477

NORTH PACIFIC OCEANOGRAPHY, FEBRUARY - APRIL 1962

by Felix Favorite, Betty-Ann Morse, Alan H. Haselwood, and Robert A. Preston, Jr.

SPECIAL SCIENTIFIC REPORT-FISHERIES No. 477

UNITED STATES DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE

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United States Fish and Wildlife Service
Special Scientific Report--Fisheries No. 477

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MV *Bertha Ann*

CONTENTS

NORTH PACIFIC OCEANOGRAPHY, FEBRUARY - APRIL 1962

by

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ABSTRACT

Oceanographic data obtained at and between salmon-fishing stations in the North Pacific Ocean during February to April 1962 aboard the chartered MV *Bertha Ann* are presented and discussed. Observations obtained between the Aleutian Islands and lat. 41° N. along long. 175° W. provide the first extensive winter data in this area.

Vertical profiles of temperature, salinity, dissolved oxygen, and sigma-t to 1,000 meters depth, and geostrophic currents to 600 meters depth are presented along long. 175° W. from the Aleutian Islands to lat. 41° N., along long. 155° W. from the Alaska Peninsula to lat. 46° N. and from lat. 46° N. long. 155° W. to the Washington coast.

Analyses of data show the Alaskan Stream extended beyond long. 175° W. where geostrophic velocities in excess of 10 cm./sec. were encountered. No evidence of upwelling through the halocline was revealed south of the Aleutian Islands. The Subtropic boundary in the central part of the North Pacific, as indicated by the vertical 34 °/oo isohaline in the surface layer, was found near lat. 42° N. This is approximately the same latitude at which it has been found during summer and implies dominant changes in the surface layer are the result of differential latitudinal heating and cooling rather than advection.

INTRODUCTION

This is the fifth report of oceanographic field work conducted in the North Pacific Ocean by the Oceanographic Section of the Bureau of Commercial Fisheries Biological Laboratory, Seattle, Wash., for the American Section of the International North Pacific Fisheries Commission (INPFC). The observations are obtained to determine the oceanography of the area and, also, to permit investigations into relationships between the physical, chemical, and biological conditions, and the distribution and abundance of salmon stocks.

Previous reports in this series (Favorite and Pedersen, 1959a and 1959b; Favorite, Callaway, and Hebard, 1961; Morse, 1962[1]) have not

[1] Betty-Ann Morse. North Pacific and Bering Sea Oceanography 1960 and 1961. Bureau of Commercial Fisheries Biological Laboratory, Seattle, Wash. [Unpublished manuscript.]

included presentations of the distribution of properties because in most instances the cruises were to some degree coordinated with the cruises of other INPFC members: Japan and Canada; thus, any attempt to define conditions within a given region without additional data from these sources could be possibly not only incomplete but also misleading. An atlas combining data collected by Canada, Japan, and U.S. agencies during the summer of 1958 has been compiled by Dodimead and Favorite (1961), and a complete summary of oceanographic conditions in the Subarctic Pacific region during 1955 to 1960 is being compiled by a subcommittee on Oceanography appointed by INPFC.

This report presents some results of the oceanographic program aboard the chartered MV *Bertha Ann* during a fishery-oceanographic cruise from February to April 1962. The locations of the oceanographic stations and bathythermograph (BT) lowerings are shown in figure 1. Previous investigations had shown that the water structure south of the Aleutian Islands was very complex, and a series of oceanographic stations at 30-mile intervals was planned along long. 175° and 165° W. To ensure that observations were made far enough southward to locate the salinity front assumed to be in the vicinity of lat. 41° N., a salinometer was installed aboard the vessel and water samples were analyzed aboard ship as they were collected. Time lost in awaiting fishing weather during the southern leg on long. 175° W. prevented obtaining observations on long. 165° W., and further delays, caused by weather, necessitated terminating the southern leg on long. 155° W. at lat. 46° N.

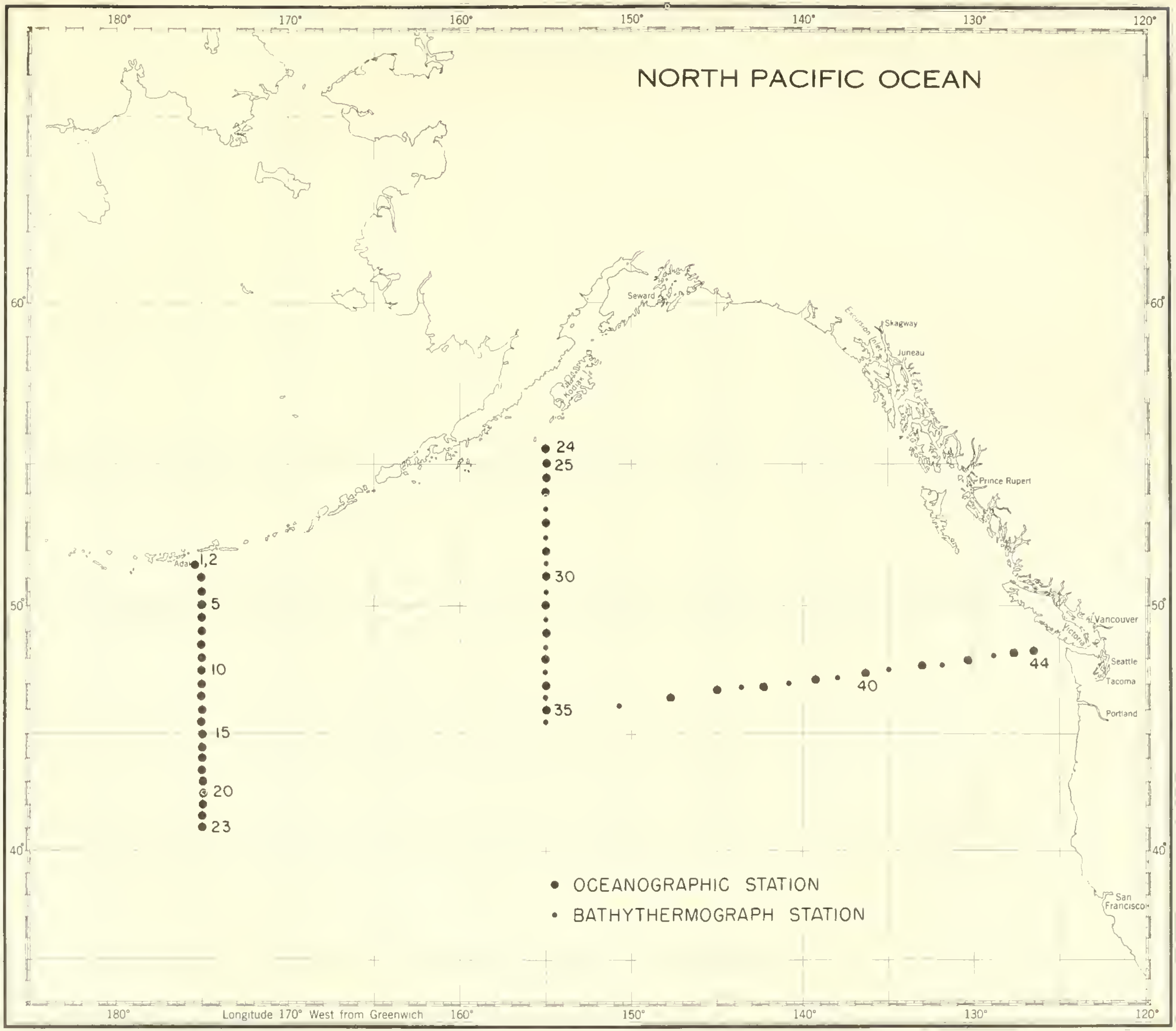
Because of the considerable distance between the three lines of stations (long. 175° W., 155° W., and east-west line along approximately lat. 47° N.), discussion of oceanographic conditions has been limited to the vertical distribution of properties along these legs only. No attempt has been made to show any horizontal continuity of properties between the lines occupied.

The main objective of the oceanographic observations was to determine the winter conditions in the central Subarctic region and thereby ascertain the winter environment of the Pacific salmon. Although oceanographic data are available from the following winter cruises, none of these provided any extensive data in the central part of the region: cruises by the International Fisheries Commission during January 1927, 1928, and 1929 in the Gulf of Alaska (McEwen, Thompson, and VanCleve, 1930; Thompson, McEwen, and VanCleve, 1936); USS *Serrano* during March 1949 in the Gulf of Alaska (Scripps Institution of Oceanography, 1957); HMCS *Sault Ste. Marie* during March 1952 off the coast of British Columbia (Doe, 1955); MV *Hugh M. Smith* during January to March 1954 in the central mid-Pacific south of lat. 40° N. (McGary and Stroup, 1956); USCGC *Northwind* during February to April 1955 in the eastern Bering Sea (U.S. Navy Hydrographic Office, 1958); various Canadian vessels manned by personnel from the Pacific Oceanographic Group, Fisheries Research Board of Canada, during each winter since 1957 in the northeastern North Pacific (Fisheries Research Board of Canada, 1957, 1958, and 1959; Dodimead, Abbott-Smith, and Hollister, 1960); and RV *Vityaz* during October 1958 to March 1959 in the North Pacific[2].

A great amount of information concerning the salmon environment had been learned as a result of spring and summer cruises during other years. The distribution of Bristol Bay red salmon in the Aleutian area during spring and summer was shown to be closely related to the extent of the Alaskan Stream, which flows westward south of the Aleutian Islands (INPFC, 1958). Temperature data collected during summer 1957 showed that immediately southward of the Aleutians, water at 50 to over 200 meters depth was in the 3° C. range during June, but by August, the flow of warm water out of the Gulf of Alaska increased the water temperature in this stratum in excess of 5° C. (INPFC, 1959). Knowledge of the westward extent and the velocity of the Alaskan Stream in this area during the winter was needed in order to interpret correctly the conditions encountered during spring.

Favorite and Hanavan (1963) showed that the southern extent of the shallow temperature-minimum stratum indicated by the almost

[2] Data available at National Oceanographic Data Center, Washington, D.C. [Unpublished.]



Base Map prepared by the Canadian Hydrographic Service, Surveys and Mapping Branch, DEPARTMENT OF MINES AND TECHNICAL SURVEYS, OTTAWA

Figure 1.--Locations of oceanographic casts and bathythermograph lowerings, February to April 1962.

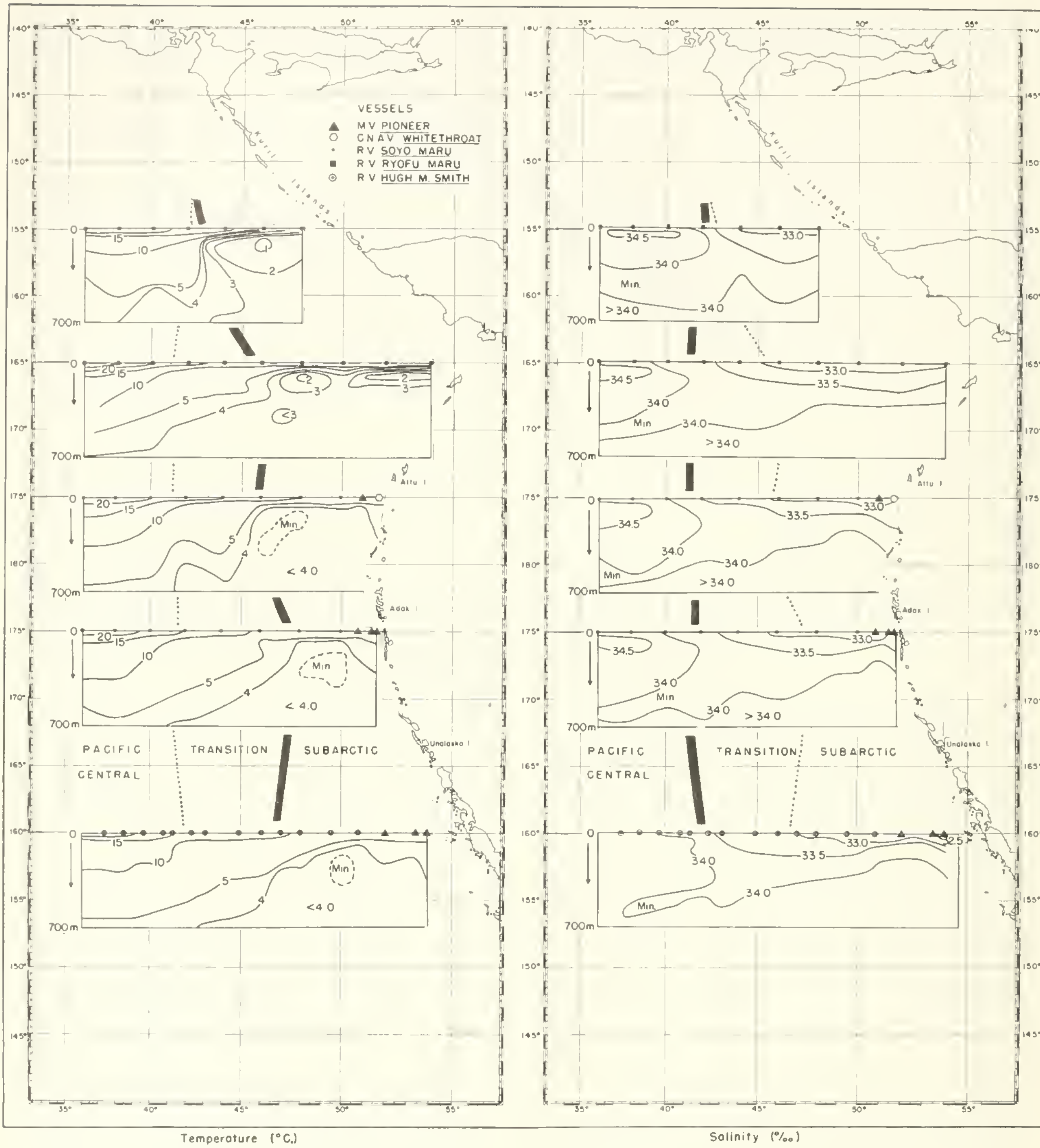


Figure 2.--Vertical sections of temperature and salinity along long. 160° W., 175° W., 175° E., 165° E., and 155° E. during summer 1958, showing the north-south extent of Subarctic, Transition, and Pacific central regions (from Favorite and Hanavan, 1963).

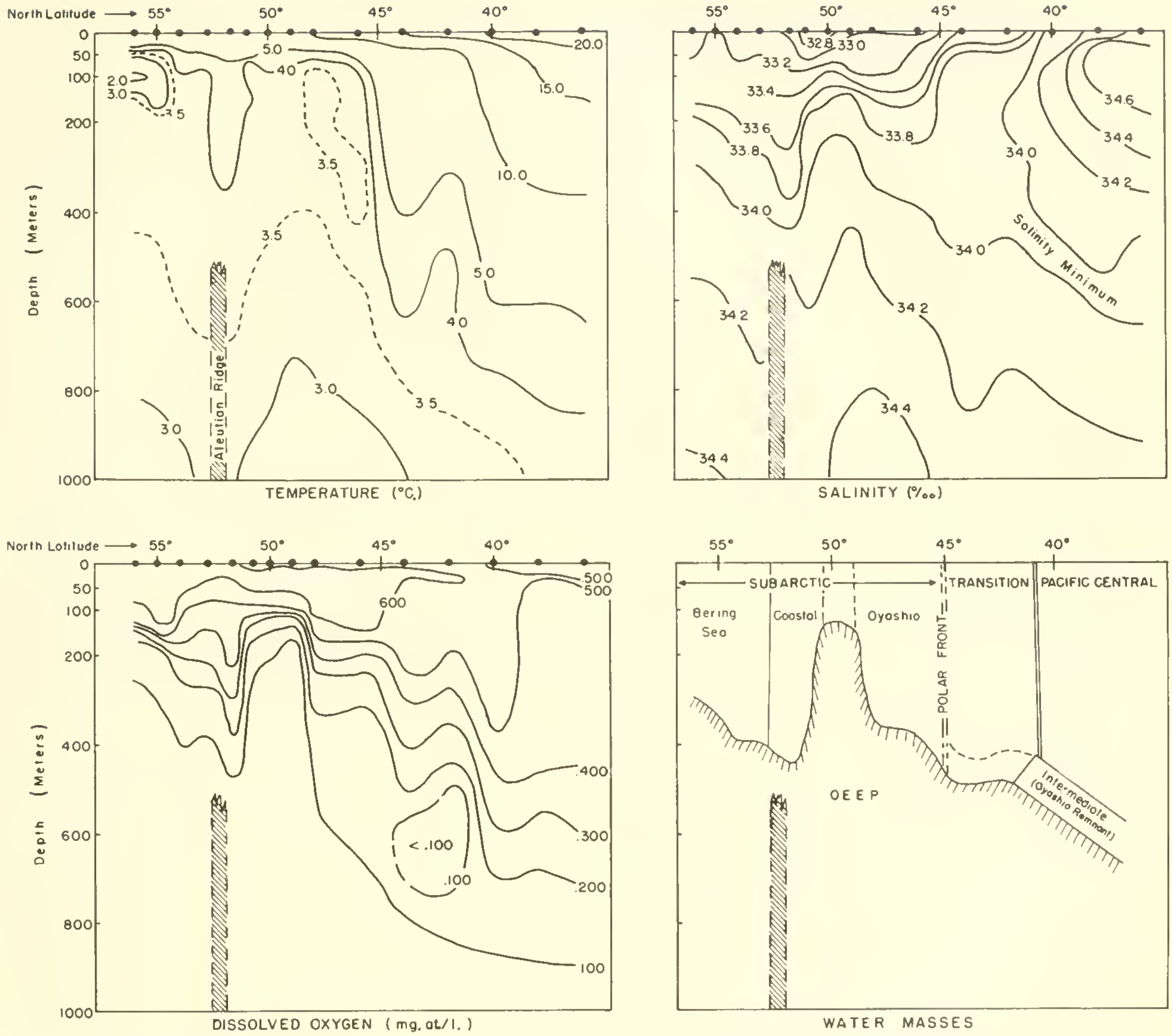


Figure 3.- Vertical sections of temperature, salinity, dissolved oxygen, and a schematic diagram of water masses along 175° E. during summer 1958 (from Favorite and Hebard, 1961).

vertical 4° C. isotherm which occurs at approximately lat. 46° to 48° N. denoted the southern limit of salmon (as determined by surface gill net catches) during summer. After comparing salmon distribution during spring with relatively permanent oceanographic features, they proposed that the maximum southern limit of salmon is determined by the salinity front at lat. 41° N. (indicated by the almost vertical 34 ‰ isohaline in the surface layer). The boundaries of these fronts and the associated water masses are shown in figure 2. Further subdivision of these water masses, and a more detailed picture of the water structure along long. 175° E. during 1958 are presented in figure 3. The position of the 34 ‰ isohaline in the mid-Pacific during summer has been relatively constant since at least 1955. However, because the axis of the North Equatorial Current is known to oscillate from lat. 9° to 11° N. in summer, to lat. 6° to 7° N. in winter (Defant, 1961, p. 569), winter observations were necessary to determine if the proposed boundaries shifted southward during winter.

A significant feature of the water structure southward of the Aleutian Islands is the vertical intrusion of Deep Water, indicated by the ridging of the isohalines (see fig. 3). During spring and summer 1958, evidence was obtained that the implied vertical movement extended almost to the surface in spring, but was suppressed during summer by the dilute, less dense water flowing out of the Gulf of Alaska (INPFC, 1960). We assumed that during winter, the period of minimum coastal runoff, upwelling might reach the surface and reveal an area in which nutrients at depth were restored to the surface layers; thus providing a partial explanation as to why the water in the Subarctic region is so fertile.

Another feature of the region requiring investigation during winter was the ever-present temperature-minimum stratum. It is generally accepted that the temperature-minimum in the eastern North Pacific is the result of winter overturn, and the temperatures reflect the local winter surface temperatures (Dodimead, 1961). Westward of the Gulf of Alaska, however, the temperatures in the minimum stratum are colder than could be expected from winter overturn, and appear to be associated with a westward intrusion from the Oyashio region. The intrusion of this cold water (found between lat. 45° and 50° N.) from long. 165° W. in 1956 to 150° W. in 1959 has been shown by Favorite and Hebard (1961). It was necessary to ascertain if the convergence of the westward flowing Alaskan Stream and the eastward flowing Oyashio or Kuroshio Extension during winter could result in a downward transport of cold surface water which after the advent of spring and summer heating would also be evident as a temperature-minimum stratum and contradict the previous interpretation.

Finally, because the cruise track along long. 155° W. crossed the area of divergence off the Washington coast, the cruise provided an excellent opportunity for an effective drift bottle experiment. Assuming a drift of about 5 miles per day indicated by our previous recoveries, the bottles released along long. 155° W. should pass through the divergence zone in summer and come ashore on the North American continent during the fall, and the bottles released along long. 175° W. should pass the zone during winter and come ashore the following spring.

OCEANOGRAPHIC CONDITIONS

Density

The vertical profiles of density expressed as sigma-t[3] along the three cruise legs are shown in figure 4. A significant feature in all profiles is the crowding of the isolines between 100 and 150 meters, which indicates the marked stability of the water column at these depths. Northward of lat. 45° N., winter overturn has resulted in an almost isothermal layer above the halocline. Since these temperatures approximate those in the deeper layers relatively isothermal conditions exist to a depth of about 800 meters. Thus, the stability of the water column in this area is almost entirely a function of the salinity distribution.

Sigma-t distribution is discussed first because it is the basis for calculations of the geostrophic currents which are presented in the following section. Since these currents reflect flow relative to a selected reference level at which no motion is supposed to occur, it is difficult to evaluate the significance or validity of these currents without knowledge of the density structure. The downward slope of the isolines from lat. 50° N. along long. 175° W. and lat. 52° N. along long. 155° W. at all depths indicates that a flow existed at and below 1,000 meters, and geostrophic currents will not reflect true current speeds. Along the east-west leg near lat. 47° N., however, the isolines are relatively level and in the absence of slope currents the geostrophic approximation may be reasonably accurate.

Geostrophic Currents

The geostrophic approximation neglects friction and acceleration; assumes a balance between Coriolis and pressure forces; and presupposes a known level of no net motion. Using a reference level of 1,000-decibars, Reid (1961) has presented the geostrophic circulation for the entire Pacific Ocean and found that it compares favorably with currents estimated from the set and drift of vessels and tabulated in various atlases. On an ocean-wide

[3]Sigma-t--density as defined by: (specific gravity 1) 1,000, expressed as milligrams per cm^3.

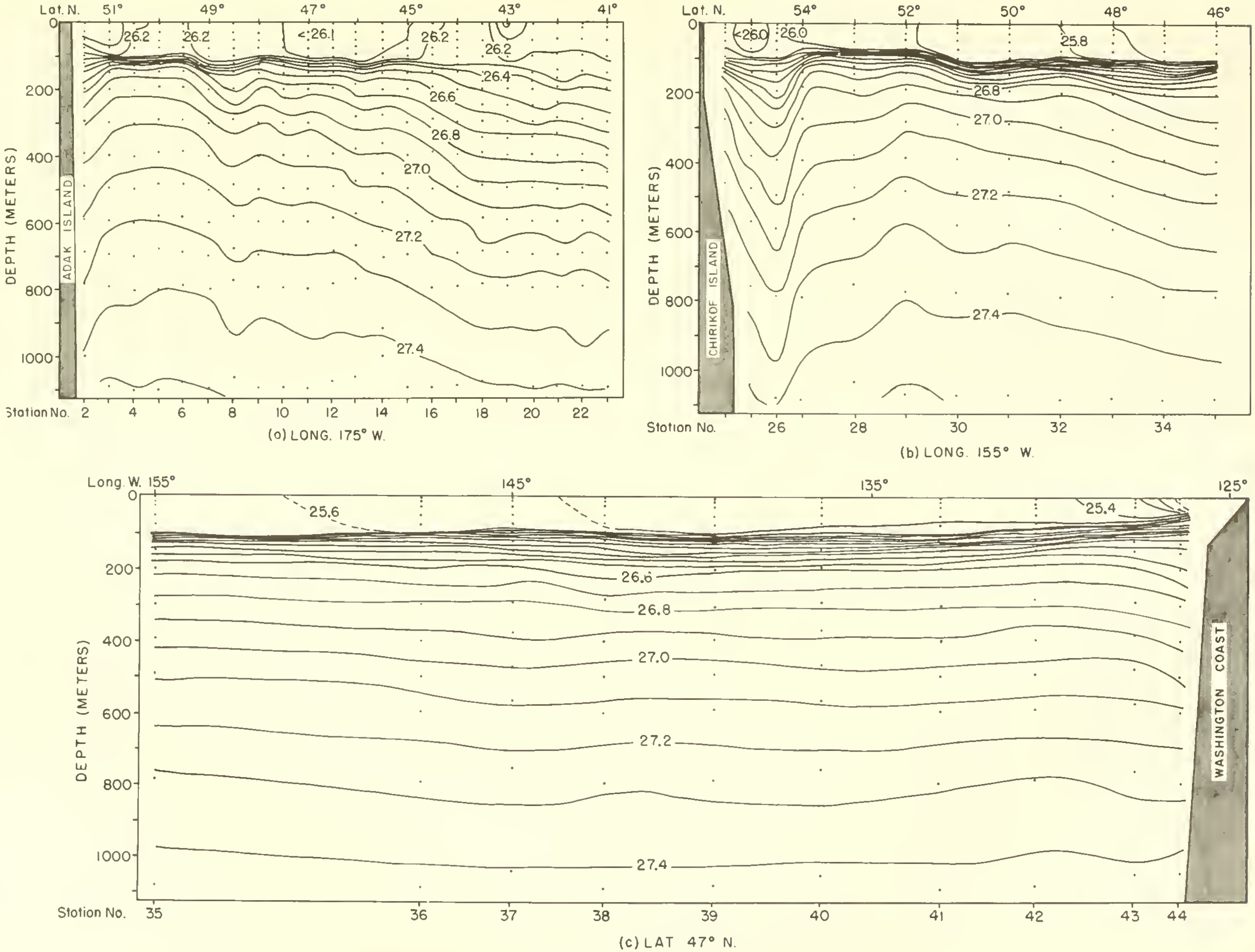


Figure 4.--Sigma-t profiles.

scale such a general assumption may be justified, but in the relatively confined and complex Subarctic region, some doubt exists as to the validity of geostrophic currents. However, since the level of no motion is not known and direct current measurements were not made, the geostrophic calculations are the only method available to show flow, and are presented with the previously stated reservations.

Profiles of isobaric surfaces relative to the 1,000-decibar surface are shown in figure 5 and the vertical profiles of geostrophic currents are shown in figure 6.

At long. 175° W. (fig. 6a) the Alaskan Stream was evident south of the Aleutian Islands to lat. 50° N. and attained a maximum velocity of about 10 cm./sec. near the Islands. South of lat. 50° N. the current structure was complex with marked frontal zones at latitudes 48° and 46° N. Between lat. 46° and 42° N., there was a pronounced eastward flow reaching 8 cm./sec. near latitude 44° N.

At long. 155° W. (fig. 6b) the axis of the westward flowing Alaskan Stream occurred offshore at lat. 54° N. with a speed in excess of 20 cm./sec. near the surface, and speeds in excess of 6 cm./sec. were present below 600 meters. The westward flow extended to lat. 52° N., south of which the predominant flow was eastward (except for an insignificant westward flow of approximately 0.3 cm./sec. between lat. 50° and 51° N.) with the main axis near lat. 48° N.

Geostrophic currents along lat. 47° N. (fig. 6a) were weak and variable. Velocities in excess of 2 cm./sec. were found only off the Washington coast, and this northward flow is substantiated by recoveries of drift bottles released during the cruise near the coast and reported coming ashore all along the west coast of Vancouver Island.

Temperature

One of the purposes of the winter cruise was to observe conditions during the period of maximum cooling of the surface layer which was known to occur during the period January to March. At most stations along long. 175° and 155° W. the temperatures at 100 meters were equivalent to those at the surface and in some instances the surface temperatures were lower, which indicates that no appreciable spring warming had occurred.

There are three significant features in the temperature profile along long. 175° W. (fig. 7a): First, the temperature maximum at 125 to 200 meters between Adak Island and lat. 50° N. which is associated with the westward flowing Alaskan Stream. Winter cooling had not penetrated deep enough into the water column to remove evidence of this stratum. It is apparent that when complete vertical mixing occurred, as at lat. 49°30' N., it is difficult to distinguish the origin of this water.

Second, the presence of a temperature-minimum between lat. 48° to 46° N. at 150 meters indicates the stratum to be an intrusion of cold water from the Oyashio region rather than a consequence of local cooling. The frontal zone which occurred between lat. 50° to 48° N. separates these two flows.

The third feature is the sharp downward slope of the 4° C. isotherm at lat. 45° N., (indicated in figure 2 as denoting the Polar Front) south of which the heat content of the water column is greatly increased.

These three features are also evident in the profile along long. 155° W. (fig. 7b). South of the narrow band of cold water near the continental slope the temperature-maximum associated with the westward flowing Alaskan Stream extends from approximately lat. 55°30' to 52°30' N. Compared with the conditions at long. 175° W. the Stream at long. 155° W. was about twice as wide; the maximum temperature was about 1° C. higher; and, as indicated in the section on geostrophic currents, the maximum velocity was almost twice as great.

The temperature-minimum stratum (reflecting the intrusion of water from the west) was displaced northward and occurred between lat. 48° and 51° N. The minimum temperature had increased 0.3° C. and the stratum had spread laterally. South of lat. 48° N., the downward slope of the 4° C. isotherm, although present, was not as sharp as at long. 175° W.

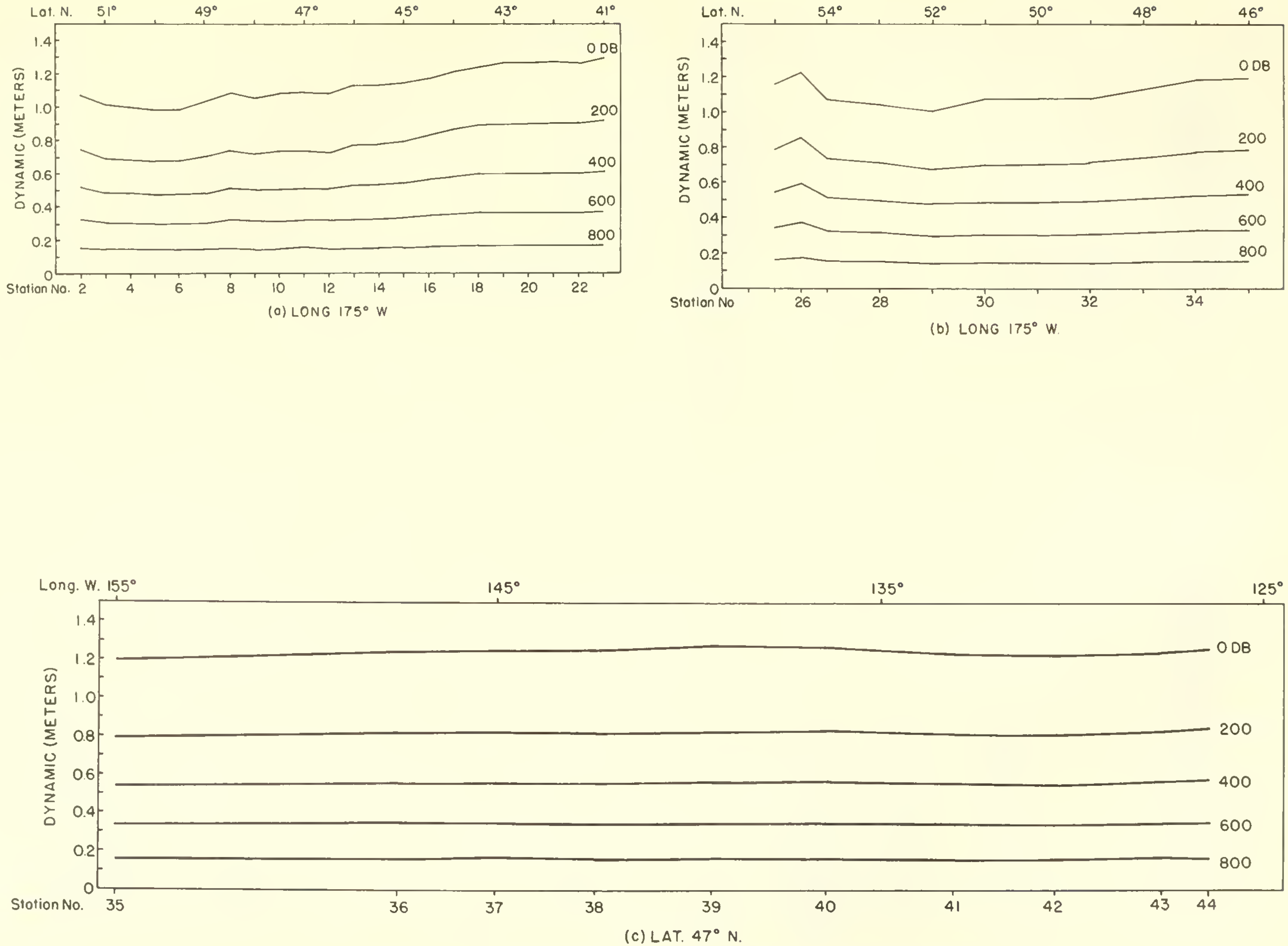


Figure 5.--Profiles of isobaric surfaces relative to 1,000-decibar surface.

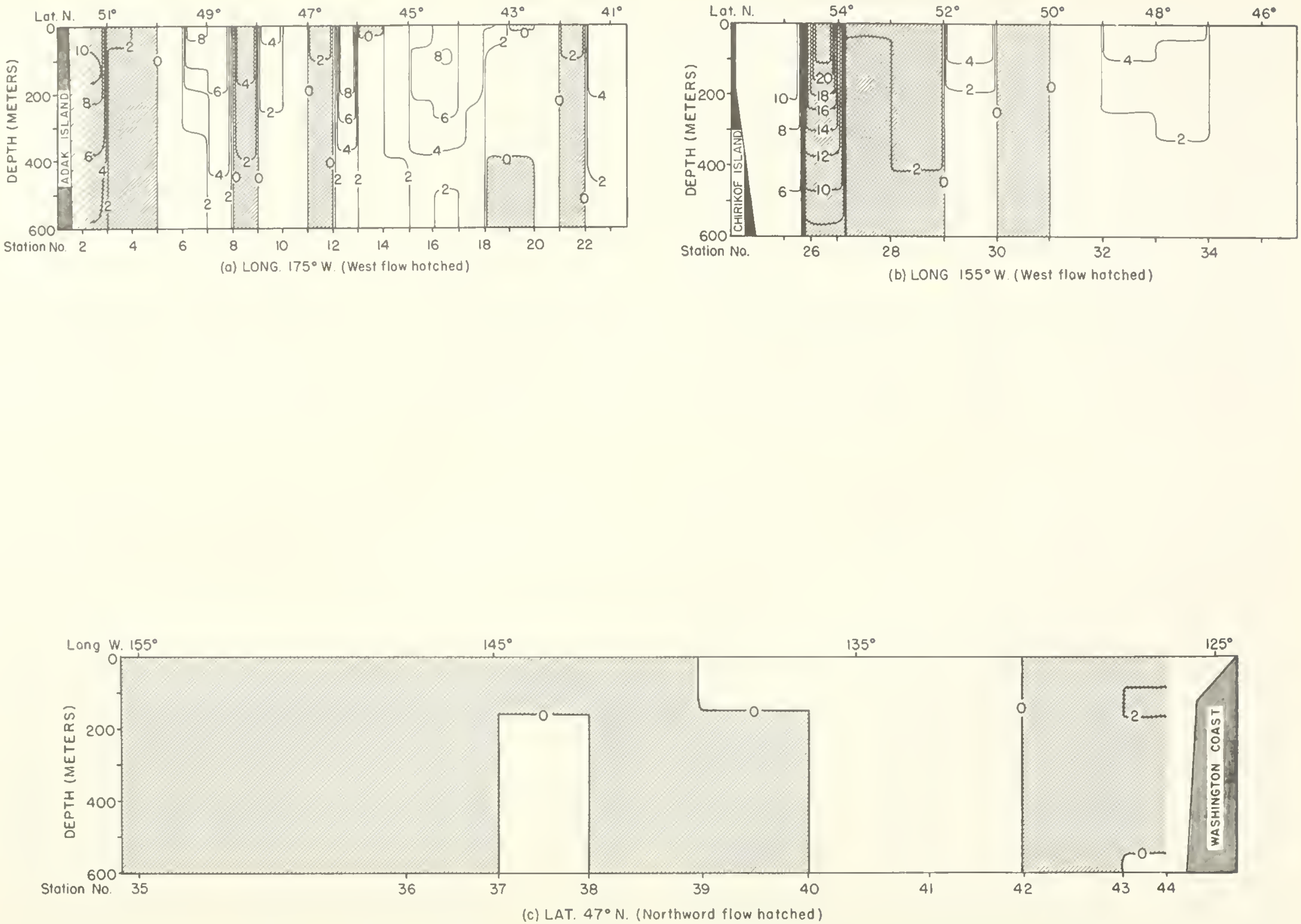
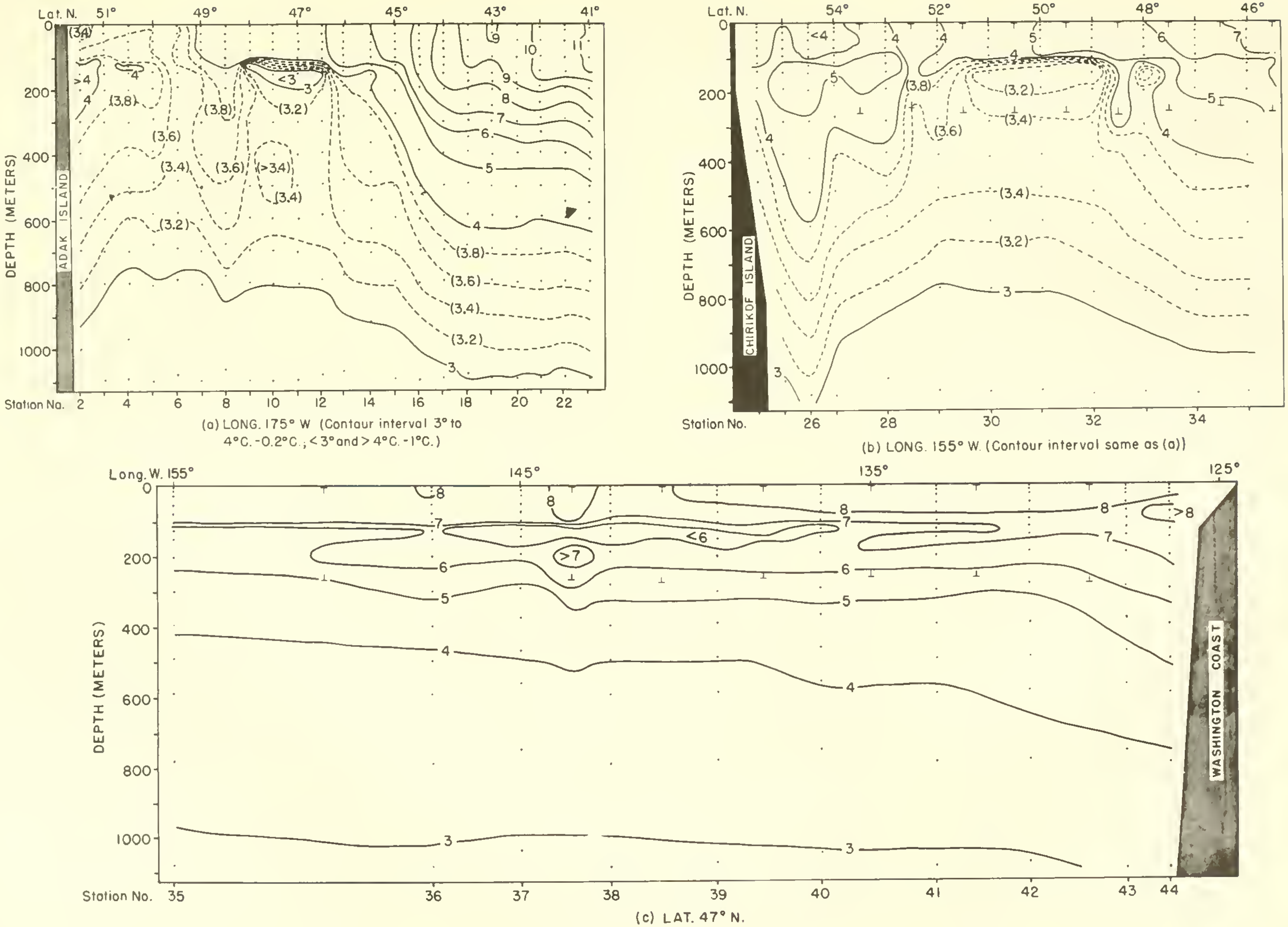


Figure 6.--Components of geostrophic currents (cm./sec.) relative to 1,000-decibar surface.



(a) LONG. 175° W (Contour interval 3° to 4°C. - 0.2°C.; < 3° and > 4°C. - 1°C.)

(b) LONG. 155° W. (Contour interval same as (a))

(c) LAT. 47° N.

Figure 7.--Temperature profiles (°C.). (⊥ and T indicates bathythermograph lowering.)

The temperature profile along lat. 47° N. (fig. 7c) contains none of the striking features of the two meridional sections. Although a temperature minimum existed at 100 to 150 meters, minimum temperatures exceeded 5° C. and are believed to be chiefly the result of winter-cooling rather than the result of advection from the temperature-minimum stratum shown in the previous two profiled.

The isotherms slope gradually downward to the east and dip sharply near the coast reflecting the northward flow off the Washington coast.

Salinity

The salinity is of particular interest as a criterion for indicating the presence of vertical divergence south of the Aleutian Islands and defining the Subtropic boundary.

Salinity profiles along long. 175° W., 155° W. and lat. 47° N. (fig. 8) show the dilute surface layer occurring from the surface to a depth of 100 meters which is characteristic of the Subarctic region. Tully and Barber (1960) have discussed the causes of this dilution and compared it with an estuarine system. As indicated earlier in the discussion of sigma-t, the salinity is a dominant factor in the stability of the water column during the winter period because of the relatively vertical isothermal conditions, particularly north of lat. 45° N.

No direct indication of vertical divergence, which would transport high salinity water to the surface, is evident in the salinity distribution along long. 175° W. (fig. 8a). The sharpest halocline found, however, during the entire cruise occurred at this longitude between lat. 50° and 51° N. The moderate, horizontal component of flow in the Alaskan Stream probably prevents the very minor vertical component from being manifest in the water structure near the surface. There is evidence in the temperature profile at this longitude that a vertical movement was present at lat. $49^{\circ}30'$ N., so one should not discount the possibility that such a feature may have existed farther to the westward where the flow of the Alaskan Stream must be reduced by divergences to the north through the passes and to the southward by water recirculating in the eastern Subarctic region.

Along long. 155° W. and lat. 47° N. (fig. 8) salinities in the upper 100 meters were relatively uniform with a range of 32.6 to 32.8 $^{o}/oo$, except near the Washington coast where further dilution occurred. Along long. 175° W. (fig. 8a), however, the salinities ranged from 32.6 to 34.3 $^{o}/oo$. Between lat. 45° and 44° N. there was a sharp gradient near the surface. Southward at lat. 43° N. a gyre or possibly an intruded tongue of lower salinity water interrupts the continuity of steadily increasing values, but at approximately lat. 42° N. the almost vertical 34 $^{o}/oo$ isohaline in the upper 200 meters denotes the position of the Subtropic boundary. Rather than shifting southward in winter in response to a southward shift of the North Equatorial Current, the boundary appears to occur a little farther to the northward than it has in recent years during summer. Below 200 meters the salinity minimum stratum which is ever present south of lat. 40° N. is clearly evident.

Comparison with other available data as far back as 1955 shows that the water structure in the vicinity of the northern extent of the salinity minimum and the position of the surface boundary indicated by the upper 34 $^{o}/oo$ isohaline have been relatively constant in the northern, central Pacific during the past 6 years. This implies a dynamic equilibrium condition between advection, diffusion, precipitation, and evaporation.

Dissolved Oxygen

Vertical profiles of dissolved oxygen are shown in figure 9.

No new information was obtained from the oxygen values; nor was this entirely unexpected. The main purpose of the observations was to provide a supplementary parameter for water mass analyses.

In general, values in the surface layer were at or near saturation. The low values ($<$ .1mg.at./l) at and below 200 meters depth, between lat. 50° and 51° N. along long. 175° W. and at lat. 52° N. along long. 155° W. are

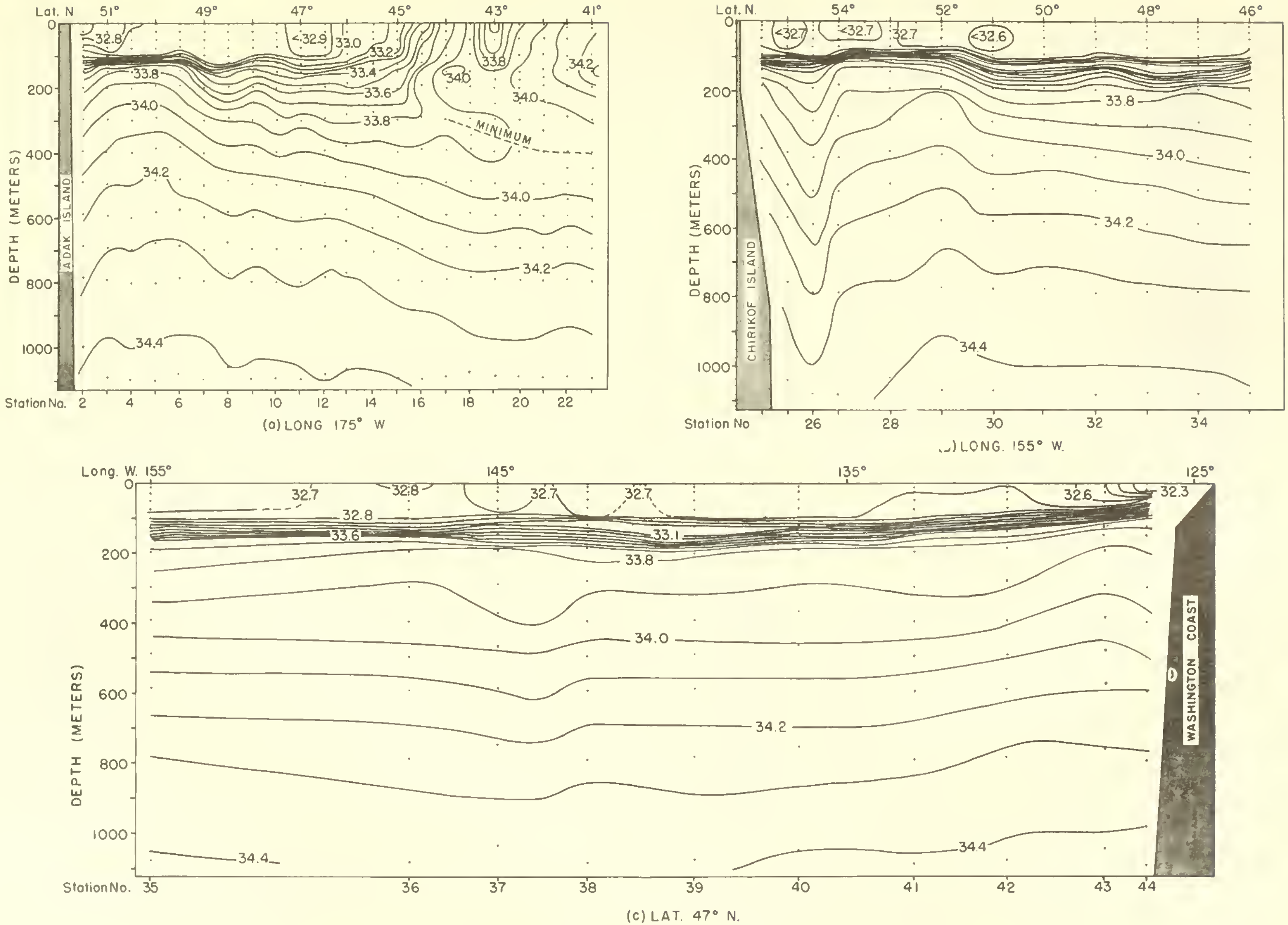


Figure 8.--Salinity profiled (⁰/oo).

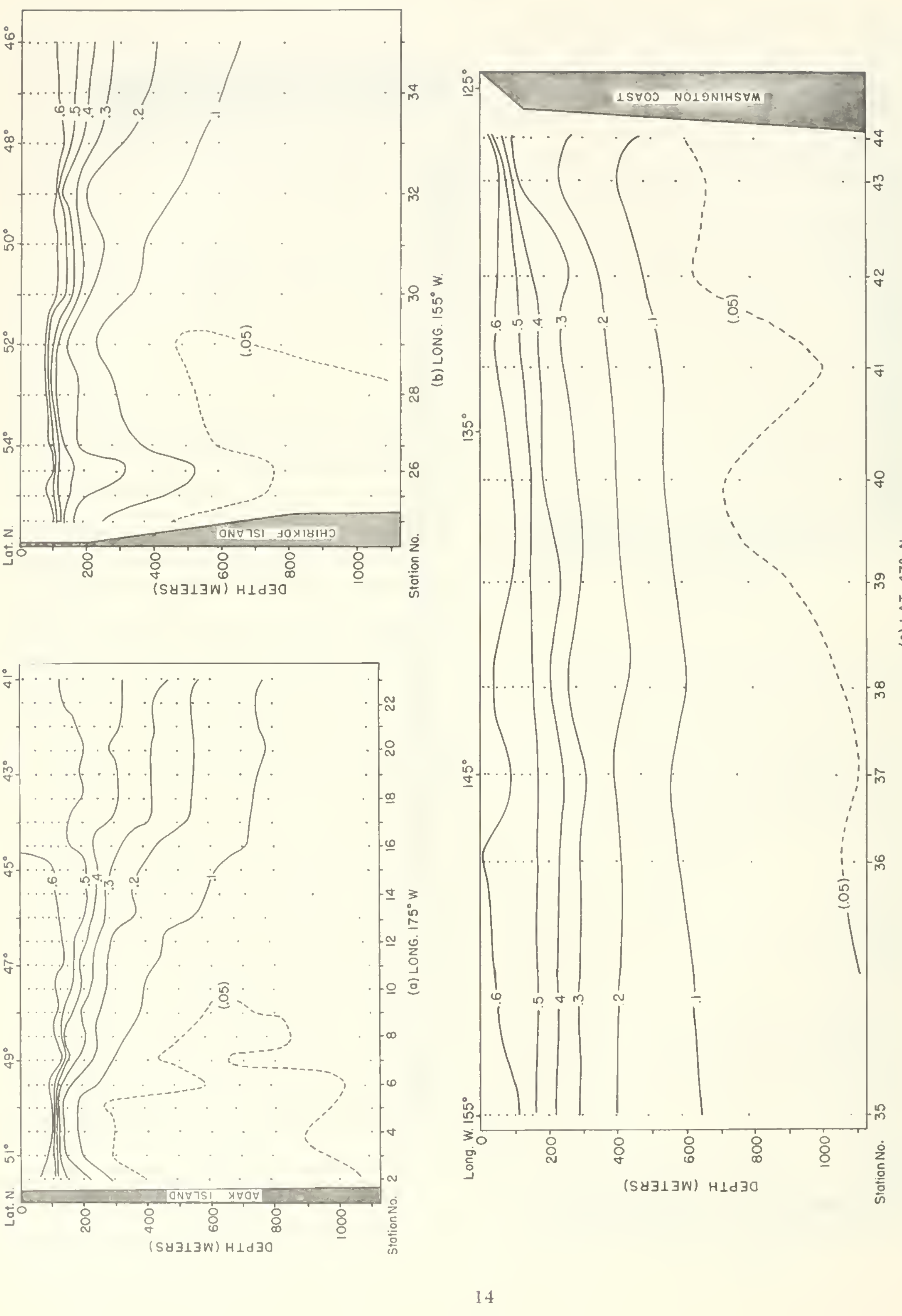


Figure 9.--Dissolved oxygen profiles (mg. at ./l.).

similar to those found during summer and are considered a relatively permanent feature in this region. The low values reflect a vertical movement of Deep Water and are considered to force nekton populations in the northern areas into the surface layer. A similar rising of the isolines occurs in the north equatorial region resulting in convex or "bowllike" stratum in the North Pacific.

SUMMARY

Good evidence was obtained of a significant westward velocity and transport in the Alaskan Stream southward of the Aleutian Islands and Alaska Peninsula as far westward as long. 175° W. Upwelling through the halocline was not evidenced south of the Aleutian Islands at long. 175° W., but it is suggested that, in years when the flow of the Alaskan Stream is not so pronounced, such a condition could occur. It does not appear that the temperature-minimum stratum south of the Alaskan Stream at 150 to 200 meters could have been formed locally, and, therefore, the stratum must be the result of advection from the western Subarctic.

The positions of the subsurface temperature front at lat. 46° N. and the surface salinity front at lat. 42° N. in the central North Pacific revealed by analysis of summer data remained the same. This indicates that no seasonal shift of water masses occurs northward of the Subtropic boundary, and the dominant changes in the surface layer are the result of differential latitudinal heating and cooling rather than advection.

Further results of this cruise will be forthcoming in reports and bulletins of INPFC.

ACKNOWLEDGMENTS

The assistance and cooperation of James E. Mason, Captain Erling Jacobson, Chief Engineer William Peck, Magnus Landro, and Rudolf Jenssen during continuously difficult weather conditions materially contributed to the success of the program and are gratefully acknowledged.

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APPENDIX A - FIELD PROCEDURE

Vessel

The MV *Bertha Ann* (frontispiece) is a former military refrigerated cargo vessel converted for fisheries work and was chartered from the Ballard Docks Co. (R. Stewart). Specifications of the vessel are as follows:

Type - Converted AKL (Ex. U.S. Army F.S.)
Length - 176 feet 6 inches
Beam - 32 feet
Draft - 12 feet
Gross tonnage - 550
Cruising speed - 11.0 knots
Cruising radius - 7,000 miles
Propulsion - Two 6-cyl. GM diesel engines--total 1,000 hp.
Auxiliary power - Two 100-kw. generators
Electronic equipment - Gyro compass, loran, fathometer, radio direction finder, radar
Winches - Oceanographic winch - portable, temporarily installed.
General arrangement - Raised forecastle head, two cargo hatches amidship, superstructure and engine room aft.

Oceanographic Observers

Felix Favorite, Program Leader	February 10 to March 12
Alan H. Haselwood	January 31 to April 11
Robert A. Preston, Jr.	January 31 to April 11

Oceanographic Casts

A single 14 Nansen bottle cast or two casts of 7 bottles were made to approximately 1,100 meters at and between fishing sets. Sampling depths were 25, 50, 75, 100, 125, 150, 200, 300, 400, 500, 600, 700, 800, and 1,100 meters. At station Nos. 18 to 23, some sampling depths were changed to provide more information on the salinity-minimum stratum. In anticipation of surface warming during the second leg of the cruise, a bottle was inserted at the 10-meter level, which necessitated removal of one at 700 meters. Each bottle carried two protected reversing thermometers, and the bottom 8 bottles also carried one unprotected thermometer.

The surface sample was obtained by bucket sample at the time of the BT lowering, which occurred just prior to the cast.

Chemistry

Salinity samples were drawn into standard citrate bottles and were analysed each evening utilizing the Industrial Manufacturing Company (Jayco, South Africa) salinometer Model Mark III. The salinometer was shock-mounted and had its own motor-generator set converting 220 volts direct current to 100 volts, 60-cycle alternating current. The salinometer was turned on each evening and calibrated, using Copenhagen water. Secondary standards, previously analysed by chemical methods, were used to insure proper operation prior to analysing samples. Calibration was checked at frequent intervals, and no appreciable deviation was encountered. The salinities of these samples are reported to three decimal places.

At Station 29 the motor-generator set broke down, and salinity samples at this and subsequent stations were stored until the vessel reached Seattle where they were analysed chemically, using the Knudsen method. The salinities of these samples are reported to two decimal places.

Oxygen samples were analysed aboard ship after the samples were drawn into standard brown glass bottles. Modified Winkler method was used. No surface sample was obtained.

Additional Work

Plankton - Vertical plankton hauls using a $\frac{1}{2}$-meter, No. 6 mesh net were made after dark whenever possible. In instances where a zero wire angle could not be maintained, the length of wire out was altered to obtain a haul from 150 meters to the surface. Hauling speed was approximately 50 meters per minute.

Drift bottles - Unweighted drift bottles were released in groups of 120 bottles. The release points are tabulated in Appendix B. Cards in the bottles were similar to those used in other years with serial numbers from 2001 to 5600.

APPENDIX B - TABULATED DATA

Notes On Tabulated Data

Data headings are similar to those in previous reports and are in such common usage only a few explanatory remarks are required.

Position	- As in other years, station positions were predetermined and the vessel was maneuvered to reach each location by utilizing loran. Locations are considered to be as accurate as permitted by the positions and nature of the available loran stations.
Weather	- Coded from U.S. Navy H.O. Publication 606-C. Wind - shipboard anemometer (average reading over minute interval). Wet, dry temperatures - sling psychrometer.
Observed data	- Sigma-t computed by IBM 650 program.
Interpolated data	- Routine by machine program utilizing observed data two points below and one above the indicated depth.
Wire angles	- The wire angles were recorded but are not presented because at most stations it was necessary to maneuver the vessel constantly during the cast. This resulted in 5^{o} to 10^{o} variations in the wire angle which were of short duration and perhaps only affected the catenary near the surface. In very heavy seas and high winds, it was necessary to place the vessel stern to the wind and maneuver in this position. In most instances small wire angles were maintained.

MV BERTHA ANN
STATION 1

51-30 N 175-28 W 14 FEB 1962 0033 GCT
WEATHER 03 CLOUDS 6 AMT 8 WIND 150 14 KTS SEA 3
SWELL 180 AMT 5 BAR 0999 MBS DRY 4.4 WET 2.8 BT 1

OBSERVED VALUES

DEPTH	TEMP	SAL	σ_t	OXY
0	2.8	32.599	26.01	
25	3.18	32.585	25.97	.640
50	3.18	32.592	25.97	.640
74	3.80	32.823	26.10	.588
99	4.44	33.149	26.29	.460
123	4.72	33.376	26.44	.367
148	4.72	33.472	26.52	.327
197	4.70	33.721	26.72	.262
296	4.30	33.860	26.87	.166
395	3.82	34.019	27.05	.091

INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	SAL	σ_t	$10^5\delta$	ΔD
0	2.8	32.599	26.01	200.6	.000
10	3.00	32.591	25.99	202.8	.020
20	3.13	32.586	25.97	204.3	.040
30	3.21	32.585	25.96	205.1	.060
50	3.18	32.592	25.97	204.4	.101
75	3.83	32.834	26.10	192.1	.151
100	4.46	33.160	26.30	174.0	.197
150	4.72	33.481	26.53	153.1	.279
200	4.69	33.732	26.73	134.5	.351
250	4.55	33.856	26.84	124.1	.416
300	4.28	33.866	26.88	121.0	.477

MV BERTHA ANN
STATION 2

51-30 N 175-28 W 19 FEB 1962 0039-0012 GCT
WEATHER 03 CLOUDS 6 AMT 5 WIND 240 30 KTS SEA 4
SWELL 240 AMT 6 BAR 0994 MBS DRY 3.0 WET 1.0 BT 2

OBSERVED VALUES

DEPTH	TEMP	SAL	σ_t	OXY
0	3.3	32.668	26.02	
25	3.35	32.652	26.01	.630
49	3.48	32.802	26.11	.596
73	3.66	32.958	26.22	.551
98	3.62	33.092	26.33	.546
122	4.43	33.359	26.46	.388
147	4.80	33.601	26.61	.284
196	4.48	33.768	26.78	.218
294	3.84	33.949	26.99	.089
392	3.76	34.041	27.07	.053
490	3.65	34.131	27.15	.050
588	3.54	34.191	27.21	.041
686	3.36	34.243	27.27	.041
784	3.25	34.280	27.31	.034
1000	2.88	34.368	27.41	.044

INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	SAL	σ_t	$10^5\delta$	ΔD
0	3.3	32.668	26.02	199.5	.000
10	3.31	32.641	26.00	201.6	.020
20	3.33	32.641	26.00	201.9	.040
30	3.37	32.670	26.02	200.1	.060
50	3.49	32.808	26.12	190.8	.099
75	3.67	32.970	26.23	180.4	.145
100	3.66	33.109	26.34	170.0	.189
150	4.82	33.623	26.63	143.6	.267
200	4.45	33.779	26.79	128.4	.335
250	4.13	33.893	26.92	116.9	.396
300	3.82	33.957	27.00	109.3	.453
400	3.75	34.048	27.08	102.6	.559
500	3.64	34.138	27.16	095.5	.658
600	3.52	34.198	27.22	090.5	.751
700	3.34	34.249	27.28	085.5	.839
800	3.23	34.286	27.32	082.3	.923
1000	2.88	34.368	27.41	073.7	1.079

MV BERTHA ANN
STATION 3

51-00 N	175-02 W	19 FEB 1962	0458 GCT
WEATHER 03	CLOUDS 6 AMT 5	WIND 240 23 KTS	SEA 4
SWELL 240 AMT 5	BAR 0998 MBS	DRY 3.0 WET 0.5	BT 3

OBSERVED VALUES

DEPTH	TEMP	SAL	σ_t	OXY
0	3.5	32.738	26.06	
25	3.58	32.731	26.05	.633
50	3.64	32.753	26.06	.624
74	3.78	32.834	26.11	.630
99	3.90	32.977	26.21	.554
124	3.99	33.609	26.70	.263
148	3.99	33.775	26.84	.177
198	3.88	33.918	26.96	.087
297	3.72	34.030	27.07	.048
396	3.65	34.110	27.14	.050
495	3.46	34.202	27.23	.039
594	3.31	34.256	27.28	.038
693	3.14	34.303	27.34	.039
792	3.04	34.335	27.37	.039
1090	2.50	34.448	27.51	.056

INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	SAL	σ_t	$10^5\delta$	ΔD
0	3.5	32.738	26.06	195.9	.000
10	3.53	32.732	26.05	196.7	.020
20	3.57	32.730	26.05	197.2	.040
30	3.59	32.733	26.05	197.3	.060
50	3.64	32.753	26.06	196.3	.099
75	3.79	32.839	26.11	191.4	.147
100	3.90	32.993	26.22	181.0	.194
150	3.99	33.786	26.84	122.7	.270
200	3.88	33.923	26.96	111.7	.329
250	3.79	34.005	27.04	105.0	.383
300	3.72	34.033	27.07	102.6	.435
400	3.64	34.113	27.14	096.6	.535
500	3.45	34.206	27.23	088.5	.628
600	3.30	34.259	27.29	083.7	.714
700	3.13	34.306	27.34	079.1	.795
800	3.03	34.338	27.38	076.3	.873
1000	2.70	34.411	27.46	068.6	1.018

MV BERTHA ANN
STATION 4

50-30 N 175-00 W 20 FEB 1962 0029 GCT
WEATHER 01 CLOUDS 6 AMT 3 WIND 220 25 KTS SEA 3
SWELL 220 AMT 5 BAR 1009 MBS DRY 3.9 WET 2.6 BT 4

OBSERVED VALUES

DEPTH	TEMP	SAL	σ_t	OXY
0	3.5	32.848	26.15	
25	3.61	32.941	26.21	.622
50	3.61	32.943	26.21	.632
75	3.64	32.948	26.21	.629
100	3.64	32.965	26.23	.614
125	4.01	33.620	26.71	.237
150	3.98	33.799	26.86	.147
200	3.83	33.938	26.98	.073
300	3.65	34.063	27.10	.048
400	3.55	34.142	27.17	.048
500	3.41	34.203	27.23	.048
600	3.22	34.259	27.30	.041
700	3.05	34.298	27.34	.044
800	2.95	34.335	27.38	.046
1100	2.52	34.431	27.50	.059

INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	SAL	σ_t	$10^5\delta$	ΔD
0	3.5	32.848	26.15	187.6	.000
10	3.56	32.896	26.18	184.6	.019
20	3.60	32.930	26.20	182.4	.037
30	3.62	32.949	26.22	181.2	.055
50	3.61	32.943	26.21	181.7	.091
75	3.64	32.948	26.21	181.8	.136
100	3.64	32.965	26.23	180.7	.181
150	3.98	33.799	26.86	121.6	.257
200	3.83	33.938	26.98	110.1	.315
250	3.72	34.026	27.06	102.8	.368
300	3.65	34.063	27.10	099.7	.419
400	3.55	34.142	27.17	093.5	.516
500	3.41	34.203	27.23	088.3	.607
600	3.22	34.259	27.30	082.9	.693
700	3.05	34.298	27.34	078.9	.774
800	2.95	34.335	27.38	075.7	.851
1000	2.68	34.402	27.46	069.1	.996

MV BERTHA ANN
STATION 5

50-00 N 175-00 W 20 FEB 1962 0551 GCT
WEATHER 02 CLOUDS 6 AMT 6 WIND 180 25 KTS SEA 4
SWELL 220 AMT 5 BAR 1010 MBS DRY 2.8 WET 1.7 BT 5

OBSERVED VALUES

DEPTH	TEMP	SAL	σ_t	OXY
0	3.6	32.967	26.23	
24	3.59	32.953	26.22	.625
48	3.59	32.951	26.22	.627
72	3.58	32.953	26.22	.621
96	3.62	32.975	26.24	.614
120	3.94	33.666	26.75	.226
144	3.98	33.791	26.85	.153
192	3.90	33.912	26.95	.074
289	3.76	34.048	27.08	.040
386	3.64	34.143	27.16	.042
483	3.43	34.217	27.24	.035
580	3.30	34.261	27.29	.034
677	3.11	34.311	27.35	.038
800	2.94	34.354	27.40	.038
1100	2.48	34.441	27.51	.056

INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	SAL	σ_t	$10^5\delta$	ΔD
0	3.6	32.967	26.23	179.5	.000
10	3.59	32.960	26.23	180.0	.018
20	3.59	32.954	26.22	180.5	.036
30	3.59	32.951	26.22	180.8	.054
50	3.59	32.951	26.22	181.0	.090
75	3.58	32.955	26.22	180.7	.135
100	3.65	33.044	26.29	174.8	.179
150	3.98	33.816	26.87	120.3	.253
200	3.89	33.929	26.97	111.3	.311
250	3.81	34.011	27.04	104.8	.365
300	3.75	34.061	27.09	100.8	.416
400	3.62	34.155	27.17	093.3	.513
500	3.40	34.227	27.25	086.4	.603
600	3.27	34.271	27.30	082.5	.687
700	3.07	34.321	27.36	077.4	.767
800	2.94	34.354	27.40	074.2	.843
1000	2.64	34.415	27.47	067.7	.985

MV BERTHA ANN
STATION 6

49-31 N 175-00 W 23 FEB 1962 0618 GCT
WEATHER 03 CLOUDS 6 AMT 8 WIND 160 25 KTS SEA 5
SWELL 160 AMT 6 BAR 0999 MBS DRY 2.8 WET 1.7 BT 6

OBSERVED VALUES

DEPTH	TEMP	SAL	σ_t	OXY
0	3.6	32.937	26.21	
24	3.56	32.931	26.21	.630
48	3.58	32.934	26.21	.625
72	3.65	32.956	26.22	.636
96	3.69	33.107	26.34	.557
120	3.50	33.619	26.76	.295
144	3.56	33.751	26.86	.204
192	3.53	33.859	26.95	.134
288	3.53	34.014	27.07	.062
382	3.40	34.107	27.16	.059
482	3.29	34.172	27.22	.051
577	3.20	34.230	27.27	.049
686	3.08	34.306	27.35	.020
784	2.97	34.344	27.39	.022
1078	2.50	34.437	27.50	.055

INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	SAL	σ_t	$10^5\delta$	ΔD
0	3.6	32.937	26.21	181.8	.000
10	3.58	32.933	26.21	182.0	.018
20	3.56	32.931	26.21	182.0	.036
30	3.56	32.931	26.21	182.1	.054
50	3.58	32.935	26.21	182.1	.090
75	3.66	32.968	26.23	180.5	.135
100	3.67	33.167	26.38	165.7	.178
150	3.57	33.776	26.88	119.3	.249
200	3.53	33.875	26.96	111.9	.307
250	3.52	33.962	27.03	105.6	.361
300	3.52	34.029	27.08	100.9	.413
400	3.38	34.121	27.17	093.4	.510
500	3.27	34.183	27.23	088.3	.601
600	3.18	34.245	27.29	083.5	.687
700	3.06	34.313	27.35	077.8	.768
800	2.95	34.350	27.39	074.6	.844
1000	2.65	34.415	27.47	067.8	.986

MV BERTHA ANN
STATION 7

49-00 N 175-00 W 25 FEB 1962 0041 GCT
WEATHER 01 CLOUDS 8 AMT 2 WIND 140 20 KTS SEA 3
SWELL 140 AMT 4 BAR 1015 MBS DRY 7.2 WET 6.7 BT 7

OBSERVED VALUES

DEPTH	TEMP	SAL	σ_t	OXY
0	4.2	32.914	26.13	
25	4.05	32.921	26.15	.634
50	4.05	32.918	26.15	.640
75	4.05	32.922	26.15	.640
100	4.05	32.920	26.15	.636
125	3.90	33.013	26.24	.606
150	3.54	33.470	26.64	.384
199	3.55	33.694	26.81	.242
299	3.66	33.945	27.00	.078
399	3.62	34.092	27.12	.055
498	3.48	34.181	27.21	.041
598	3.27	34.237	27.27	.049
697	3.05	34.288	27.33	.051
797	2.96	34.346	27.39	.054
1096	2.53	34.438	27.50	.072

INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	SAL	σ_t	$10^5\delta$	ΔD
0	4.2	32.914	26.13	189.1	.000
10	4.12	32.918	26.14	188.1	.019
20	4.07	32.920	26.15	187.6	.038
30	4.04	32.921	26.15	187.3	.057
50	4.05	32.918	26.15	187.7	.095
75	4.05	32.922	26.15	187.6	.142
100	4.05	32.920	26.15	187.9	.189
150	3.54	33.470	26.64	142.1	.271
200	3.55	33.698	26.82	125.4	.338
250	3.59	33.857	26.94	114.2	.398
300	3.66	33.947	27.01	108.5	.454
400	3.62	34.093	27.13	097.9	.557
500	3.48	34.182	27.21	090.6	.651
600	3.27	34.238	27.27	084.9	.739
700	3.05	34.290	27.34	079.5	.821
800	2.96	34.348	27.39	074.8	.898
1000	2.69	34.422	27.47	067.7	1.041

MV BERTHA ANN
STATION 8

48-30 N 175-00 W 26 FEB 1962 0306 GCT
WEATHER 03 CLOUDS 6 AMT 8 WIND 130 50 KTS SEA 5
SWELL 130 AMT 6 BAR 1006 MBS DRY 7.8 WET 7.2 BT 8

OBSERVED VALUES

DEPTH	TEMP	SAL	σ_t	OXY
0	4.3	32.900	26.11	
24	4.04	32.891	26.13	.634
48	4.04	32.897	26.13	.634
73	4.04	32.897	26.13	.634
96	4.04	32.898	26.13	.634
120	4.00	32.986	26.21	.585
144	4.03	33.367	26.51	.388
193	3.85	33.538	26.66	.325
289	3.82	33.895	26.95	.111
483	3.62	34.121	27.15	.052
579	3.48	34.189	27.22	.041
676	3.34	34.251	27.28	.044
772	3.15	34.287	27.32	.044
1061	2.66	34.403	27.46	.061

INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	SAL	σ_t	$10^5\delta$	ΔD
0	4.3	32.900	26.11	191.1	.000
10	4.16	32.894	26.12	190.3	.019
20	4.07	32.891	26.13	189.8	.038
30	4.02	32.891	26.13	189.3	.057
50	4.04	32.897	26.13	189.2	.095
75	4.04	32.897	26.13	189.4	.142
100	4.04	32.906	26.14	188.9	.189
150	4.03	33.432	26.56	149.7	.274
200	3.83	33.563	26.68	138.2	.346
250	3.78	33.746	26.83	124.4	.412
300	3.81	33.926	26.97	111.6	.471
400	3.73	34.105	27.12	098.1	.576
500	3.60	34.135	27.16	095.3	.673
600	3.45	34.203	27.23	089.4	.765
700	3.30	34.262	27.29	084.2	.852
800	3.10	34.298	27.34	080.0	.934
1000	2.75	34.378	27.43	071.6	1.086

MV BERTHA ANN
STATION 9

48-00 N 175-00 W 26 FEB 1962 1302 GCT
WEATHER 01 CLOUDS 6 AMT 3 WIND 130 40 KTS SEA 6
SWELL 130 AMT 6 BAR 1007 MBS DRY 7.8 WET 6.7 BT 9

OBSERVED VALUES

DEPTH	TEMP	SAL	σ_t	OXY
0	4.4	32.936	26.13	
25	4.33	32.937	26.14	.636
50	4.33	32.936	26.14	.636
75	4.33	32.936	26.14	.635
100	4.31	32.944	26.14	.635
124	2.80	33.247	26.53	.588
149	3.20	33.438	26.64	.435
199	3.54	33.694	26.82	.251
298	3.31	33.902	27.00	.136
398	3.39	34.034	27.10	.087
497	3.33	34.128	27.18	.080
596	3.33	34.223	27.26	.047
696	3.15	34.272	27.31	.048
795	3.03	34.319	27.36	.051
1094	2.56	34.423	27.49	.067

INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	SAL	σ_t	$10^5\delta$	ΔD
0	4.4	32.936	26.13	189.4	.000
10	4.36	32.937	26.13	189.0	.019
20	4.34	32.937	26.14	188.9	.038
30	4.32	32.937	26.14	188.8	.057
50	4.33	32.936	26.14	189.1	.095
75	4.33	32.936	26.14	189.3	.142
100	4.31	32.944	26.14	188.7	.189
150	3.21	33.445	26.65	140.9	.271
200	3.54	33.698	26.82	125.3	.338
250	3.57	33.851	26.94	114.4	.398
300	3.31	33.905	27.01	108.2	.454
400	3.39	34.036	27.10	099.8	.558
500	3.33	34.131	27.18	092.8	.654
600	3.33	34.226	27.26	086.5	.744
700	3.14	34.274	27.32	081.6	.828
800	3.02	34.321	27.36	077.5	.908
1000	2.73	34.396	27.45	070.0	1.056

MV BERTHA ANN
STATION 10

47-31 N 175-00 W 26 FEB 1962 2031 GCT
WEATHER 01 CLOUDS 8 AMT 1 WIND 220 30 KTS SEA 5
SWELL 220 AMT 7 BAR 1013 MBS DRY 6.1 WET 5.0 BT 10

OBSERVED VALUES

DEPTH	TEMP	SAL	σ_t	OXY
0	4.5	32.914	26.10	
25	4.51	32.912	26.10	.635
50	4.51	32.913	26.10	.632
75	4.51	32.910	26.10	.630
100	4.48	32.930	26.12	.629
125	3.67	33.256	26.46	.518
149	2.94	33.318	26.57	.551
199	3.07	33.552	26.75	.392
298	3.28	33.836	26.95	.166
398	3.46	33.995	27.06	.084
497	3.49	34.138	27.17	.055
596	3.28	34.189	27.23	.055
696	3.10	34.252	27.30	.053
796	3.01	34.306	27.35	.065
1094	2.58	34.420	27.48	.067

INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	SAL	σ_t	$10^5\delta$	ΔD
0	4.5	32.914	26.10	192.1	.000
10	4.51	32.913	26.10	192.3	.019
20	4.51	32.912	26.10	192.5	.038
30	4.51	32.912	26.10	192.6	.057
50	4.51	32.913	26.10	192.7	.096
75	4.51	32.910	26.10	193.1	.144
100	4.48	32.930	26.12	191.5	.192
150	2.92	33.321	26.58	147.7	.277
200	3.07	33.556	26.75	131.6	.347
250	3.19	33.728	26.88	120.0	.410
300	3.28	33.840	26.96	112.8	.468
400	3.46	33.998	27.07	103.4	.576
500	3.49	34.141	27.18	093.7	.675
600	3.27	34.191	27.24	088.4	.766
700	3.09	34.254	27.30	082.6	.851
800	3.01	34.308	27.35	078.3	.931
1000	2.74	34.392	27.45	070.4	1.080

MV BERTHA ANN
STATION 11

47-00 N 175-00 W 27 FEB 1962 0202-0247 GCT
WEATHER 01 CLOUDS 8 AMT 1 WIND 220 15 KTS SEA 3
SWELL 220 AMT 6 BAR 1019 MBS DRY 7.8 WET 7.2 BT 11

OBSERVED VALUES

DEPTH	TEMP	SAL	σ_t	OXY
0	4.8	32.874	26.04	
25	4.76	32.874	26.04	.635
50	4.74	32.866	26.04	.634
75	4.72	32.870	26.04	.635
100	4.66	32.890	26.06	.634
125	3.66	33.056	26.30	.617
149	2.86	33.246	26.52	.582
199	3.00	33.570	26.77	.376
299	3.32	33.868	26.98	.154
398	3.39	34.001	27.07	.103
498	3.38	34.115	27.17	.096
597	3.30	34.193	27.24	.066
696	3.16	34.261	27.30	.056
796	3.02	34.267	27.32	.062
1095	2.59	34.420	27.48	.069

INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	SAL	σ_t	$10^5\delta$	ΔD
0	4.8	32.874	26.04	198.1	.000
10	4.78	32.875	26.04	197.9	.020
20	4.77	32.875	26.04	197.9	.040
30	4.75	32.873	26.04	198.0	.060
50	4.74	32.866	26.04	198.6	.100
75	4.72	32.870	26.04	198.3	.150
100	4.66	32.890	26.06	196.4	.199
150	2.84	33.253	26.53	152.1	.286
200	3.00	33.575	26.77	129.5	.356
250	3.16	33.780	26.92	115.8	.417
300	3.32	33.870	26.98	110.9	.474
400	3.39	34.003	27.08	102.3	.581
500	3.38	34.117	27.17	094.4	.679
600	3.30	34.195	27.24	088.4	.770
700	3.15	34.262	27.30	082.6	.856
800	3.01	34.268	27.32	081.3	.938
1000	2.73	34.349	27.41	073.5	1.093

MV BERTHA ANN
STATION 12

46-30 N 175-00 W   27 FEB 1962 1108-1152 GCT
WEATHER 01 CLOUDS 8 AMT 1 WIND 150 10 KTS SEA 3
SWELL 150 AMT 5 BAR 1019 MBS DRY 8.3 WET 6.7 BT 12

OBSERVED VALUES

DEPTH	TEMP	SAL	σ_t	OXY
0	4.9	32.886	26.03	
25	4.83	32.885	26.04	.624
49	4.83	32.894	26.05	.628
74	4.82	32.894	26.05	.620
98	4.81	32.887	26.05	.613
123	3.68	33.103	26.33	.607
147	2.99	33.289	26.54	.584
195	3.24	33.566	26.74	.414
293	3.25			.198
391	3.38	33.975	27.05	.117
488	3.38	34.076	27.14	.086
586	3.30	34.190	27.23	.067
683	3.18	34.256	27.30	.061
781	3.04	34.325	27.37	.066
1074	2.62	34.357	27.43	.069

INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	SAL	σ_t	$10^5\delta$	ΔD
0	4.9	32.886	26.03	198.3	.000
10	4.86	32.884	26.04	198.1	.020
20	4.84	32.884	26.04	198.0	.040
30	4.82	32.886	26.04	197.7	.060
50	4.83	32.894	26.05	197.4	.100
75	4.82	32.894	26.05	197.5	.149
100	4.76	32.896	26.06	196.9	.198
150	2.94	33.310	26.57	148.7	.284
200	3.26	33.591	26.76	130.7	.354
250	3.33	33.798	26.92	116.1	.416
300	3.26	33.929	27.03	105.9	.471
400	3.39	33.987	27.06	103.5	.576
500	3.37	34.089	27.15	096.4	.676
600	3.29	34.202	27.24	087.8	.768
700	3.16	34.268	27.31	082.2	.853
800	3.01	34.335	27.38	076.3	.932
1000	2.73	34.374	27.43	071.7	1.080

MV BERTHA ANN
STATION 13

46-03 N 174-54 W 01 MAR 1962 0432-0510 GCT
WEATHER 03 CLOUDS 6 AMT 6 WIND 230 45 KTS SEA 4
SWELL 230 AMT 6 BAR 1021 MBS DRY 7.2 WET 6.1 BT 13

OBSERVED VALUES

DEPTH	TEMP	SAL	σ_t	OXY
0	5.9	33.033	26.03	
23	5.83	33.027	26.04	.615
44	5.82	33.024	26.04	.613
68	5.80	33.022	26.04	.608
90	5.80	33.022	26.04	.608
113	5.75	33.035	26.05	.608
137	4.59	33.377	26.46	.575
185	3.76	33.461	26.61	.556
280	3.69	33.744	26.84	.297
378	3.62	33.896	26.97	.190
474	3.57	34.042	27.09	.122
572	3.54	34.160	27.19	.098
670	3.34	34.227	27.26	.079
768	3.20	34.288	27.32	.070
1063	2.73	34.404	27.46	.070

INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	SAL	σ_t	$10^5\delta$	ΔD
0	5.9	33.033	26.03	198.3	.000
10	5.86	33.030	26.04	198.2	.020
20	5.84	33.028	26.04	198.2	.040
30	5.82	33.026	26.04	198.2	.060
50	5.82	33.023	26.04	198.7	.100
75	5.80	33.022	26.04	198.8	.150
100	5.78	33.026	26.04	198.6	.200
150	4.17	33.479	26.58	147.5	.287
200	3.61	33.495	26.65	141.2	.359
250	3.49	33.638	26.78	129.6	.427
300	3.68	33.787	26.88	120.7	.490
400	3.61	33.930	27.00	110.0	.605
500	3.56	34.076	27.12	099.3	.710
600	3.50	34.184	27.21	091.4	.805
700	3.29	34.246	27.28	085.2	.893
800	3.15	34.305	27.34	080.1	.976
1000	2.84	34.388	27.43	071.8	1.128

MV BERTHA ANN
STATION 14

45-30 N 175-00 W 02 MAR 1962 0250 GCT
WEATHER 01 CLOUDS 6 AMT 3 WIND 170 15 KTS SEA 2
SWELL 170 AMT 4 BAR 1025 MBS DRY 8.3 WET 8.3 BT 14

OBSERVED VALUES

DEPTH	TEMP	SAL	σ_t	OXY
0	6.0	33.066	26.05	
25	6.00	33.082	26.06	.618
50	5.97	33.069	26.05	.618
75	6.00	33.117	26.09	.607
100	5.93	33.143	26.12	.606
125	4.92	33.374	26.42	.593
150	3.98	33.400	26.54	.585
200	4.00	33.571	26.67	.501
276	3.62	33.737	26.84	.291
362	3.62	33.897	26.97	.186
453	3.62	34.014	27.06	.152
538	3.57	34.121	27.15	.109
627	3.44	34.181	27.21	.087
704	3.37	34.241	27.27	.079
915	3.00	34.346	27.39	.069
1000	2.88	34.358	27.41	

INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	SAL	σ_t	$10^5\delta$	ΔD
0	6.0	33.066	26.05	197.0	.000
10	6.00	33.076	26.06	196.4	.020
20	6.00	33.081	26.06	196.1	.040
30	6.00	33.082	26.06	196.1	.060
50	5.97	33.069	26.05	197.0	.099
75	6.00	33.117	26.09	194.1	.148
100	5.93	33.143	26.12	191.6	.196
150	3.98	33.400	26.54	151.6	.282
200	4.00	33.571	26.67	139.3	.355
250	3.81	33.693	26.79	128.6	.422
300	3.57	33.785	26.89	119.7	.484
400	3.62	33.952	27.01	108.4	.598
500	3.60	34.073	27.11	099.9	.702
600	3.49	34.168	27.20	092.4	.798
700	3.37	34.238	27.26	086.7	.888
800	3.23	34.300	27.33	081.3	.972
1000	2.88	34.358	27.41	074.5	1.128

MV BERTHA ANN
STATION 15

45-00 N 175-00 W 02 MAR 1962 0742 GCT
WEATHER 01 CLOUDS 6 AMT 3 WIND 270 20 KTS SEA 2
SWELL 190 AMT 4 BAR 1023 MBS DRY 7.2 WET 6.7 BT 15

OBSERVED VALUES

DEPTH	TEMP	SAL	σ_t	OXY
0	6.0	33.119	26.09	
25	6.01	33.128	26.10	.616
50	6.03	33.134	26.10	.615
75	6.08	33.167	26.12	.606
99	6.10	33.189	26.13	.606
124	5.45	33.430	26.40	.573
149	4.91	33.533	26.55	.562
198	4.40	33.597	26.65	.513
297	4.19	33.810	26.84	.299
396	3.79	33.924	26.97	.197
496	3.56	34.022	27.07	.131
595	3.52	34.133	27.17	.101
694	3.40	34.207	27.24	.082
793	3.22	34.262	27.30	.066
1091	2.73	34.405	27.46	.069

INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	SAL	σ_t	$10^5\delta$	Δ D
0	6.0	33.119	26.09	193.0	.000
10	6.00	33.123	26.09	192.9	.019
20	6.01	33.126	26.09	192.9	.038
30	6.01	33.129	26.10	192.8	.057
50	6.03	33.134	26.10	192.9	.096
75	6.08	33.167	26.12	191.3	.144
100	6.09	33.194	26.14	189.7	.192
150	4.89	33.536	26.55	150.8	.277
200	4.38	33.600	26.66	141.0	.350
250	4.15	33.695	26.76	132.0	.418
300	4.18	33.815	26.85	123.7	.482
400	3.78	33.928	26.98	111.9	.600
500	3.55	34.026	27.08	102.9	.707
600	3.52	34.138	27.17	095.0	.806
700	3.39	34.211	27.24	088.9	.898
800	3.21	34.266	27.30	083.6	.984
1000	2.87	34.365	27.41	073.8	1.141

MV BERTHA ANN
STATION 16

44-30 N 175-00 W 03 MAR 1962 0116-0200 GCT
WEATHER 01 CLOUDS 3 AMT 3 WIND 150 25 KTS SEA 2
SWELL 320 AMT 4 BAR 1031 MBS DRY 6.7 WET 5.0 BT 16

OBSERVED VALUES

DEPTH	TEMP	SAL	σ_t	OXY
0	7.2	33.398	26.15	
24	7.34	33.453	26.18	.590
48	7.78	33.591	26.22	.583
72	7.82	33.604	26.23	.579
96	7.89	33.628	26.23	.569
120	7.80	33.650	26.26	.566
144	7.52	33.858	26.47	.503
192	6.72	33.841	26.57	.479
288	4.98	33.802	26.75	.366
386	4.29	33.906	26.91	.243
496	4.00	34.028	27.04	.168
596	3.72	34.086	27.11	.125
695	3.62	34.183	27.20	.104
795	3.40	34.258	27.28	.081
1094	2.84	34.392	27.44	.065

INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	SAL	σ_t	$10^5\delta$	ΔD
0	7.2	33.398	26.15	187.1	.000
10	7.22	33.411	26.16	186.5	.019
20	7.30	33.438	26.17	185.8	.038
30	7.42	33.480	26.19	184.4	.057
50	7.80	33.597	26.22	181.2	.094
75	7.83	33.606	26.23	181.3	.139
100	7.89	33.632	26.24	180.6	.184
150	7.44	33.887	26.50	156.2	.268
200	6.58	33.838	26.58	149.1	.344
250	5.69	33.818	26.68	140.1	.416
300	4.84	33.807	26.77	131.5	.484
400	4.22	33.921	26.93	117.1	.608
500	3.99	34.031	27.04	107.2	.720
600	3.71	34.089	27.11	100.7	.824
700	3.61	34.187	27.20	093.1	.921
800	3.39	34.261	27.28	085.9	1.010
1000	3.00	34.364	27.40	075.3	1.171

MV BERTHA ANN
STATION 17

44-00 N 175-00 W 03 MAR 1962 0642-0720 GCT
WEATHER 03 CLOUDS 3 AMT 6 WIND 140 48 KTS SEA 4
SWELL 140 AMT 5 BAR 1027 MBS DRY 7.2 WET 6.7 BT 17

OBSERVED VALUES

DEPTH	TEMP	SAL	σ_t	OXY
0	8.5	33.791	26.27	
25	8.58	33.794	26.26	.580
49	8.58	33.794	26.26	.579
74	8.59	33.797	26.26	.572
98	8.66	33.823	26.27	.565
123	8.72	33.852	26.28	.558
148	8.58	34.010	26.43	.501
197	7.81	33.960	26.51	.471
296	6.26	33.892	26.67	.395
393	5.15	33.906	26.81	.304
492	4.30	33.978	26.96	.209
591	3.90	34.093	27.10	.135
690	3.72	34.168	27.18	.103
789	3.52	34.240	27.25	.083
1086	2.90	34.383	27.42	.068

INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	SAL	σ_t	$10^5\delta$	ΔD
0	8.5	33.791	26.27	175.9	.000
10	8.54	33.793	26.27	176.5	.018
20	8.57	33.794	26.26	177.0	.036
30	8.59	33.794	26.26	177.5	.054
50	8.58	33.794	26.26	177.7	.090
75	8.59	33.798	26.26	178.0	.134
100	8.67	33.825	26.27	177.6	.178
150	8.56	34.017	26.44	162.7	.263
200	7.76	33.957	26.51	156.3	.343
250	6.98	33.918	26.59	149.2	.419
300	6.21	33.891	26.67	141.8	.492
400	5.08	33.909	26.82	127.7	.627
500	4.25	33.986	26.98	113.4	.748
600	3.87	34.101	27.11	101.5	.855
700	3.70	34.175	27.18	095.0	.953
800	3.50	34.247	27.26	088.2	1.045
1000	3.08	34.353	27.38	077.0	1.210

MV BERTHA ANN
STATION 18

43-30 N 175-00 W 04 MAR 1962 0632-0730 GCT
WEATHER 65 CLOUDS X AMT X WIND 180 45 KTS SEA 5
SWELL 180 AMT 8 BAR 1010 MBS DRY 10.0 WET BT 18

OBSERVED VALUES

DEPTH	TEMP	SAL	σ_t	OXY
0	9.3	33.908	26.24	
49	9.20	33.919	26.26	.563
98	9.20	33.930	26.27	.563
147	8.98	33.976	26.34	.538
171	8.25	33.937	26.42	.515
195	7.99	33.945	26.47	.501
244	7.38	33.932	26.55	.454
293	6.41	33.880	26.64	.416
342	5.78	33.883	26.72	.364
388	5.30	33.893	26.79	.318
486	4.46	33.953	26.93	.231
584	4.12	34.036	27.03	.177
682	3.84	34.131	27.13	.112
780	3.64	34.211	27.22	.091
1073	3.05	34.362	27.39	.054

INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	SAL	σ_t	$10^5\delta$	ΔD
0	9.3	33.908	26.24	179.2	.000
10	9.27	33.910	26.24	178.7	.018
20	9.25	33.912	26.25	178.5	.036
30	9.23	33.915	26.25	178.1	.054
50	9.20	33.919	26.26	177.8	.090
75	9.19	33.925	26.27	177.7	.134
100	9.20	33.931	26.27	177.8	.178
150	8.91	33.973	26.35	171.2	.265
200	7.93	33.945	26.48	159.6	.348
250	7.28	33.928	26.56	152.5	.426
300	6.30	33.877	26.65	144.0	.500
400	5.18	33.898	26.80	129.7	.637
500	4.38	33.963	26.94	116.6	.760
600	4.07	34.051	27.05	107.5	.872
700	3.80	34.147	27.15	098.1	.975
800	3.60	34.226	27.23	090.8	1.069
1000	3.20	34.337	27.36	079.5	1.239

MV BERTHA ANN
STATION 19

43-00 N 175-00 W 04 MAR 1962 1900-1945 GCT
WEATHER 03 CLOUDS 6 AMT 8 WIND 270 04 KTS SEA 2
SWELL 180 AMT 6 BAR 1010 MBS DRY 8.7 WET 8.6 BT 19

OBSERVED VALUES

DEPTH	TEMP	SAL	σ_t	OXY
0	8.9	33.516	25.99	
50	8.97	33.664	26.10	.574
99	9.00	33.693	26.12	.570
148	8.58	33.963	26.39	.510
172	8.00	33.916	26.44	.516
197	7.90	33.934	26.47	.493
246	7.60	33.946	26.53	.462
295	6.46	33.879	26.63	.412
344	5.78	33.900	26.73	.348
394	5.45	33.898	26.77	.311
493	4.48	33.947	26.92	.236
592	4.04	34.048	27.05	.168
690	3.82	34.136	27.14	.121
789	3.61	34.220	27.23	.087
1085	3.00	34.367	27.40	.055

INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	SAL	σ_t	$10^5\delta$	ΔD
0	8.9	33.516	25.99	202.2	.000
10	8.92	33.555	26.02	199.8	.020
20	8.93	33.590	26.05	197.5	.040
30	8.95	33.619	26.07	195.8	.060
50	8.97	33.664	26.10	193.2	.099
75	8.99	33.693	26.12	191.8	.147
100	9.00	33.696	26.12	192.2	.195
150	8.54	33.964	26.40	166.3	.285
200	7.89	33.936	26.48	159.7	.367
250	7.54	33.943	26.53	155.1	.446
300	6.37	33.877	26.64	144.8	.521
400	5.40	33.899	26.78	132.3	.660
500	4.43	33.952	26.93	118.0	.785
600	4.01	34.056	27.06	106.4	.897
700	3.80	34.145	27.15	098.3	.999
800	3.59	34.228	27.24	090.6	1.093
1000	3.17	34.341	27.37	078.9	1.262

MV BERTHA ANN
STATION 20

42-29 N 175-00 W 04 MAR 1962 2343-0129 GCT
WEATHER 01 CLOUDS 6 AMT 6 WIND 310 08 KTS SEA 3
SWELL 240 AMT 4 BAR 1011 MBS DRY 10.3 WET 10.2 BT 20

OBSERVED VALUES

DEPTH	TEMP	SAL	σ_t	OXY
0	9.6	33.822	26.12	
49	9.60	33.917	26.19	.556
98	9.60	33.934	26.21	.560
147	9.56	34.051	26.31	.520
172	9.18	34.068	26.38	.501
196	8.59	34.011	26.43	.502
245	8.00	33.979	26.49	.480
294	7.11	33.930	26.58	.352
343	6.12	33.919	26.71	.317
395	5.53	33.908	26.77	.304
494	4.58	33.970	26.93	.231
593	4.10	34.067	27.06	.166
692	3.80	34.165	27.16	.109
791	3.62	34.228	27.23	.097
1089	2.98	34.353	27.39	.071

INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	SAL	σ_t	$10^5\delta$	ΔD
0	9.6	33.822	26.12	190.2	.000
10	9.60	33.848	26.14	188.5	.019
20	9.60	33.870	26.16	187.0	.038
30	9.60	33.889	26.17	185.8	.057
50	9.60	33.918	26.19	184.1	.094
75	9.60	33.936	26.21	183.3	.140
100	9.60	33.937	26.21	183.7	.186
150	9.53	34.055	26.31	174.8	.276
200	8.51	34.004	26.44	163.8	.361
250	7.92	33.975	26.50	158.1	.441
300	6.99	33.927	26.60	149.4	.518
400	5.48	33.909	26.78	132.5	.659
500	4.54	33.975	26.94	117.5	.784
600	4.07	34.074	27.07	105.7	.896
700	3.78	34.171	27.17	096.1	.997
800	3.60	34.233	27.24	090.3	1.090
1000	3.19	34.326	27.35	080.3	1.261

MV BERTHA ANN
STATION 21

42-00 N 175-00 W 05 MAR 1962 0343-0418 GCT
WEATHER 01 CLOUDS 6 AMT 3 WIND 310 15 KTS SEA 3
SWELL 270 AMT 4 BAR 1011 MBS DRY 9.8 WET 9.5 BT 21

OBSERVED VALUES

DEPTH	TEMP	SAL	σ_t	OXY
0	10.2	33.968	26.13	
47	10.22	34.055	26.20	.551
94	10.22	34.062	26.20	.551
140	10.18	34.061	26.21	.536
164	10.12	34.081	26.23	.528
188	9.33	34.090	26.37	.491
236	8.34	34.009	26.47	.479
282	7.50	33.965	26.56	.440
328	6.46	33.921	26.66	.386
395	5.59	33.921	26.77	.322
494	4.55	33.946	26.91	.241
593	4.00	34.030	27.04	.169
692	3.86	34.140	27.14	.127
791	3.64	34.221	27.23	.088
1088	2.98	34.374	27.41	.057

INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	SAL	σ_t	$10^5\delta$	ΔD
0	10.2	33.968	26.13	189.0	.000
10	10.21	33.993	26.15	187.5	.019
20	10.21	34.015	26.17	186.1	.038
30	10.22	34.033	26.18	185.1	.057
50	10.22	34.058	26.20	183.7	.094
75	10.22	34.069	26.21	183.4	.140
100	10.22	34.062	26.20	184.5	.186
150	10.16	34.068	26.22	184.1	.278
200	9.01	34.082	26.42	165.6	.365
250	8.07	33.992	26.49	159.0	.446
300	7.12	33.948	26.60	149.6	.523
400	5.53	33.922	26.78	132.2	.664
500	4.50	33.949	26.92	119.0	.790
600	3.98	34.037	27.04	107.5	.903
700	3.85	34.148	27.15	098.6	1.006
800	3.62	34.228	27.23	090.9	1.101
1000	3.18	34.343	27.37	078.9	1.271

MV BERTHA ANN
STATION 22

41-30 N 175-00 W 06 MAR 1962 0020-0056 GCT
WEATHER 03 CLOUDS 6 AMT 4 WIND 270 16 KTS SEA 3
SWELL 270 AMT 4 BAR 1012 MBS DRY 9.0 WET 8.9 BT 22

OBSERVED VALUES

DEPTH	TEMP	SAL	σ_t	OXY
0	10.7	34.114	26.16	
10	10.76	34.116	26.15	.550
48	10.77	34.155	26.18	.546
96	10.52	34.144	26.21	.535
144	10.38	34.183	26.27	.491
192	9.18	34.102	26.41	.471
288	7.26	33.950	26.58	.435
394	5.65	33.931	26.77	.322
443	4.96	33.932	26.86	.276
492	4.54	33.969	26.93	.234
542	4.21	34.016	27.00	.194
591	4.10	34.067	27.06	.161
690	3.80	34.167	27.17	.114
789	3.62	34.237	27.24	.087
1085	2.94	34.283	27.34	.056

INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	SAL	σ_t	$10^5\delta$	ΔD
0	10.7	34.114	26.16	186.5	.000
10	10.76	34.116	26.15	187.5	.019
20	10.80	34.121	26.15	188.1	.038
30	10.81	34.130	26.15	187.8	.057
50	10.77	34.156	26.18	185.7	.094
75	10.67	34.157	26.20	184.4	.140
100	10.50	34.145	26.22	183.0	.186
150	10.29	34.179	26.28	178.1	.276
200	9.00	34.089	26.43	165.0	.362
250	7.94	34.009	26.53	155.9	.442
300	7.05	33.940	26.60	149.2	.518
400	5.56	33.931	26.78	131.8	.659
500	4.48	33.976	26.94	116.8	.783
600	4.08	34.076	27.07	105.7	.894
700	3.78	34.175	27.17	095.8	.995
800	3.60	34.243	27.25	089.5	1.088
1000	3.16	34.295	27.33	082.2	1.260

MV BERTHA ANN
STATION 23

41-00 N 175-00 W 06 MAR 1962 0556-0631 GCT
WEATHER 01 CLOUDS 6 AMT 3 WIND 140 12 KTS SEA 2
SWELL 270 AMT 4 BAR 1012 MBS DRY 9.2 WET BT 23

OBSERVED VALUES

DEPTH	TEMP	SAL	σ_t	OXY
0	11.1	34.14	26.11	
10	11.10	34.15	26.12	.546
50	11.29	34.22	26.14	.542
99	11.28	34.22	26.14	.538
148	10.98	34.30	26.26	.456
197	9.47	34.14	26.39	.465
295	7.78	34.01	26.55	.432
396	6.16	33.93	26.72	.355
446	5.43	33.94	26.81	.319
496	4.74	33.95	26.90	.251
546	4.36	33.99	26.97	.213
596	4.09	34.02	27.03	.180
695	3.90	34.14	27.13	
794	3.69	34.22	27.22	.094
1092	2.99	34.37	27.41	.060

INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	SAL	σ_t	$10^5\delta$	ΔD
0	11.1	34.14	26.11	190.9	.000
10	11.10	34.15	26.12	190.4	.019
20	11.12	34.16	26.13	190.1	.038
30	11.16	34.18	26.13	189.8	.057
50	11.29	34.22	26.14	189.4	.095
75	11.32	34.23	26.14	189.7	.142
100	11.28	34.22	26.14	190.4	.190
150	10.94	34.30	26.26	180.1	.283
200	9.39	34.13	26.40	167.5	.370
250	8.34	34.04	26.49	159.2	.452
300	7.70	34.00	26.56	153.2	.530
400	6.10	33.93	26.72	138.1	.676
500	4.70	33.95	26.90	120.7	.805
600	4.07	34.03	27.03	108.9	.920
700	3.89	34.15	27.14	098.9	1.024
800	3.68	34.22	27.22	091.8	1.119
1000	3.22	34.33	27.36	079.7	1.290

MV BERTHA ANN
STATION 24

55-30 N 155-00 W 18 MAR 1962 2357 GCT
WEATHER 73 CLOUDS 6 AMT 6 WIND 170 20 KTS SEA 3
SWELL 170 AMT 4 BAR 1014 MBS DRY 1.1 WET 1.1 BT 24

OBSERVED VALUES

DEPTH	TEMP	SAL	σ_t	OXY
0	3.6	32.720	26.04	
10	3.61	32.711	26.03	.647
23	3.61	32.733	26.05	.651
46	3.59	32.770	26.08	.647
69	3.50	32.787	26.10	.652
92	3.75	32.910	26.17	.630
115	3.90	33.316	26.48	.413
138	4.16	33.712	26.77	.247
186	4.26	33.919	26.92	.164
276	3.82	34.021	27.05	.074
368	3.76	34.074	27.10	.055
460	3.64	34.160	27.18	.049

INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	SAL	σ_t	$10^5\delta$	ΔD
0	3.6	32.720	26.04	198.2	.000
10	3.61	32.711	26.03	199.0	.020
20	3.61	32.725	26.04	198.0	.040
30	3.61	32.745	26.06	196.5	.060
50	3.58	32.774	26.08	194.2	.099
75	3.53	32.809	26.11	191.2	.147
100	3.81	33.019	26.25	178.2	.193
150	4.24	33.842	26.86	121.0	.268
200	4.25	33.959	26.95	112.8	.326
250	4.03	34.030	27.03	105.6	.381
300	3.77	34.040	27.07	102.6	.433
400	3.72	34.100	27.12	098.4	.533

MV BERTHA ANN
STATION 25

55-00 N 155-00 W 19 MAR 1962 0237-0310 GCT
WEATHER 70 CLOUDS 6 AMT 7 WIND 320 30 KTS SEA 3
SWELL 320 AMT 4 BAR 1014 MBS DRY 00.0 WET 1.1 BT 25

OBSERVED VALUES

DEPTH	TEMP	SAL	σ_t	OXY
0	4.0	32.672	25.96	
10	4.14	32.643	25.92	.637
24	4.15	32.647	25.92	.641
47	4.11	32.649	25.93	.635
70	4.13	32.653	25.93	.630
94	4.55	32.930	26.11	.526
118		33.333		.367
139	5.70	33.508	26.43	.321
189	5.41	33.796	26.70	.235
284	4.71	33.905	26.86	.174
378	4.28	33.966	26.96	.131
473	3.97	34.065	27.07	.081
569	3.88	34.144	27.14	.069
756	3.51	34.255	27.26	.045
1040	2.98	34.367	27.40	.042

INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	SAL	σ_t	$10^5\delta$	ΔD
0	4.0	32.672	25.96	205.4	.000
10	4.14	32.643	25.92	209.0	.021
20	4.17	32.641	25.92	209.5	.042
30	4.15	32.648	25.93	208.9	.063
50	4.11	32.649	25.93	208.6	.105
75	4.18	32.688	25.95	206.5	.157
100	4.75	33.019	26.16	187.6	.206
150	5.70	33.587	26.50	156.3	.292
200	5.34	33.838	26.74	133.9	.365
250	4.98	33.932	26.85	123.3	.429
300	4.62	33.919	26.88	120.7	.490
400	4.20	33.986	26.98	112.0	.606
500	3.92	34.089	27.09	102.1	.713
600	3.84	34.166	27.16	096.3	.812
700	3.65	34.228	27.23	090.5	.905
800	3.43	34.277	27.29	085.2	.993
1000	3.05	34.355	27.39	076.5	1.155

MV BERTHA ANN
STATION 26

54-30 N 155-00 W   19 MAR 1962   2358-0030 GCT
WEATHER 01   CLOUDS 6 AMT 1   WIND 270   02 KTS   SEA 1
SWELL 270 AMT 1   BAR 1016 MBS   DRY 3.3   WET 1.7   BT 26

OBSERVED VALUES

DEPTH	TEMP	SAL	σ_t	OXY
0	3.8	32.719	26.02	
10	3.75	32.711	26.01	.650
24	3.78	32.726	26.02	.653
48	3.80	32.744	26.04	.643
72	3.80	32.749	26.04	.637
96	3.88	32.769	26.05	.625
120	5.45	33.309	26.31	.378
144	5.72	33.536	26.45	.310
192	5.64	33.638	26.54	
287	4.97	33.851	26.79	.210
393	4.44	33.926	26.91	.154
491	4.21	33.989	26.98	.105
589	3.96	34.057	27.06	.079
786	3.62	34.199	27.21	.046
1080	3.10	34.341	27.37	.045

INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	SAL	σ_t	$10^5\delta$	ΔD
0	3.8	32.719	26.02	200.0	.000
10	3.75	32.711	26.01	200.3	.020
20	3.76	32.719	26.02	199.8	.040
30	3.79	32.731	26.03	199.2	.060
50	3.80	32.745	26.04	198.4	.100
75	3.81	32.751	26.04	198.2	.150
100	4.04	32.823	26.08	195.1	.199
150	5.76	33.574	26.48	158.0	.287
200	5.61	33.655	26.56	150.7	.364
250	5.31	33.766	26.68	139.4	.437
300	4.89	33.869	26.81	127.4	.504
400	4.42	33.931	26.91	118.5	.627
500	4.19	33.995	26.99	112.1	.742
600	3.94	34.065	27.07	105.0	.851
700	3.74	34.136	27.15	098.3	.953
800	3.60	34.208	27.22	092.1	1.048
1000	3.24	34.311	27.34	081.9	1.222

MV BERTHA ANN
STATION 27

54-00 N 155-00 W 20 MAR 1962 0304-0341 GCT
WEATHER 03 CLOUDS 6 AMT 8 WIND 135 25 KTS SEA 3
SWELL 135 AMT 3 BAR 1014 MBS DRY 2.8 WET 2.2 BT 27

OBSERVED VALUES

DEPTH	TEMP	SAL	σ_t	OXY
0	4.0	32.668	25.96	
9	3.96	32.641	25.94	.649
23	3.92	32.643	25.94	.647
46	3.86	32.663	25.97	.643
69	3.62	32.796	26.09	.647
92	4.16	33.053	26.25	.534
115	4.94	33.612	26.60	.341
139	4.98	33.813	26.76	.250
182	4.45	33.876	26.87	.191
274	4.08	33.955	26.97	.121
393	3.78	34.040	27.07	.081
491	3.79	34.137	27.14	.059
590	3.66	34.202	27.21	.049
787	3.26	34.302	27.33	.042
1082	2.76	34.394	27.45	.044

INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	SAL	σ_t	$10^5\delta$	ΔD
0	4.0	32.668	25.96	205.7	.000
10	3.96	32.639	25.94	207.6	.021
20	3.93	32.638	25.94	207.5	.042
30	3.90	32.647	25.95	206.6	.063
50	3.83	32.678	25.98	203.7	.104
75	3.69	32.851	26.13	189.5	.153
100	4.40	33.213	26.35	169.4	.198
150	4.92	33.865	26.81	126.5	.272
200	4.30	33.897	26.90	117.9	.333
250	4.08	33.942	26.96	112.7	.391
300	4.00	33.975	26.99	109.8	.447
400	3.77	34.046	27.07	103.0	.553
500	3.78	34.144	27.15	096.5	.653
600	3.64	34.208	27.21	091.1	.747
700	3.46	34.263	27.28	085.8	.835
800	3.24	34.308	27.33	080.8	.918
1000	2.89	34.375	27.42	073.3	1.072

MV BERTHA ANN
STATION 28

53-00 N 155-00 W 22 MAR 1962 0253-0329 GCT
WEATHER 01 CLOUDS 6 AMT 3 WIND 300 25 KTS SEA 3
SWELL 300 AMT 4 BAR 0990 MBS DRY 3.3 WET 2.2 BT 29

OBSERVED VALUES

DEPTH	TEMP	SAL	σ_t	OXY
0	4.0	32.825	26.08	
10	4.04	32.722	26.00	.638
24	4.07	32.721	25.99	.641
48	4.07	32.725	25.99	.643
71	4.04	32.731	26.00	.640
95	5.55	33.527	26.47	.342
118	5.56	33.746	26.64	.272
142	5.24	33.837	26.75	.239
190	4.53	33.892	26.87	.184
284	4.15	34.001	27.00	.101
376	3.95	34.085	27.09	.071
470	3.76	34.150	27.16	.054
563	3.48	34.230	27.25	.048
751	3.20	34.303	27.33	.035
1033	2.72	34.400	27.45	.046

INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	SAL	σ_t	$10^5\delta$	ΔD
0	4.0	32.825	26.08	193.9	.000
10	4.04	32.722	26.00	202.1	.020
20	4.06	32.704	25.98	203.7	.040
30	4.08	32.721	25.99	202.7	.060
50	4.07	32.725	25.99	202.5	.101
75	4.18	32.808	26.05	197.5	.151
100	5.67	33.620	26.53	152.9	.195
150	5.13	33.858	26.78	129.4	.266
200	4.43	33.904	26.89	118.8	.328
250	4.13	33.961	26.97	111.8	.386
300	4.10	34.017	27.02	107.7	.441
400	3.90	34.104	27.11	100.0	.545
500	3.68	34.174	27.18	093.2	.642
600	3.39	34.254	27.28	085.0	.731
700	3.24	34.295	27.32	081.1	.814
800	3.12	34.321	27.35	078.5	.894
1000	2.78	34.389	27.44	071.1	1.044

MV BERTHA ANN
STATION 29

52-00 N 155-00 W 24 MAR 1962 0224-0259 GCT
WEATHER 03 CLOUDS 6 AMT 7 WIND 330 35 KTS SEA 4
SWELL 333 AMT 4 BAR 1003 MBS DRY 1.6 WET 1.1 BT 31

OBSERVED VALUES

DEPTH	TEMP	SAL	σ_t	OXY
0	4.0	32.63	25.93	
9	3.93	32.61	25.92	.642
23	3.96	32.61	25.91	.646
46	3.90	32.61	25.92	.644
69	3.86	32.65	25.96	.637
93	4.02	33.28	26.44	.412
117	4.25	33.68	26.73	.249
140	4.00	33.78	26.84	.203
186	3.74	33.88	26.94	.124
280	3.72	34.02	27.06	.064
384	3.56	34.13	27.16	.055
480	3.45	34.20	27.23	.049
576		34.26		.049
773	2.98	34.35	27.39	.053
1068	2.56	34.46	27.52	.060

INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	SAL	σ_t	$10^5\delta$	ΔD
0	4.0	32.63	25.93	208.6	.000
10	3.93	32.61	25.92	209.5	.021
20	3.96	32.61	25.91	209.9	.042
30	3.94	32.61	25.92	209.8	.063
50	3.88	32.58	25.90	211.6	.105
75	3.89	32.83	26.10	193.0	.156
100	4.14	33.43	26.55	150.5	.199
150	3.93	33.80	26.86	121.0	.267
200	3.74	33.90	26.96	112.0	.325
250	3.74	33.98	27.02	106.4	.380
300	3.69	34.04	27.08	101.8	.432
400	3.55	34.14	27.17	093.7	.530
500	3.41	34.21	27.24	087.8	.621
600	3.23	34.27	27.30	082.1	.706
700	3.09	34.32	27.36	077.6	.786
800	2.94	34.36	27.40	073.8	.862
1000	2.66	34.44	27.49	066.0	1.002

MV BERTHA ANN
STATION 30

51-00 N 155-00 W 25 MAR 1962 0227-0302 GCT
WEATHER 03 CLOUDS 6 AMT 7 WIND 320 30 KTS SEA 4
SWELL 350 AMT 6 BAR 1010 MBS DRY 1.1 WET 0.0 BT 33

OBSERVED VALUES

DEPTH	TEMP	SAL	σ_t	OXY
0	4.6	32.61	25.85	
10	4.75	32.60	25.82	.644
24	4.76	32.59	25.82	.640
48	4.74	32.59	25.82	.634
72	4.75	32.59	25.82	.640
96	4.74	32.61	25.83	.637
120	3.50	32.95	26.23	.599
144	3.11	33.33	26.57	.454
192	3.21	33.73	26.88	.226
288	3.47	33.95	27.03	.118
388	3.45	34.07	27.12	.081
485	3.41	34.14	27.18	.065
579	3.29	34.21	27.25	.062
775	3.01	34.33	27.37	.059
1070	2.61	34.43	27.49	.063

INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	SAL	σ_t	$10^5\delta$	ΔD
0	4.6	32.61	25.85	215.9	.000
10	4.75	32.60	25.82	218.3	.022
20	4.76	32.59	25.82	219.2	.044
30	4.75	32.59	25.82	219.2	.066
50	4.74	32.59	25.82	219.3	.110
75	4.82	32.57	25.79	221.8	.165
100	4.47	32.66	25.90	211.7	.219
150	3.12	33.39	26.61	144.2	.308
200	3.24	33.75	26.89	118.5	.374
250	3.40	33.88	26.98	110.6	.431
300	3.47	33.97	27.04	104.9	.485
400	3.45	34.08	27.13	097.1	.586
500	3.39	34.15	27.19	092.0	.681
600	3.26	34.22	27.26	086.2	.770
700	3.12	34.29	27.33	080.2	.853
800	2.98	34.34	27.38	075.7	.931
1000	2.70	34.41	27.46	068.7	1.075

MV BERTHA ANN
STATION 31

50-00 N 155-00 W 26 MAR 1962 0206-0238 GCT
WEATHER 03 CLOUDS 6 AMT 8 WIND 230 20 KTS SEA 2
SWELL 300 AMT 3 BAR 1018 MBS DRY 3.3 WET 2.2 BT 35

OBSERVED VALUES

DEPTH	TEMP	SAL	σ_t	OXY
0	5.0	32.64	25.83	
9	5.05	32.63	25.82	.632
23	5.05	32.63	25.82	.632
47	5.04	32.62	25.81	.630
71	5.04	32.63	25.82	.631
95	5.04	32.63	25.82	.632
119	3.30	33.03	26.31	.591
143	3.11	33.34	26.57	.471
191	3.16	33.68	26.84	.294
287	3.43	33.92	27.01	.141
386	3.46	34.05	27.11	.092
482	3.46	34.15	27.19	.085
579	3.28	34.23	27.27	.065
776	3.01	34.34	27.38	.067
1073	2.62	34.42	27.48	

INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	SAL	σ_t	$10^5\delta$	ΔD
0	5.0	32.64	25.83	217.8	.000
10	5.05	32.63	25.82	219.2	.022
20	5.05	32.63	25.82	219.3	.044
30	5.05	32.62	25.81	220.1	.066
50	5.04	32.62	25.81	220.2	.110
75	5.16	32.60	25.78	223.2	.165
100	4.55	32.72	25.94	208.0	.219
150	3.11	33.40	26.62	143.4	.307
200	3.20	33.71	26.86	121.2	.373
250	3.35	33.84	26.95	113.1	.432
300	3.44	33.94	27.02	106.8	.487
400	3.47	34.07	27.12	098.1	.589
500	3.42	34.17	27.21	090.8	.683
600	3.25	34.24	27.28	084.6	.771
700	3.11	34.30	27.34	079.3	.853
800	2.98	34.35	27.39	074.9	.930
1000	2.71	34.41	27.46	068.8	1.074

MV BERTHA ANN
STATION 32

49-00 N 155-00 W 28 MAR 1962 0228-0308 GCT
WEATHER 01 CLOUDS 6 AMT 2 WIND 225 12 KTS SEA 2
SWELL 270 AMT 5 BAR 1009 MBS DRY 6.1 WET 5.0 BT 37

OBSERVED VALUES

DEPTH	TEMP	SAL	σ_t	OXY
0	5.4	32.65	25.79	
10	5.26	32.64	25.80	.636
25	5.24	32.64	25.80	.636
49	5.20	32.64	25.81	.633
74	5.17	32.64	25.81	.630
99	4.74	32.76	25.95	.629
123	3.14	33.22	26.48	.383
148	3.11	33.57	26.76	.376
197	3.26	33.76	26.89	.189
296	3.43	33.90	26.99	.152
393	3.49	34.04	27.10	.121
491	3.48	34.14	27.18	.089
589	3.35	34.22	27.25	.071
786	3.06	34.33	27.37	.061
1082	2.68	34.43	27.48	.074

INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	SAL	σ_t	$10^5\delta$	ΔD
0	5.4	32.65	25.79	221.4	.000
10	5.26	32.64	25.80	220.7	.022
20	5.25	32.64	25.80	220.7	.044
30	5.23	32.64	25.80	220.5	.066
50	5.21	32.64	25.81	220.5	.110
75	5.18	32.64	25.81	220.4	.165
100	4.64	32.78	25.98	204.4	.218
150	3.12	33.58	26.76	129.9	.302
200	3.27	33.76	26.89	118.0	.364
250	3.36	33.83	26.94	114.0	.422
300	3.43	33.91	27.00	109.0	.478
400	3.49	34.05	27.10	099.8	.582
500	3.47	34.15	27.19	092.9	.678
600	3.33	34.23	27.26	086.1	.767
700	3.18	34.29	27.32	080.8	.850
800	3.04	34.34	27.38	076.3	.929
1000	2.78	34.41	27.46	069.5	1.075

MV BERTHA ANN
STATION 33

48-00 N 155-00 W 29 MAR 1962 0128-0206 GCT
WEATHER 03 CLOUDS 6 AMT 6 WIND 110 05 KTS SEA 2
SWELL 280 AMT 2 BAR 1011 MBS DRY 7.2 WET 5.6 BT 39

OBSERVED VALUES

DEPTH	TEMP	SAL	σ_t	OXY
0	6.0	32.63	25.70	
10	5.68	32.62	25.74	.636
25	5.56	32.62	25.75	.636
50	5.53	32.61	25.75	.631
75	5.50	32.62	25.76	.630
100	5.50	32.63	25.76	.626
125	3.92	33.00	26.23	.602
150	3.58	33.26	26.47	.534
200	3.95	33.76	26.83	.353
300	3.85	33.90	26.95	.208
392	3.68	34.01	27.05	.152
491	3.58	34.12	27.15	.110
588	3.48	34.19	27.22	.086
785	3.19	34.32	27.35	.068
1078	2.71	34.43	27.48	.057

INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	SAL	σ_t	$10^5\delta$	ΔD
0	6.0	32.63	25.70	229.7	.000
10	5.68	32.62	25.74	226.8	.023
20	5.59	32.62	25.75	225.9	.046
30	5.55	32.62	25.75	225.6	.069
50	5.53	32.61	25.75	226.3	.114
75	5.50	32.62	25.76	225.5	.170
100	5.50	32.63	25.76	225.0	.226
150	3.58	33.26	26.47	158.2	.322
200	3.95	33.76	26.83	124.6	.393
250	3.91	33.83	26.89	119.4	.454
300	3.85	33.90	26.95	113.9	.512
400	3.67	34.02	27.06	103.9	.621
500	3.57	34.13	27.16	095.4	.721
600	3.46	34.20	27.23	089.7	.814
700	3.32	34.27	27.30	083.8	.901
800	3.17	34.33	27.36	078.4	.982
1000	2.84	34.41	27.45	070.2	1.131

MV BERTHA ANN
STATION 34

47-00 N 155-00 W 30 MAR 1962 0203-0250 GCT
WEATHER 01 CLOUDS 6 AMT 6 WIND 050 20 KTS SEA 3
SWELL 010 AMT 5 BAR 1002 MBS DRY 6.7 WET 6.1 BT 41

OBSERVED VALUES

DEPTH	TEMP	SAL	σ_t	OXY
0	6.8	32.64	25.61	
10	6.75	32.64	25.62	.614
24	6.72	32.64	25.62	.616
48	6.70	32.65	25.63	.617
72	6.66	32.66	25.64	.615
96	6.48	32.66	25.67	.614
120	5.50	32.94	26.01	.595
144	5.32	33.31	26.32	.566
192	5.46	33.79	26.69	.413
290	4.40	33.87	26.87	.253
391	3.98	33.97	26.99	.196
487	3.80	34.08	27.10	.135
585	3.68	34.16	27.17	.103
782	3.35	34.31	27.32	.065
1080	2.77	34.43	27.47	.054

INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	SAL	σ_t	$10^5\delta$	ΔD
0	6.8	32.64	25.61	238.6	.000
10	6.75	32.64	25.62	238.1	.024
20	6.73	32.64	25.62	238.0	.048
30	6.72	32.64	25.62	238.0	.072
50	6.70	32.65	25.63	237.2	.120
75	6.68	32.64	25.63	238.0	.179
100	6.26	32.70	25.73	228.7	.237
150	5.36	33.39	26.38	167.0	.336
200	5.35	33.80	26.71	136.8	.412
250	4.75	33.84	26.81	127.6	.478
300	4.35	33.88	26.88	120.6	.540
400	3.96	33.98	27.00	109.9	.655
500	3.79	34.09	27.11	100.7	.760
600	3.66	34.17	27.18	094.1	.857
700	3.49	34.25	27.26	087.1	.948
800	3.32	34.32	27.33	080.8	1.032
1000	2.94	34.41	27.44	071.3	1.184

MV BERTHA ANN
STATION 35

46-00 N 155-00 W 01 APR 1962 0207-0315 GCT
WEATHER 01 CLOUDS 6 AMT 3 WIND 220 20 KTS SEA 6
SWELL 210 AMT 8 BAR 0996 MBS DRY 8.9 WET 7.2 BT 43

OBSERVED VALUES

DEPTH	TEMP	SAL	σ_t	OXY
0	7.0	32.70	25.63	
10	7.07	32.69	25.61	.614
25	7.06	32.68	25.61	.614
50	7.04	32.69	25.62	.610
75	7.01	32.70	25.63	.606
100	6.99	32.70	25.63	.605
125	5.43	33.32	26.32	.575
149	5.62	33.53	26.46	.538
198	5.33	33.75	26.67	.440
296	4.57	33.85	26.83	.284
391	4.06	33.95	26.97	.201
488	3.78	34.06	27.08	.139
586	3.67			.114
781	3.34	34.30	27.32	.067
1077	2.82	34.41	27.45	.054

INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	SAL	σ_t	$10^5\delta$	ΔD
0	7.0	32.70	25.63	236.6	.000
10	7.07	32.69	25.61	238.4	.024
20	7.06	32.68	25.61	239.2	.048
30	7.06	32.68	25.61	239.3	.072
50	7.04	32.69	25.62	238.6	.120
75	7.01	32.70	25.63	237.8	.180
100	6.99	32.70	25.63	237.8	.239
150	5.61	33.54	26.47	158.7	.338
200	5.31	33.75	26.67	140.1	.413
250	4.90	33.80	26.76	132.2	.481
300	4.54	33.85	26.84	125.0	.545
400	4.03	33.96	26.98	112.1	.664
500	3.77	34.07	27.09	102.0	.771
600	3.65	34.16	27.18	094.7	.869
700	3.48	34.25	27.26	087.0	.960
800	3.31	34.31	27.33	081.4	1.044
1000	2.96	34.39	27.42	073.0	1.198

MV BERTHA ANN
STATION 36

46-25 N 147-46 W 04 APR 1962 0445-0525 GCT
WEATHER 03 CLOUDS 6 AMT 8 WIND 230 06 KTS SEA 3
SWELL 250 AMT 4 BAR 1003 MBS DRY 6.7 WET 5.0 BT 46

OBSERVED VALUES

DEPTH	TEMP	SAL	σ_t	OXY
0	8.0	32.80	25.57	
10	8.00	32.80	25.57	.597
25	8.00	32.79	25.56	.594
50	7.96	32.79	25.57	.598
75	7.98	32.79	25.56	.592
100	7.96	32.79	25.57	.590
125	6.04	33.26	26.20	.577
149	6.54	33.58	26.38	.563
198	6.46	33.85	26.61	.449
297	5.20	33.91	26.81	.295
395	4.24	33.93	26.93	.208
496	3.87	34.04	27.06	.146
591	3.87	34.14	27.14	.096
788	3.42	34.26	27.28	.091
1082	2.87	34.39	27.43	.045

INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	SAL	σ_t	$10^5\delta$	ΔD
0	8.0	32.80	25.57	242.5	.000
10	8.00	32.80	25.57	242.6	.024
20	8.00	32.79	25.56	243.5	.048
30	7.99	32.79	25.56	243.5	.072
50	7.96	32.79	25.57	243.4	.121
75	7.98	32.79	25.56	244.1	.182
100	7.96	32.79	25.57	244.2	.243
150	6.54	33.59	26.39	166.4	.346
200	6.43	33.85	26.61	146.3	.424
250	5.76	33.89	26.73	135.6	.494
300	5.16	33.91	26.82	127.5	.560
400	4.21	33.94	26.94	115.5	.682
500	3.87	34.04	27.06	105.3	.792
600	3.85	34.15	27.15	097.7	.893
700	3.61	34.21	27.22	091.4	.988
800	3.39	34.27	27.29	085.2	1.076
1000	3.01	34.36	27.40	075.7	1.237

MV BERTHA ANN
STATION 37

46-40 N 145-00 W 05 APR 1962 0859-0957 GCT
WEATHER 61 CLOUDS 6 AMT 8 WIND 230 32 KTS SEA 2
SWELL 230 AMT 3 BAR 1004 MBS DRY 7.2 WET 6.7 BT 47

OBSERVED VALUES

DEPTH	TEMP	SAL	σ_t	OXY
0	7.6	32.67	25.53	
10	7.62	32.67	25.52	.605
24	7.62	32.66	25.51	.603
48	7.63	32.66	25.51	.604
72	7.64	32.66	25.51	.607
96	7.19	32.84	25.72	.599
120	5.85	33.14	26.13	.582
144	5.77	33.32	26.28	.578
193	6.09	33.82	26.63	.474
289	4.90	33.86	26.81	.332
372	4.30	33.89	26.89	.207
466	4.05	33.99	27.00	.142
560	3.92	34.09	27.09	.098
748	3.51	34.22	27.24	.061
1036	2.90	34.37	27.41	.055

INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	SAL	σ_t	$10^5\delta$	ΔD
0	7.6	32.67	25.53	246.7	.000
10	7.62	32.67	25.52	247.1	.025
20	7.62	32.66	25.51	248.0	.050
30	7.62	32.66	25.51	248.2	.075
50	7.65	32.65	25.50	249.6	.125
75	7.63	32.68	25.53	247.5	.187
100	6.88	32.90	25.80	221.5	.246
150	5.84	33.40	26.33	171.9	.344
200	5.99	33.82	26.64	143.0	.423
250	5.32	33.84	26.74	134.0	.492
300	4.80	33.86	26.82	127.1	.557
400	4.21	33.92	26.93	117.0	.679
500	4.01	34.03	27.04	107.5	.791
600	3.83	34.12	27.13	099.7	.895
700	3.61	34.19	27.20	092.9	.991
800	3.40	34.25	27.27	086.8	1.081
1000	2.97	34.35	27.39	076.1	1.244

MV BERTHA ANN
STATION 38

46-54 N 142-15 W 05 APR 1962 2225-2322 GCT
WEATHER 03 CLOUDS 6 AMT 7 WIND 220 20 KTS SEA 3
SWELL 220 AMT 4 BAR 1014 MBS DRY 6.7 WET 5.6 BT 49

OBSERVED VALUES

DEPTH	TEMP	SAL	σ_t	OXY
0	7.9	32.65	25.47	
9	7.74	32.63	25.47	.600
23	7.65	32.62	25.48	.603
47	7.60	32.62	25.49	.595
70	7.52	32.60	25.48	.593
93	6.78	32.62	25.60	.580
117	5.50	33.03	26.08	.576
140	5.65	33.12	26.13	.546
186	6.34	33.72	26.52	.425
279	5.68	33.88	26.73	.264
394	4.25	33.95	26.95	.213
493	4.02	34.04	27.04	.158
592	3.84	34.13	27.13	.102
790	3.40	34.27	27.29	.062
1086	2.84	34.39	27.43	.048

INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	SAL	σ_t	$10^5\delta$	ΔD
0	7.9	32.65	25.47	252.3	.000
10	7.73	32.63	25.48	251.6	.025
20	7.67	32.62	25.48	251.7	.050
30	7.64	32.62	25.48	251.4	.075
50	7.63	32.62	25.48	251.6	.125
75	7.40	32.57	25.47	252.6	.188
100	6.26	32.77	25.78	223.4	.247
150	5.86	33.28	26.23	181.1	.348
200	6.27	33.75	26.55	151.7	.431
250	5.93	33.84	26.67	141.4	.504
300	5.33	33.89	26.78	131.0	.572
400	4.23	33.96	26.96	114.3	.695
500	4.01	34.05	27.05	106.0	.805
600	3.82	34.14	27.14	098.1	.907
700	3.59	34.21	27.22	091.1	1.002
800	3.38	34.28	27.30	084.4	1.090
1000	2.99	34.37	27.41	074.8	1.249

MV BERTHA ANN

STATION 39

47-07 N 139-23 W   07 APR 1962   0840-0923 GCT
WEATHER 61   CLOUDS 6 AMT 8   WIND 020   25 KTS   SEA 3
SWELL 020 AMT 4   BAR 1026 MBS   DRY 6.4   WET 6.1   BT 51

OBSERVED VALUES

DEPTH	TEMP	SAL	σ_t	OXY
0	8.0	32.64	25.44	
10	8.16	32.64	25.42	.607
25	8.15	32.64	25.42	.600
50	8.02	32.62	25.43	.598
75	7.93	32.62	25.44	.603
100	7.88	32.63	25.45	.599
125	6.14	33.02	25.99	.567
150	5.35	33.05	26.11	
200	6.25	33.78	26.58	.441
300	5.24	33.89	26.79	.300
390	4.30	33.92	26.92	.218
488	4.02	34.03	27.04	.150
586	3.88	34.13	27.13	.087
781	3.44	34.25	27.27	.055
1076	2.91	34.39	27.43	.043

INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	SAL	σ_t	$10^5\delta$	ΔD
0	8.0	32.64	25.44	254.4	.000
10	8.16	32.64	25.42	256.8	.026
20	8.16	32.64	25.42	256.9	.052
30	8.12	32.63	25.42	257.3	.078
50	8.02	32.62	25.43	256.9	.129
75	7.93	32.62	25.44	256.0	.193
100	7.88	32.63	25.45	255.0	.257
150	5.35	33.05	26.11	192.4	.369
200	6.25	33.78	26.58	149.2	.454
250	5.75	33.85	26.70	138.4	.526
300	5.24	33.89	26.79	129.9	.593
400	4.26	33.93	26.93	116.8	.716
500	4.01	34.04	27.04	106.8	.828
600	3.85	34.14	27.14	098.4	.931
700	3.61	34.20	27.21	092.1	1.026
800	3.40	34.26	27.28	086.1	1.115
1000	3.03	34.36	27.39	076.0	1.277

MV BERTHA ANN
STATION 40

47-24 N 136-30 W 08 APR 1962 0635-0713 GCT
WEATHER 61 CLOUDS 6 AMT 8 WIND 060 40 KTS SEA 4
SWELL 060 AMT 5 BAR 1016 MBS DRY 6.7 WET 6.1 BT 53

OBSERVED VALUES

DEPTH	TEMP	SAL	σ_t	OXY
0	8.1	32.70	25.48	
10	8.06	32.69	25.47	.604
24	8.03	32.69	25.48	.600
48	8.04	32.69	25.48	.606
72	8.01	32.69	25.48	.604
96	7.55	32.69	25.55	.600
120	5.99	32.98	25.98	.568
144	6.11	33.28	26.20	.517
192	6.82	33.89	26.59	.395
288	5.44	33.90	26.77	.295
366	4.74	33.93	26.88	.228
462	4.23	34.00	26.99	.150
558	4.02	34.10	27.09	.083
752	3.62	34.24	27.24	.043
1048	2.98	34.40	27.43	.038

INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	SAL	σ_t	$10^5\delta$	ΔD
0	8.1	32.70	25.48	251.3	.000
10	8.06	32.69	25.47	251.6	.025
20	8.04	32.69	25.48	251.5	.050
30	8.04	32.69	25.48	251.7	.075
50	8.05	32.69	25.48	252.1	.125
75	8.01	32.67	25.47	253.4	.188
100	7.17	32.74	25.64	237.2	.249
150	6.25	33.38	26.26	178.4	.353
200	6.68	33.89	26.61	146.6	.434
250	5.92	33.89	26.71	137.6	.505
300	5.32	33.90	26.79	130.1	.572
400	4.52	33.95	26.92	118.2	.696
500	4.15	34.04	27.03	108.3	.809
600	3.93	34.13	27.12	100.0	.913
700	3.73	34.21	27.21	092.7	1.009
800	3.52	34.27	27.28	086.7	1.099
1000	3.09	34.38	27.40	075.1	1.261

MV BERTHA ANN
STATION 41

47-43 N 133-01 W 09 APR 1962 0128-0208 GCT
WEATHER 01 CLOUDS 6 AMT 6 WIND 050 18 KTS SEA 3
SWELL 050 AMT 4 BAR 1023 MBS DRY 6.4 WET 6.1 BT 55

OBSERVED VALUES

DEPTH	TEMP	SAL	σ_t	OXY
0	8.2	32.73	25.49	
10	8.34	32.70	25.44	.605
25	8.31	32.70	25.45	.599
49	8.26	32.71	25.46	.603
74	8.00	32.73	25.52	.595
99	7.89	32.73	25.53	.588
123	6.67	33.12	26.01	
148	7.02	33.62	26.35	.449
197	6.71	33.89	26.61	.356
296	5.20	33.89	26.79	.264
394	4.40	33.93	26.92	.180
493	4.22	34.05	27.03	.114
592	3.93	34.14	27.13	.071
789	3.42	34.28	27.29	.055
1086	2.92	34.41	27.44	.048

INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	SAL	σ_t	$10^5\delta$	ΔD
0	8.2	32.73	25.49	250.5	.000
10	8.34	32.70	25.44	254.8	.025
20	8.32	32.70	25.44	254.7	.050
30	8.32	32.70	25.44	254.9	.075
50	8.25	32.71	25.46	253.5	.126
75	8.02	32.72	25.50	249.9	.189
100	7.81	32.74	25.55	245.8	.251
150	7.01	33.63	26.36	169.5	.355
200	6.65	33.89	26.61	146.2	.434
250	5.81	33.88	26.71	136.9	.505
300	5.16	33.89	26.80	129.0	.571
400	4.39	33.94	26.93	117.5	.694
500	4.20	34.06	27.04	107.4	.806
600	3.91	34.15	27.14	098.3	.909
700	3.63	34.22	27.23	090.8	1.004
800	3.40	34.29	27.30	083.9	1.091
1000	3.03	34.38	27.41	074.5	1.249

MV BERTHA ANN
STATION 42

47-55 N 130-25 W 10 APR 1962 0445-0526 GCT
WEATHER 01 CLOUDS 6 AMT 6 WIND 320 10 KTS SEA 2
SWELL 320 AMT 2 BAR 1032 MBS DRY 6.7 WET 5.0 BT 57

OBSERVED VALUES

DEPTH	TEMP	SAL	σ_t	OXY
0	8.3	32.70	25.45	
10	8.42	32.71	25.44	.599
24	8.40	32.71	25.44	.603
46	8.36	32.71	25.45	.605
70	8.19	32.75	25.50	.587
93	7.75	32.90	25.68	.554
116	7.08	33.31	26.10	.490
139	7.10	33.68	26.39	.435
185	6.49	33.89	26.63	.364
278	5.21	33.89	26.79	.281
391	4.52	33.99	26.95	.141
488	4.29	34.09	27.05	.091
586	4.20	34.17	27.13	.052
782	3.67	34.33	27.31	.038
1076	2.95	34.42	27.45	.046

INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	SAL	σ_t	$10^5\delta$	ΔD
0	8.3	32.70	25.45	254.1	.000
10	8.42	32.71	25.44	255.2	.025
20	8.41	32.71	25.44	255.3	.051
30	8.40	32.71	25.44	255.3	.077
50	8.35	32.71	25.45	254.9	.128
75	8.11	32.76	25.52	248.2	.191
100	7.47	33.03	25.83	219.6	.249
150	6.96	33.74	26.45	160.7	.344
200	6.24	33.88	26.66	141.7	.420
250	5.53	33.88	26.75	133.5	.489
300	5.04	33.91	26.83	126.1	.554
400	4.49	34.00	26.96	114.1	.674
500	4.29	34.10	27.06	105.4	.784
600	4.16	34.18	27.14	098.9	.886
700	3.89	34.27	27.24	090.0	.980
800	3.62	34.34	27.32	082.6	1.066
1000	3.13	34.41	27.42	073.4	1.222

MV BERTHA ANN
STATION 43

48-11 N 127-35 W 10 APR 1962 1644-1748 GCT
WEATHER 03 CLOUDS 6 AMT 8 WIND 300 05 KTS SEA 1
SWELL 300 AMT 1 BAR 1030 MBS DRY 6.7 WET 5.6 BT 59

OBSERVED VALUES

DEPTH	TEMP	SAL	σ_t	OXY
0	8.2	32.53	25.33	
10	8.17	32.51	25.32	.608
24	8.13	32.52	25.33	.605
48	8.05	32.53	25.35	.607
72	7.71	32.72	25.55	.549
96	7.98	33.55	26.16	.334
120	7.85	33.77	26.35	.274
144	7.56	33.86	26.46	.253
192	6.80	33.91	26.61	.240
288	6.05	33.98	26.76	.174
380	5.37	34.05	26.90	.111
474	4.86	34.12	27.02	.067
568	4.47	34.19	27.11	.059
756	3.95	34.30	27.26	.041
1044	3.30	34.42	27.42	.044

INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	SAL	σ_t	$10^5\delta$	ΔD
0	8.2	32.53	25.33	265.4	.000
10	8.17	32.51	25.32	266.6	.027
20	8.14	32.52	25.33	265.6	.054
30	8.13	32.51	25.32	266.3	.081
50	8.00	32.52	25.35	264.1	.134
75	7.77	32.86	25.65	236.0	.197
100	7.97	33.60	26.20	184.1	.250
150	7.45	33.87	26.49	157.6	.335
200	6.74	33.92	26.63	145.1	.411
250	6.34	33.95	26.70	138.4	.482
300	5.95	33.99	26.78	131.1	.549
400	5.25	34.06	26.92	118.5	.674
500	4.74	34.14	27.05	107.6	.787
600	4.38	34.21	27.14	099.1	.890
700	4.10	34.27	27.22	092.4	.986
800	3.84	34.32	27.28	086.5	1.075
1000	3.39	34.41	27.40	076.3	1.238

MV BERTHA ANN
STATION 44

48-15 N 126-31 W 10 APR 1962 2123-2205 GCT
WEATHER 01 CLOUDS 6 AMT 6 WIND 300 10 KTS SEA 1
SWELL 300 AMT 1 BAR 1031 MBS DRY 7.8 WET 6.1 BT 60

OBSERVED VALUES

DEPTH	TEMP	SAL	σ_t	OXY
0	8.2	32.21	25.08	
10	8.18	32.21	25.08	.614
25	8.12	32.21	25.09	.604
50	7.89	32.71	25.52	.436
75	8.25	33.30	25.92	.380
100	8.07	33.70	26.26	.293
125	7.83	33.77	26.35	.253
150	7.77	33.84	26.42	.238
199	7.37	33.90	26.52	.223
298	6.33	33.99	26.73	.185
397	5.51	34.04	26.88	.135
496	5.02	34.10	26.98	.081
595	4.61	34.21	27.12	.049
793	3.86	34.32	27.28	.049
1091	3.15	34.45	27.45	.049

INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	SAL	σ_t	$10^5\delta$	ΔD
0	8.2	32.21	25.08	289.2	.000
10	8.18	32.21	25.08	289.0	.029
20	8.15	32.19	25.07	290.3	.058
30	8.03	32.30	25.17	280.6	.087
50	7.89	32.71	25.52	248.4	.140
75	8.25	33.30	25.92	210.0	.197
100	8.07	33.70	26.26	178.1	.246
150	7.77	33.84	26.42	164.3	.332
200	7.36	33.90	26.52	154.9	.412
250	6.81	33.95	26.64	144.5	.487
300	6.31	33.99	26.74	135.7	.557
400	5.49	34.04	26.88	122.9	.686
500	5.00	34.11	26.99	112.9	.804
600	4.59	34.21	27.12	101.6	.911
700	4.18	34.27	27.21	093.3	1.008
800	3.84	34.33	27.29	085.8	1.098
1000	3.31	34.44	27.43	073.2	1.257

Bathythermograph lowerings, 1962

Ser. No.	Time GCT	Date	Latitude	Longitude	Bkt. temp.	Wind		Air temp		Bar.	Weather	Clouds		Vis.	Sea	Swell		Surf. sal.
						Dir.	Speed	Dry bulb	Wet bulb			Type	Amt.			Dir.	Amt.	
		1962			°C.	°T.[1]	Kn.		°F.	Mb.						°T.[1]		‰
28	2340	3/20	53°30' N	155°00' W.	4.3	22	50	40.0	37.0	05	03	6	8	6	4	22	4	32.68
30	0337	3/23	52°30'	155°00'	3.6	11	55	35.0	34.0	90	71	X	9	1	5	11	3	-----
32	2105	3/24	51°30'	155°00'	4.4	36	28	36.0	33.0	08	03	6	7	6	4	35	6	32.62
34	2325	3/25	50°30'	155°00'	4.8	26	15	37.0	34.0	18	03	6	6	7	3	31	4	32.63
36	0210	3/27	49°30'	155°00'	5.2	23	50	41.0	39.0	05	03	6	8	6	4	23	4	32.61
38	2220	3/28	48°30'	155°00'	5.9	22	10	43.0	38.0	11	01	4	5	8	2	28	2	32.64
40	2235	3/29	47°30'	155°00'	6.1	05	15	42.0	41.0	02	03	6	8	7	3	01	5	32.64
42	1118	3/30	46°30'	155°00'	7.0	21	40	45.0	43.0	04	03	6	8	6	4	21	4	32.68
44	2215	4/01	45°30'	155°00'	7.3	14	40	46.0	45.0	98	63	6	8	3	6	14	8	32.72
45	1320	4/03	46°10'	150°45'	7.2	27	30	48.0	47.0	02	01	6	3	7	8	27	9	32.62
48	1857	4/05	46°50'	143°32'	8.3	22	30	48.0	45.0	12	01	6	5	7	3	23	4	32.73
50	2355	4/06	47°00'	140°50'	8.2	01	05	47.0	43.0	29	01	6	8	7	2	00	9	32.70
52	2132	4/07	47°17'	138°00'	8.0	09	05	50.0	49.0	16	61	6	8	3	3	09	5	32.65
54	1605	4/08	47°32'	135°00'	7.8	05	30	44.0	43.0	22	03	6	8	7	4	03	5	32.67
56	2120	4/09	47°41'	131°58'	8.0	28	20	44.5	44.0	27	01	6	7	8	3	28	1	32.68
58	2100	4/10	48°15'	126°31'	7.6	32	12	44.0	41.0	30	03	6	8	6	2	32	2	32.64

[1] Degrees true.

Bathythermograph data

Temperatures at selected depths, degrees centigrades

BT number	Surface	Depth, meters										Bottom
		10	20	30	50	75	100	125	150	200	250	
28	4.3	4.3	4.2	4.2	4.2	3.6	5.7	6.0	5.8	5.1	4.9	4.8
30	3.6	3.6	3.6	3.6	3.5	3.5	3.4	3.9	3.9	3.7	-	3.7
32	4.4	4.4	4.4	4.4	4.4	4.3	4.3	3.6	3.4	3.3	3.6	3.6
34	4.8	4.8	4.8	4.7	4.7	4.7	4.7	3.3	3.1	3.4	3.6	3.6
36	5.2	5.2	5.1	5.1	5.0	5.0	5.0	3.3	3.4	3.3	3.5	3.5
38	5.9	5.9	5.9	5.9	5.8	5.8	5.8	4.3	4.1	4.2	4.2	4.3
40	6.1	6.1	6.1	6.1	6.0	5.8	5.7	4.1	4.6	4.7	4.4	4.3
42	7.0	7.0	7.0	7.0	6.9	6.9	5.8	5.2	5.6	5.3	-	4.9
44	7.3	7.3	7.3	7.3	7.2	7.1	6.7	5.9	6.1	5.8	5.5	5.5
45	7.2	7.2	7.2	7.2	7.2	7.1	7.1	5.4	5.3	5.9	5.3	5.1
48	8.3	8.3	8.3	8.3	8.3	8.3	8.2	6.1	6.3	7.0	6.6	6.5
50	8.2	8.2	8.1	8.0	7.9	7.9	7.7	5.5	6.2	6.4	6.0	5.7
52	8.0	8.0	8.0	8.0	7.9	7.7	7.6	6.0	6.4	6.9	6.2	6.0
54	7.8	7.8	7.8	7.8	7.7	7.5	7.4	6.1	6.9	6.7	5.9	5.8
56	8.0	8.0	8.0	8.0	8.0	7.6	7.6	7.0	7.3	6.8	6.0	5.8
58	7.6	7.6	7.6	7.6	7.5	7.2	7.1	7.0	6.9	6.4	5.8	5.7

Drift bottle release data

Date, GCT	Latitude	Longitude	Number of bottles
February 10	51° 03' N.	174° 56' W.	120
February 10	51° 30' N.	175° 28' W.	120
February 20	50° 00' N.	175° 00' W.	120
February 25	49° 00' N.	175° 00' W.	120
February 26	48° 00' N.	175° 00' W.	120
February 27	47° 00' N.	175° 00' W.	120
February 28	46° 00' N.	175° 00' W.	120
March 2	45° 00' N.	175° 00' W.	120
March 3	44° 00' N.	175° 00' W	120
March 4	43° 00' N.	175° 00' W.	120
March 5	42° 00' N.	175° 00' W.	120
March 6	41° 00' N.	175° 00' W.	240
March 19	55° 30' N.	155° 00' W.	120
March 19	55° 00' N.	155° 00' W.	120
March 20	54° 00' N.	155° 00' W.	120
March 21	53° 00' N.	155° 00' W.	120
March 24	52° 00' N.	155° 00' W.	120
March 25	51° 00' N.	155° 00' W.	120
March 26	50° 00' N.	155° 00' W.	120
March 28	49° 00' N.	155° 00' W.	120
March 29	48° 00' N	155° 00' W.	120
March 30	47° 00' N.	155° 00' W.	120
April 1	46° 00' N.	155° 00' W.	120
April 7	47° 07' N.	139° 23' W.	120
April 8	47° 17' N.	138° 00' W.	120
April 8	47° 32' N.	135° 00' W.	120
April 10	47° 55' N.	130° 25' W.	120
April 10	48° 11' N.	127° 35' W.	120
April 11	48° 24' N.	125° 06' W.	120

MS #1299

GPO 866-767

Created in 1849, the U.S. Department of the Interior is concerned with the management, conservation, and development of the Nation's water, fish, wildlife, mineral, forest, and park and recreational resources. It also has major responsibilities for Indian and Territorial affairs.

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