39 48 30	123 59 00	do.	53	56	63	1.0251	1.025511	1.024601
21	6 p. m.		40 27 00	124 09 00	do.	51	53	63	1.0250	1.025411	1.024501
21	12 p. m.		41 06 00	124 20 00	do.	50	52	63	1.0248	1.025211	1.024391
22	6 a. m.		41 45 00	124 30 00	do.	51	53	63	1.0244	1.024811	1.023901
22	12 m.		42 25 00	124 39 00	do.	53	55	63	1.0243	1.024711	1.023891
22	6 p. m.		43 18 00	124 34 00	do.	52	52	63	1.0240	1.024411	1.023591
22	12 p. m.		44 11 00	124 28 00	do.	50	49	63	1.0240	1.024411	1.023591
23	6 a. m.		45 04 00	124 23 00	do.	51	50	63	1.0242	1.024611	1.023791
23	12 m.		45 58 00	124 19 00	do.	51	52	63	1.0190	1.019411	1.018591
23	6 p. m.	Off Grays Harbor			do.	52	52	63	1.0150	1.015411	1.014501
23	12 p. m.	Off Destruction Island			do.	51	51	63	1.0162	1.016011	1.015791
24	6 a. m.	Cape Flattery			do.	52	50	63	1.0208	1.021211	1.020391
27	12 m.	Port Townsend			do.	50	59	63	1.0226	1.023011	1.022191
29	12 m.	Vancouver, B. C.			do.	52	55	63	1.0126	1.013011	1.012191
30	12 m.	Comox, B. C.			do.	56	58	63	1.0180	1.018411	1.016591
June 1	10 a. m.	Alert Bay, B. C.			do.	49	53	63	1.0210	1.022011	1.021191
1	12 p. m.	Queen Charlotte Sound			do.	48	49	63	1.0234	1.023811	1.022991
2	6 a. m.	Off Queen Charlotte Island			do.	49	49	63	1.0234	1.023811	1.022991
2	12 m.		51 28 00	130 55 00	do.	48	48	63	1.0238	1.024211	1.023391
2	6 p. m.		51 52 00	131 52 00	do.	47	48	63	1.0240	1.024411	1.023591
2	12 p. m.		52 17 00	132 45 00	do.	47	48	63	1.0242	1.024611	1.023791
3	6 a. m.		52 39 00	133 48 00	do.	48	48	63	1.0242	1.024611	1.023791
3	12 m.		53 04 00	134 46 00	do.	49	50	63	1.0242	1.024611	1.023791
3	6 p. m.		53 35 00	135 53 00	do.	47	48	63	1.0242	1.024611	1.023791
3	12 p. m.		54 06 00	137 00 00	do.	46	48	63	1.0244	1.024811	1.023991

Record of temperatures and specific gravities—Continued.

Date.	Time of day.	Station.	Lat. N.	Long. W.	Depth.	Temperature by attached thermometer.	Temperature of the air.	Temp. of specimen at time specific gravity was taken.	Specific gravity.	Specific gravity reduced to 60° F.	Specific gravity reduced to 15° C.
1893.			° ' "	° ' "		°	°	°			
June. 4	6 a. m.		54 37 00	138 10 00	Surface	46	47	63	1.0244	1.024811	1.023991
4	12 m.		55 06 00	139 17 00	do	46	47	63	1.0242	1.024611	1.023791
4	6 p. m.		55 43 00	140 15 00	do	46	47	63	1.0242	1.024611	1.023791
4	12 p. m.		56 20 00	141 11 00	do	45	45	63	1.0242	1.024611	1.023791
5	6 a. m.		56 58 00	142 09 00	do	46	45	63	1.0240	1.024411	1.023591
5	12 m.		57 37 00	143 11 00	do	47	48	63	1.0240	1.024411	1.023591
5	6 p. m.		57 41 00	144 31 00	do	46	46	63	1.0242	1.024611	1.023791
5	12 p. m.		57 44 00	145 51 00	do	46	46	63	1.0242	1.024611	1.023791
6	6 a. m.		57 49 00	147 11 00	do	44	43	63	1.0242	1.024611	1.023791
6	12 m.		57 51 00	148 34 00	do	45	46	63	1.0242	1.024611	1.023791
6	6 p. m.	Off Kodiak Island			do	45	47	63	1.0240	1.024411	1.023591
6	12 p. m.	St. Paul Harbor			do	44	45	62	1.0230	1.023270	1.022450
8	12 m.	St. Paul, Kodiak			do	49	50	62	1.0230	1.023270	1.022450
9	12 m.		55 41 00	155 19 00	do	45	45	62	1.0242	1.024470	1.023650
11	9 a. m.	Humboldt Harbor			do	43	50	62	1.0240	1.024270	1.023450
12	12 m.		53 07 00	166 15 00	do	44	44	62	1.0244	1.024670	1.023850
13	10 a. m.	Amukta Pass			do	41	44	63	1.0248	1.025211	1.024391
14	8 p. m.	Anakla Pass			do	42	46	63	1.0246	1.024011	1.024191
15	12 m.		54 19 00	162 10 00	do	44	46	63	1.0242	1.024611	1.023791
19	12 m.	Sandy Cove			do	42	46	63	1.0240	1.024411	1.023591
20	12 m.		54 38 00	159 37 00	do	43	46	63	1.0240	1.024411	1.023591
23	12 m.		54 57 00	160 06 00	do	44	52	63	1.0235	1.023911	1.023091
24	12 m.	Sanborn Harbor			do	44	52	63	1.0235	1.023911	1.023091
27	12 m.		54 06 00	164 31 00	do	47	50	63	1.0238	1.024211	1.023391
30	12 m.		53 01 00	170 37 00	do	44	45	63	1.0246	1.025011	1.024191

NOTE.—All specimens taken at about 1 foot below the surface, by means of a water bottle.