

# Radiocarbon

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## **HISTORICAL $^{14}\text{C}$ MEASUREMENTS FROM THE ATLANTIC, PACIFIC, AND INDIAN OCEANS**

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### INTRODUCTION

As a result of nuclear testing in the atmosphere, the estimated pre-atomic era world inventory of  $^{14}\text{C}$  of  $2.2 \times 10^{30}$  atoms was increased by ca  $6 \times 10^{28}$  atoms, *ie*, ca 3% (Fairhall & Young, 1970). About 40% of this bomb  $^{14}\text{C}$  was produced in nuclear testing from the decade before the 1958 moratorium. The remaining 60% was added during the intensive nuclear testing of 1961 and 1962. Because the atmosphere contains a relatively small fraction (ca 2%) of the world's supply of natural radiocarbon, over 90% of the total being in the deep sea below 100m, the additional  $^{14}\text{C}$  from nuclear testing produced a dramatic increase in the level of  $^{14}\text{C}$  atmospheric  $\text{CO}_2$ . Unlike the fission products, which have a comparatively short lifetime in the troposphere, the tropospheric residence time of  $^{14}\text{C}$  is on the order of a few years before being transferred to the sea. Thus, it appeared that a study of the distribution of the "excess"  $^{14}\text{C}$  in the sea and its change with time would give valuable insight into such problems as 1) the rate of  $\text{CO}_2$  exchange between the atmosphere and the sea and its dependence on wind speed over the sea surface, 2) the rate of transfer by oceanic mixing processes of contaminants, including fallout radionuclides introduced initially into the mixed surface layer of the sea, 3) the rate of bottom water formation at high latitudes and subsequent advective transport from these source regions into the deep sea.

### METHODOLOGY

We report here the results of the  $^{14}\text{C}$  sampling program which we initiated to study some of these processes. Our first goal was to develop a system for stripping  $\text{CO}_2$  from sea water aboard ship, operated by the ship's personnel. We selected 60L of sea water as a sample of sufficient size for  $^{14}\text{C}$  assay yet easily handled by one person. Beer kegs modified with valves and spigot (Young, Buddemeier, & Fairhall, 1969) proved excellent for this purpose. We built ten of these at a very modest cost. Some of our deep-

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water samples were collected with other types of water samplers such as Niskin bottles, Bodman samplers, and bag samplers, depending upon the type available on the particular ship. When vertical profiles of  $^{14}\text{C}$  were measured, several samples were often collected on the same day. Those which could not be processed at once were stored temporarily in 20L plastic bottles.

Another requirement for our  $^{14}\text{C}$  assay program was a suitable absorbent for  $\text{CO}_2$  stripped from sea water. Wet chemical methods have often been used to accomplish this, but we found that the molecular sieve technique, first used by Fergusson (1963), offered several advantages: the sieve is 100% efficient for absorbing  $\text{CO}_2$ , provided the capacity of the sieve is ample; it is in the form of innocuous dry pellets which pose no problems should the container accidentally be broken; the absorbed  $\text{CO}_2$  is readily liberated on heating; the sieve can be re-used indefinitely with negligible memory effects.

The system used to extract  $\text{CO}_2$  from ca 50L of sea water is shown schematically in figure 1. To liberate the  $\text{CO}_2$ , the seawater samples were acidified with 250ml of ordinary battery acid. A 1-pint (ca  $500\text{cm}^3$ ) glass bottle of molecular sieve was used as the  $\text{CO}_2$  absorbent. The leak-tight aquarium pump circulated the residual air in the system at a rate of 1L/min, sufficient to completely strip the  $\text{CO}_2$  from the water in 4 hours.

The  $\text{CO}_2$  in the air that was initially in the stripper bottle had a higher  $^{14}\text{C}/^{12}\text{C}$  ratio (by perhaps as much as a factor of 2) than the  $\text{CO}_2$  which was stripped from the sea water, but the perturbation on the  $^{14}\text{C}$  analyses which this could have produced is completely negligible; Berger and Libby (1969) show that the rate of air-sea exchange of  $\text{CO}_2$  in a barrel of ocean water

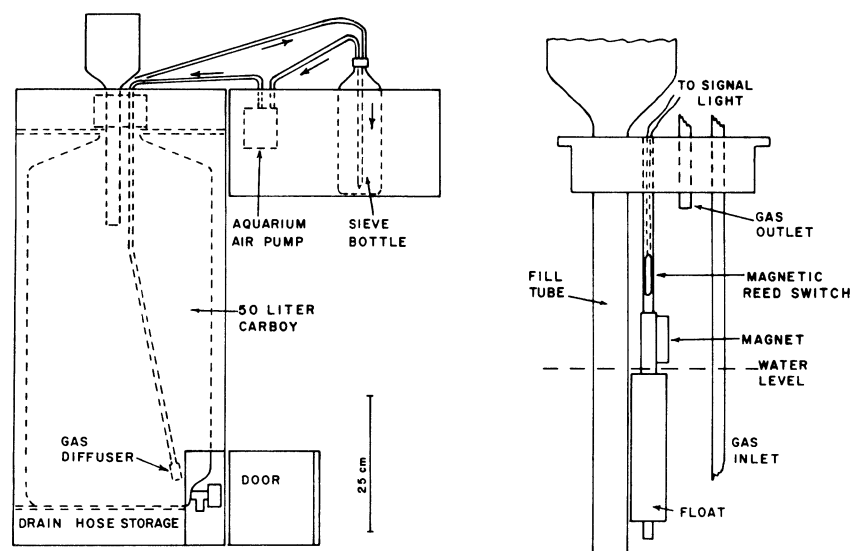


Fig 1. Outgassing unit for stripping  $\text{CO}_2$  from 50L of acidified sea water

through which air is bubbled is very slow. Therefore, most of the  $\text{CO}_2$  that was in the air inside the stripper before it was filled with sea water was expelled from the stripper without exchanging its  $^{14}\text{C}$  during the filling operation. The atmospheric  $\text{CO}_2$  that remained in the stripper after it was full was absorbed along with the  $\text{CO}_2$  from the seawater sample, but its volume is insignificant compared with the volume of  $\text{CO}_2$  released from the sea water, itself; hence, it can be neglected. The same is true for water stored temporarily in bottles.

When the samples of exposed sieve were received in the laboratory, the absorbed  $\text{CO}_2$  and water were driven off by heating the sieve to  $380^\circ\text{C}$ . Water vapor was condensed in a trap cooled with a dry-ice-acetone bath. The dried  $\text{CO}_2$  was then condensed in a trap cooled with liquid nitrogen. A 50L sample of sea water typically yielded 2.5L-atmospheres (at  $25^\circ\text{C}$ ) of  $\text{CO}_2$  and from 10 to  $20\text{cm}^3$  of water, depending on the temperature of the water sample during the outgassing procedure.

The  $\text{CO}_2$  stripped from the sieve was stored for a month in a steel cylinder to allow radon to decay. (The molecular sieve contains traces of radium and yields significant quantities of radon on outgassing the  $\text{CO}_2$ .) After a month this contaminant had decayed to a level that no longer interfered with the counting of  $^{14}\text{C}$ . The aged  $\text{CO}_2$  was then converted to methane by catalytic hydrogenation with tritium-free hydrogen (Buddemeier *et al*, 1970); a small aliquot of the  $\text{CO}_2$  was sometimes taken first for  $^{13}\text{C}/^{12}\text{C}$  isotope ratio measurement.

The assay for  $^{14}\text{C}$  was performed in 1 of 3  $^{14}\text{C}$  gas proportional counters each of ca 1L volume. Two of these were constructed from nylon and quartz and had backgrounds of between 1 and 2 counts per minute. The third counter was a thin plastic membrane counter with a background of  $<1$  count per minute. The reference standard was oxalic acid distributed by the National Bureau of Standards. By convention (Broecker & Olson, 1961), the  $^{14}\text{C}$  concentrations relative to the oxalic acid standard are given by

$$\delta^{14}\text{C} = \left( \frac{A_{\text{sample}} - 0.95 A_{\text{std}}}{0.95 A_{\text{std}}} \right) \times 1000 \quad (1)$$

$$\Delta^{14}\text{C} = \delta^{14}\text{C} - (2\delta^{13}\text{C} + 50) \left( 1 + \frac{\delta^{14}\text{C}}{1000} \right) \quad (2)$$

$$\delta^{13}\text{C} = \left( \frac{(^{13}\text{C}/^{12}\text{C})_{\text{sample}}}{(^{13}\text{C}/^{12}\text{C})_{\text{std}}} - 1 \right) \times 1000 \quad (3)$$

In these equations, A refers to the net counting rate, after the background counting rate is subtracted, of the sample or the oxalic acid standard. Almost all the samples were counted at the same gas pressure (usually 2 atm 0.1%) in the proportional counter to minimize the number of background and standard samples needing to be counted. The weighting factor, 0.95, applied to the activity of the oxalic acid standard brings its activity into agreement with the age-corrected activity of 19th century wood. The quantity,  $\delta^{14}\text{C}$ , in units of per mil (‰), measures the difference in radioactivity

between the sample and the standard, uncorrected for isotope fractionation in the sample;  $\Delta^{14}\text{C}$  is the corresponding quantity corrected for isotope fractionation.  $\delta^{13}\text{C}$  is the correction factor for isotope fractionation in the sample, also expressed in per mil. We measured the  $^{13}\text{C}/^{12}\text{C}$  ratio relative to a sample of PDB belemnite using a modified CEC Model 21-103 mass spectrometer; the accuracy of these ratio measurements as determined by inter-laboratory comparisons was  $\pm 0.4\text{‰}$ . In general,  $\delta^{13}\text{C}$  was observed to vary from an average of ca  $+1.4\text{‰}$  in surface water to  $-1.5\text{‰}$  in deep water, although variations from these mean values were sometimes observed. This is particularly true in areas of strong upwelling. For samples that lacked  $\delta^{13}\text{C}$  measurements,  $\Delta^{14}\text{C}$  was calculated using an average value of  $\delta^{13}\text{C}$  of  $-0.1$ .

Each sample was counted at least twice. If the two results agreed within 2 standard deviations, the two counts were averaged; otherwise, the sample was counted a third time and a weighted average taken. Allowing for a few per mil uncertainty in  $\Delta^{14}\text{C}$  due to a possible variation in  $\delta^{13}\text{C}$  from the mean value used in correcting the majority of the samples, the average standard deviation of the measurements is estimated to be  $\pm 10\text{‰}$ .

One problem that we encountered was contamination of our samples from tracer  $^{14}\text{C}$  used for productivity studies aboard oceanographic ships. The  $^{14}\text{C}$ -labeled carbonate used to inoculate samples of sea water to determine productivity is extremely labile. The contamination probably results from traces of airborne  $^{14}\text{CO}_2$  from these experiments exchanging with the seawater sample during its transfer from the water sampler to the  $\text{CO}_2$  outgassing unit. When it was possible to work in an area remote from the biology laboratory, preferably on an open deck or other location not on the ship's ventilation system, we obtained samples that yield internally consistent results. The deepwater samples agree well with samples collected at other times when there was no possibility of contamination. Under these favorable circumstances, there was probably no significant contribution of tracer  $^{14}\text{C}$  to the measured values. However, during one cruise, the sea water was processed in a laboratory where tracer  $^{14}\text{C}$  might have entered through the ventilating system, and several samples were highly suspect; the rest of the samples were also somewhat dubious or at least yielded only upper limits of  $^{14}\text{C}$  levels. Only those data that seem above suspicion are reported here.

In addition to measuring  $^{14}\text{C}$  specific activity, on many of the cruises we collected 250ml aliquots of water for total dissolved  $\text{CO}_2$  ( $\Sigma\text{CO}_2 = \text{CO}_2 + \text{HCO}_3^- + \text{CO}_3^{2-}$ ) analysis using the Nansen bottle accompanying the beer keg sampler. The procedures followed for collection and storage were described by Wong (1968). The samples were analyzed in the laboratory by the gas chromatographic technique of Park, Kennedy, and Dobson (1964) which uses a sodium carbonate standard for comparison. The accuracy of the method is  $\pm 1\%$ .

Shipboard analysis soon after collection would have been preferable to returning the samples to the laboratory, but this was beyond our capabilities.

From the total dissolved  $\text{CO}_2$  and  $\Delta^{14}\text{C}$ , the absolute concentration of

$^{14}\text{C}$  in the water can be calculated from the equation (Fairhall, Young, & Bradford, 1972):

$$\text{absolute } ^{14}\text{C} = 7.0 \times 10^8 \times \Sigma\text{CO}_2 \times \left(1 + \frac{\Delta^{14}\text{C} + 40}{1000}\right) ^{14}\text{C atoms/L} \quad (4)$$

The depths at which the samples were collected were determined, when possible, by protected and unprotected reversing thermometers. In most cases, the depth had to be estimated from the length of cable and wire angle. Except for some of the earliest samples, of which no salinities were measured, a Nansen bottle generally accompanied the water sampler so that salinities of sampler and Nansen bottle could be compared. The two were usually in acceptable agreement, lending reassurance that the water sampler did not pretrip or leak. Samples in which the salinity agreement was suspect were rejected and are not reported.

A few 200L water samples were collected in 1958 by Dr Sayed El Wardani using different techniques from those outlined above: the  $\text{CO}_2$  was stripped from the water with a stream of nitrogen gas and absorbed in a solution of barium hydroxide. The resulting slurry of barium carbonate was stored in its glass container with a tightly fitting rubber stopper to exclude air. The top was then dipped in melted wax for further insurance against leakage. These samples remained in storage until 1966 when they were finally processed for  $^{14}\text{C}$  counting. Their  $^{14}\text{C}$  levels are in fairly good agreement with the early data of Bien, Rakestraw, & Suess (1960), indicating that there was little or no leakage of air into the containers during their long period of storage.

#### RESULTS

Tables 1–9, below, include the following information:

Name of the cruise and the cruise vessel  
 Station number and its geographic location  
 Date the sample was collected  
 Nominal sampling depth  
 Temperature and salinity at the sampling depth  
 $\delta^{14}\text{C}$   
 $\delta^{13}\text{C}$  (a value in parenthesis is an assumed value)  
 $\Delta^{14}\text{C}$   
 Total  $\text{CO}_2$  ( $\Sigma\text{CO}_2$ )  
 Absolute concentration of  $^{14}\text{C}$  in  $10^9$  atoms/liter  
 Sample identification number

#### ACKNOWLEDGMENTS

As may be expected for a program that operated largely on a ship-of-opportunity basis, we are indebted to a great many individuals, some of whom are unknown to us. Those deserving special thanks include the officers and crew of the US Coast Guard cutters *Bering Strait*, *Bibb*, *Campbell*, *Duane*, *Klamath*, *Spencer*, *Wachusett*, and *Winona*; the officers and crew of the USNS *Eltanin*; Joe Reed and the officers and crew of the Scripps research vessel, *Thomas Washington*.

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TABLE 1  
Seawater samples from the Atlantic Ocean

Depth (m)	Temp (°C)	Salinity (0/00)	$\delta^{14}\text{C}$	$\delta^{13}\text{C}$	$\Delta^{14}\text{C}$	$\sum \text{CO}_2$ (mM)	$^{14}\text{C}$ at/L ( $\times 10^{-9}$ )	UW no.
CRUISE: ATLANTIS II-78								
Station: S-01/1913			32.7°N	29.9°W				
Date: 9/5/73								
0	22.19	36.546	193	0.8	131	2.07	1.70	0-0752
100	17.67	36.411	149	(-.1)	91	2.11	1.67	0-0753
200	16.41	36.289	108	(-.1)	52	2.12	1.62	0-0754
300	15.03	36.044	92	(-.1)	38	2.12	1.60	0-0755
400	13.76	35.900	94	(-.1)	40	2.15	1.60	0-0756
500			81	-.3	27	2.14	1.60	0-0757
700	10.89	35.564	46	-.6	-4	2.17	1.57	0-0758
Station: S-02/1914			27.2°N	34.3°W				
Date: 9/7/73								
0	26.22	37.241	234	(-.1)	172	2.11	1.80	0-0759
100	20.08	36.844	162	(-.1)	104	2.10	1.68	0-0760
150	18.49	36.609	181	(-.1)	122	2.15	1.75	0-0761
200	17.78	36.513	147	(-.1)	90	2.12	1.68	0-0762
300	16.22	36.293	109	(-.1)	54	2.12	1.62	0-0763
400	14.90	36.013	74	(-.1)	21	2.13	1.58	0-0764
500	14.66	35.868	84	(-.1)	30	2.16	1.62	0-0765
700	11.03	35.540	14	(-.1)	-36	2.18	1.53	0-0766
1000	7.92	35.325	-7	-.7	-55	2.23	1.54	0-0767
1500	5.47	35.258	-30	-1.5	-76	2.20	1.48	0-0768
2000	3.88	35.091	-37	-.7	-84	2.22	1.48	0-0769
3000	2.79	34.992	-78	.7	-125	2.22	1.42	0-0770
5500	2.49	34.896	-38	.5	-87	2.24	1.49	0-0771
Station: S-03/1921			18.1°N	38.2°W				
Date: 9/12/73								
0	26.10	36.968	204	.7	142	2.09	1.72	0-0772
50	25.45	37.337	198	(-.1)	138	2.24	1.84	0-0773
100	23.49	37.148	187	(-.1)	128	2.08	1.70	0-0774
200	18.05	36.557	109	(-.1)	54	2.14	1.64	0-0775
300	15.19	36.077	58	(-.1)	6	2.19	1.60	0-0776
400	13.43	35.751	17	-.3	-33	2.20	1.55	0-0777
700	8.17	35.171	-20	-1.0	-67	2.23	1.52	0-0779
1000	6.03	34.912	-49	(-.1)	-97	2.24	1.48	0-0780
1500	4.69	35.059	-38	(-.1)	-86	2.21	1.48	0-0781
2200	3.71	35.029	-44	-.4	-90	2.21	1.47	0-0782
3000	2.77	34.977	-62	.2	-109	2.23	1.45	0-0783
5700	2.39	34.867	-60	-.6	-106	2.25	1.47	0-0784
Station: S-04/1935			09.0°N	40.0°W				
Date: 9/19/73								
0	28.06	35.377	197	(-.1)	138	1.98	1.63	0-0785
100	14.28	35.361	44	(-.1)	-8	2.18	1.57	0-0786
200	10.44	34.856	24	(-.1)	-26	2.21	1.57	0-0787
300	8.75	34.664	14	(-.1)	-37	2.26	1.58	0-0788
400	8.30	34.654	-26	(-.1)	-75	2.26	1.53	0-0789
500	7.97	34.638	-29	(-.1)	-77	2.24	1.51	0-0790
700	6.81	34.579	-31	1.6	-82	2.25	1.51	0-0791
1000	5.05	34.623	-47	-.5	-94	2.23	1.48	0-0792
1500	4.40	34.817				2.21		0-0793A
2000	3.52	34.816	-24	-.2	-72	2.18	1.48	0-0793

TABLE 1 (continued)  
Seawater samples from the Atlantic Ocean

Depth (m)	Temp (°C)	Salinity (0/00)	$\delta^{14}\text{C}$	$\delta^{13}\text{C}$	$\Delta^{14}\text{C}$	$\Sigma \text{CO}_2$ (mM)	$^{14}\text{C}$ at/L ( $\times 10^{-5}$ )	UW no.
Station: S-05/1942                      9.0°N    50.0°W								
Date: 9/23/73								
0	28.68	29.526	208	.6	146	1.70	1.41	0-0794
100	22.01	36.303	118	(-.1)	62	2.10	1.62	0-0795
200	13.12	35.562	-36	(-.1)	-84	2.21	1.48	0-0796
500	7.41	34.711	-46	(-.1)	-94	2.23	1.48	0-0798
700	5.89	34.819	-51	-.8	-97	2.23	1.47	0-0799
850	5.28	34.631	-50	(-.1)	-97	2.23	1.47	0-0800
1000	4.97	34.734	-49	-.2	-96	2.24	1.48	0-0801
1500	4.36	35.019	-16	.0	-65	2.19	1.50	0-0802
2500	3.18	35.118	-15	(-.1)	-64	2.20	1.50	0-0803
4500	2.10	34.843	-56	.7	-105	2.24	1.47	0-0804
Station: S-06/1954                      12.0°N    59.4°W								
Date: 9/29/73								
0	28.41	33.970	188	1.0	126	1.90	1.56	0-0806
100	25.47	36.780	197	(-.1)	138	1.99	1.64	0-0807
130	23.51	36.940	204	.5	143	2.03	1.68	0-0808
200	17.30	36.427	158	(-.1)	101	2.12	1.69	0-0809
500	5.98	35.033	-30	(-.1)	-78	2.18	1.47	0-0811
1000	5.22	35.043	-56	-.1	-103	2.23	1.46	0-0813
Station: S-07/1963                      13.5°N    50.9°W								
Date: 10/9/73								
0	27.32	36.647	167	2.0	104	2.03	1.63	0-0816
100	24.75	36.618	190	(-.1)	131	2.07	1.70	0-0817
140	28.42	37.143	186	1.6	123	2.10	1.71	0-0818
200	18.81	36.596	101	(-.1)	46	2.15	1.64	0-0819
300	14.53	35.900	29	-.6	-22	2.20	1.57	0-0820
500	9.25	35.078	-32	(-.1)	-80	2.23	1.50	0-0821
700	7.82	34.704	-73	-.4	-119	2.25	1.45	0-0822
1000	5.70	34.762	-75	(-.1)	-121	2.24	1.44	0-0823
1500	3.51	34.980	-25	-.4	-73	2.21	1.50	0-0824
2500	3.00	34.934	-58	(-.1)	-105	2.20	1.44	0-0825
3500	2.50	34.902	-34	-1.5	-80	2.21	1.48	0-0826
5050	1.71	34.809	-66	(-.1)	-112	2.26	1.47	0-0827
Station: S-08/1968                      18.0°N    48.1°W								
Date: 10/11/73								
0	27.26	37.125	238	1.5	172	2.09	1.77	0-0828
90	25.18	37.175	222	(-.1)	161	2.07	1.74	0-0829
100	24.38	37.137	225	1.0	162	2.07	1.74	0-0830
150	21.42	37.069	205	(-.1)	145	2.12	1.76	0-0831
200	18.82	36.764	126	.4	69	2.14	1.66	0-0832
300	16.10	36.200	69	(-.1)	16	2.14	1.58	0-0833
500	11.04	35.502	5	-.2	-45	2.22	1.54	0-0834



TABLE 1 (continued)  
Seawater samples from the Atlantic Ocean

Depth (m)	Temp (°C)	Salinity (0/00)	$\delta^{14}\text{C}$	$\delta^{13}\text{C}$	$\Delta^{14}\text{C}$	$\Sigma \text{CO}_2$ (mM)	$^{14}\text{C}_{\text{at/L}}$ ( $\times 10^{-2}$ )	UW no.
Station: S-09/1974 Date: 10/14/73			23.0°N	45.0°W				
0	26.72	37.434	242	(-1)	180	2.08	1.78	0-0835
100	21.84	37.163	213	4	151	2.07	1.72	0-0836
200	18.76	36.811	139	(-1)	82	2.11	1.66	0-0837
300	17.03	36.359	114	(-1)	59	2.13	1.64	0-0838
500	13.67	35.867	32	(-1)	-20	2.16	1.54	0-0839
700	10.25	35.461	-11	(-1)	-61	2.16	1.48	0-0840
2500	3.08	34.945	-50	(-1)	-97	2.20	1.45	0-0843
Station: S-09/1975 Date: 10/18/73			23.0°N	45.1°W				
1000	6.09	35.043	-42	(-1)	-90	2.22	1.48	0-0845
1500	4.83	35.045	-30	(-1)	-79	2.19	1.47	0-0846
Station: S-10/1986 Date: 10/26/73			23.5°N	55.0°W				
0	27.52	36.681	222	-1.5	165	2.04	1.72	0-0848
100	23.07	37.043	54	(-1)	2	2.08	1.52	0-0849
150	21.24	37.032	114	(-1)	58	2.11	1.62	0-0850
200	19.27	36.774	98	(-1)	43	2.14	1.62	0-0851
300	17.43	36.432	151	-6	95	2.12	1.68	0-0852
500	14.61	36.016	-114	(-1)	-158	2.16	1.33	0-0853
700	11.37	35.540	-33	-1.9	-78	2.18	1.47	0-0854
1000	6.74	35.012	-34	(-1)	-82	2.21	1.48	0-0855
2500	3.13	34.959	-64	(-1)	-110	2.20	1.43	0-0857
3500	2.78	34.912	-50	-7	-95	2.20	1.46	0-0858
5600	2.03	34.844	-71	(-1)	-117	2.21	1.43	0-0859
Station: S-11/1993 Date: 10/29/73			23.0°N	62.0°W				
0	27.62	35.955	80	(-1)	26	2.00	1.49	0-0860
100	23.53	36.678	97	(-1)	42	2.05	1.57	0-0861
150	21.64	36.797	132	-2	76	2.07	1.62	0-0862
200	19.94	36.772	156	(-1)	99	2.08	1.66	0-0863
300	17.67	36.492	10	-2.9	-35	2.11	1.48	0-0864
500	14.85	36.026	-64	(-1)	-110	2.13	1.39	0-0865
700	11.19	35.465	-20	-1.3	-66	2.20	1.50	0-0866
1000	6.42	34.967	-41	(-1)	-89	2.22	1.48	0-0867
1500	4.31	35.010	-10	3	-60	2.18	1.50	0-0868
2500	3.07	34.947	-56	(-1)	-103			0-0869
4000	2.33	34.897	-77	-1.5	-120	2.19	1.41	0-0870
5879	2.07	34.833	-91	(-1)	-136	2.23	1.41	0-0871
Station: S-12/1997 Date: 10/31/73			20.0°N	64.8°W				
0	27.88	34.702	209	-1.0	151	1.90	1.58	0-0872
200	22.23	37.059	182	(-1)	123	2.11	1.72	0-0874
300	18.09	36.512	116	(-1)	61	2.16	1.66	0-0875
500	12.76	35.670	-43	-1.7	-88	2.17	1.45	0-0876

TABLE 2

Sea water samples collected in the Caribbean Sea by NOAA ship *OCEANOGRAPHER* during the BOMAX Expedition

Depth (m)	Temp (°C)	Salinity (0/00)	$\delta^{14}\text{C}$	$\delta^{13}\text{C}$	$\Delta^{14}\text{C}$	$\Sigma \text{CO}_2$ (mM)	$^{14}\text{C}$ at/L ( $\times 10^{-3}$ )	UW no.
Station: 17.6°N 54.6°W								
Date: 5/29/69								
0	27.42	35.229	211	-2	151			0-0316
100	27.42	35.225	208	(-1)	148			0-0317
200	27.42	35.258	97	(-1)	42			0-0318
300	27.32	35.457	60	(-1)	7			0-0319
400	26.87	36.405	27	(-1)	-24			0-0320
500	26.50	36.792	-23	(-1)	-71			0-0321
1000	24.71	37.090	-20	-3	-68			0-0322
2000	19.03	36.601	-21	(-1)	-70			0-0323
3000	15.92	36.102	-21	(-1)	-70			0-0324
4000	13.23	35.658	-51	(-1)	-98			0-0325

TABLE 3

Seawater samples from the Atlantic Ocean at Ocean Weather Stations BRAVO, CHARLIE, DELTA and ECHO

Depth (m)	Temp (°C)	Salinity (0/00)	$\delta^{14}\text{C}$	$\delta^{13}\text{C}$	$\Delta^{14}\text{C}$	$\Sigma \text{CO}_2$ (mM)	$^{14}\text{C}$ at/L ( $\times 10^{-3}$ )	UW no.
Station: BRAVO			56.7°N	50.6°W				
Date: 9/3/71								
0	8.16	34.04	25	2.0	-30	2.03	1.43	0-0470
50	4.99		56	(-1)	4	2.11	1.53	0-0471
500	4.01		64	.4	10	2.15	1.58	0-0472
1500	3.68		-13	.3	-63	2.15	1.47	0-0473
2000			-16	-2	-65	2.15	1.47	0-0474
3500			-61	(-1)	-107	2.15	1.41	0-0475
Station: BRAVO			56.7°N	50.6°W				
Date: 10/6/72								
10	4.96	34.43	269	(-1)	206	2.10	1.83	0-0679
1545			160	(-1)	103	2.18	1.74	0-0680
3445			116	(-1)	60			0-0681
Station: CHARLIE			52.5°N	35.0°W				
Date: 9/29/69 to 10/5/69								
0	10.14	34.530	127	(-1)	71	2.09	1.62	0-0240
115	5.72	34.672	80	(-1)	26	2.18	1.63	0-0241
2828	3.16	34.931	21	(-1)	-30	2.20	1.55	0-0242
3212	3.10	34.995	18	(-1)	-32	2.18	1.54	0-0243
Station: CHARLIE			52.5°N	35.0°W				
Date: 1/26-30/70								
0	6.86	36.683	153	(-1)	96	2.12	1.68	0-0244
110	6.81	34.650	118	(-1)	62	2.32	1.79	0-0245
231	5.31	34.750	40	(-1)	-11	2.19	1.58	0-0246
319	5.11	34.944	52	(-1)	0	2.26	1.64	0-0247
426	4.78	34.909	48	(-1)	-4	2.21	1.60	0-0248
552	4.37	34.946	32	(-1)	-20	2.20	1.57	0-0249
2071	3.27	34.950	3	(-1)	-47	2.20	1.53	0-0250
3106	2.97	34.982	25	(-1)	-26	2.19	1.56	0-0251
3727	2.96	34.965	-1	(-1)	-50	2.23	1.54	0-0252

TABLE 3 (continued)  
Seawater samples from the Atlantic Ocean Weather Stations

Depth (m)	Temp (°C)	Salinity (0/00)	$\delta^{14}\text{C}$	$\delta^{13}\text{C}$	$\Delta^{14}\text{C}$	$\sum \text{CO}_2$ (mM)	$^{14}\text{C}$ at/L ( $\times 10^{-3}$ )	UM no.
Station: CHARLIE Date: 11/14-24/70			52.5°N	35.0°W				
0			132	(-.1)	76	2.10	1.64	0-0297
50	7.54	34.724	105	(-.1)	50	2.14	1.63	0-0298
101	8.28	34.736	108	(-.1)	53	2.12	1.62	0-0299
152	6.93	34.799	103	(-.1)	48	2.13	1.62	0-0300
221	5.85	34.804	84	(-.1)	30	2.16	1.62	0-0301
Station: CHARLIE Date: 4/23/71			52.5°N	35.0°W				
1000	3.91	34.95	59	.4	5	2.22	1.62	0-0386
Station: CHARLIE Date: 1/6/73								
200	5.16	34.66	112	(-.1)	-38	2.20	1.54	0-0682
2000			38	(-.1)	-14	2.21	1.58	0-0683
Station: DELTA Date: 11/8-20/71			44.0°N	41.0°W				
0	15.31	35.22	157	.8	97	1.82	1.45	0-0495
50	15.24	35.33	150	(-.1)	93	2.04	1.62	0-0496
100	15.08	35.40	149	(-.1)	92	2.09	1.66	0-0497
200	13.72	35.76	94	(-.1)	40	2.13	1.61	0-0498
300	13.10	35.75	119	(-.1)	63	2.11	1.63	0-0499
500	10.35	35.38	53	(-.1)	1	2.14	1.56	0-0500
700	7.87	35.15	1	(-.1)	-49	2.16	1.50	0-0501
1000	5.56	35.07	-18	(-.1)	-66	2.15	1.46	0-0502
1500	4.24	35.01	0	(-.1)	-50	2.13	1.48	0-0503
2000	3.36	34.96				2.16		0-0504
3500			-18	(-.1)	-67	2.17	1.48	0-0505
Station: DELTA Date: 9/22/72			44.0°N	41.0°W				
0	20.41	35.03	193	-1.0	136	2.06	1.70	0-0668
50	17.14	36.09	172	-1.4	117	2.06	1.67	0-0669
100	15.92	36.07	140	0	83	2.10	1.65	0-0670
150	14.75	35.85	120	.1	64	2.15	1.66	0-0671
200	13.88	35.72	155	-1.2	100	2.15	1.72	0-0672
300	13.08	35.69				2.20		0-0673
500	10.57	35.34	90	.5	34	2.16	1.62	0-0674
700	8.03	35.13	22	0	-30	2.23	1.58	0-0675
1000	5.77	35.07	5	.1	-46	2.13	1.48	0-0676
2000						2.20		0-0676A
3000			39	(-.1)	-12	2.19	1.58	0-0677
4663			26	(-.1)	-25	2.22	1.58	0-0678
Station: DELTA Date: 6/18-23/73			44.0°N	41.0°W				
0	17.77	36.030	166	1.0	106	2.07	1.66	0-0722
100	15.71	36.088	111	(-.1)	56	2.12	1.63	0-0723
200	13.88	35.688	106	.5	50	2.13	1.62	0-0724
300	12.82	36.391	65	(-.1)	12	2.14	1.58	0-0725
400	11.82	35.522	33	.8	-20	2.15	1.54	0-0726
500		35.219	25	.4	-27	2.17	1.54	0-0727
700		35.075	22	(-.1)	-28	2.18	1.54	0-0728
1000	5.66	35.020				2.17		0-0729
1500	4.00	34.908	23	(-.1)	-28	2.16	1.53	0-0730
2000	3.73	34.964	5	(-.1)	-45	2.15	1.50	0-0731
3000	3.03	35.011	-17	.1	-66	2.19	1.49	0-0732

TABLE 3 (continued)  
Seawater samples from the Atlantic Ocean Weather Stations

Depth (m)	Temp (°C)	Salinity (0/00)	$\delta^{14}\text{C}$	$\delta^{13}\text{C}$	$\Delta^{14}\text{C}$	$\sum \text{CO}_2$ (mM)	$^{14}\text{C}$ at/L ( $\times 10^{-5}$ )	UW no.
Station: ECHO Date: 6/1-29/72			35.0°N 48.0°W					
0	22.59	36.50	187	2.0	123	2.07	1.69	0-0528
100	18.57	36.40	188	.6	127	2.08	1.70	0-0529
500	15.22	36.04	85	.6	29	2.15	1.61	0-0530
700	11.98	35.59	37	-.5	-14	2.20	1.58	0-0531
1000	7.01	35.13	25	-1.1	-24	2.13	1.52	0-0532
1900			-3	.5	-54	2.21	1.53	0-0716
2000			-16	.7	-67	2.20	1.50	0-0533
3000			-8	(-.1)	-57	2.20	1.51	0-0534
4877			-31	1.1	-82	2.22	1.49	0-0535
Station: ECHO Date: 1/1-20/73			35.0°N 48.0°W					
0	18.06	36.39				2.11		0-0684
100	18.63	36.333				2.09		0-0685
205	18.32		195	(.1)	136	2.15	1.77	0-0686
305	17.41	36.396	172	-.6	115	2.15	1.74	0-0687
405	16.62	36.282	142	(-.1)	85	2.18	1.72	0-0688
525	15.42	36.059	117	.3	60	2.18	1.68	0-0689
770		35.440				2.30		0-0690
1350		35.071	2	-.3	-48	2.23	1.55	0-0691
2650		35.007	6	0	-45	2.22	1.55	0-0692
3360		34.915				2.20		0-0693
4050		34.884	14	-.4	-62	2.23	1.53	0-0694

TABLE 4  
Seawater samples from the Pacific Ocean at Ocean Weather Stations NOVEMBER, PAPA and VICTOR

Depth (m)	Temp (°C)	Salinity (0/00)	$\delta^{14}\text{C}$	$\delta^{13}\text{C}$	$\Delta^{14}\text{C}$	$\sum \text{CO}_2$ (mM)	$^{14}\text{C}$ at/L ( $\times 10^{-5}$ )	UW no.
Station: NOVEMBER Date: 11/11/68			30.0°N 140.0°W					
0			306	.5	239			0-0202
1000		34.422	-152	-1.3	-192			0-0203
Station: NOVEMBER Date: 2/16/69			30.0°N 140.0°W					
0			258	(-.1)	195			0-0208
100	18.77	35.045	250	(-.9)	185			0-0204
220	13.00	35.014	164	-.9	108			0-0205
330	10.09	34.671	33	(-.1)	-18	2.11	1.51	0-0223
440	7.75	33.998	-16	(-.1)	-65	2.20	1.50	0-0224
550	6.01	33.996	-40	(-.1)	-88	2.25	1.50	0-0225
1100	3.87	34.449	-168	(-.1)	-210	2.36	1.37	0-0234
1655	2.96	34.403	-163	(-.1)	-205	2.36	1.38	0-0233
2000			-212	(-.1)	-252			0-0209
2205	2.38	34.614	-193	(-.1)	-234			0-0207
2360	2.08	34.626	-187	(-.1)	-228	2.37		0-0232
3785	1.76	34.684	-176	-1.9	-214			0-0206

TABLE 4 (continued)

Seawater samples from the Pacific Ocean Weather Stations

Depth (m)	Temp (°C)	Salinity (0/00)	$\delta^{14}\text{C}$	$\delta^{13}\text{C}$	$\Delta^{14}\text{C}$	$\sum \text{CO}_2$ (mM)	$^{14}\text{C}$ at/L ( $\times 10^{-9}$ )	UW no.
Station: NOVEMBER			30.0°	140.0°W				
Date: 12/24/69								
0		35.013	300	(-.1)	235	2.04	1.82	0-0253
115	19.4	35.001	291	(-.1)	227	2.00	1.77	0-0254
220	13.1	34.133	179	(-.1)	120	2.10	1.70	0-0255
325	9.9	34.059	53	(-.1)	0	2.12	1.54	0-0256
437	7.5	33.995	-38	(-.1)	-86	2.25	1.50	0-0257
500	6.8	33.979	-51	(-.1)	-98	2.30	1.52	0-0258
3040	1.6	34.655	-179	(-.1)	-220	2.39	1.37	0-0259
Station: NOVEMBER			30.0°	140.0°W				
Date: 11/3/70								
0	20.9	34.776	302	(-.1)	237	1.99	1.78	0-0378
50	20.9	34.660	318	1.5	248	1.97	1.78	0-0379
100	17.9	34.595	308	(-.1)	242	2.00	1.80	0-0380
200	12.9	34.080	166	(-.1)	108	2.06	1.65	0-0381
500	6.4	33.969	-59	-1.0	-104	2.21	1.45	0-0382
1000	3.8	34.391	-123	-2.6	-163	2.36	1.45	0-0383
2000		34.607	-180	(-.1)	-221	2.37	1.36	0-0384
Station: NOVEMBER			30.0°	140.0°W				
Date: 5/31/71								
0	19.7		265	.7	200	2.01	1.72	0-0389
102	18.9		248	1.2	183	2.01	1.75	0-0390
204	12.5		147	(-.1)	90	2.00	1.60	0-0391
306	10.2		52	(-.1)	0	2.07	1.51	0-0392
405	8.5		-23	(-.1)	-72	2.12	1.44	0-0393
506	6.6		-97	(-.1)	-142	2.15	1.36	0-0394
725	5.0		-104	-1.0	-147	2.32	1.46	0-0395
1000	4.4		-176	(-.1)	-217	2.37	1.36	0-0396
2105	2.4		-224	(-.1)	-262	2.37	1.29	0-0397
3080	2.0		-201	(-.1)	-240	2.37	1.33	0-0398
4470	1.9		-164	(-.7)	-204	2.36	1.38	0-0399
Station: NOVEMBER			30.0°N	140.0°W				
Date: 9/1/72								
0	22.6		316	(-.1)	250	2.07	1.87	0-0655
101	19.1	35.018	279	(-.1)	215	2.07	1.82	0-0656
200	15.0	34.477	194	(-.1)	134	2.08	1.71	0-0657
310	11.0	34.172	78	(-.1)	24	2.15	1.60	0-0658
442	7.9	34.010	-48	(-.1)	-96	2.23	1.47	0-0659
556	6.3	34.054	-83	-.8	-128	2.37	1.51	0-0660
738	5.3	34.250	-110	(-.1)	-154	2.44	1.51	0-0661
1020	4.2	34.429	-170	(-.1)	-211	2.49	1.44	0-0662
2010	2.5	34.636	-205	(-.1)	-244	2.47	1.38	0-0663
3080	2.0	34.644	-175	(-.1)	-216	2.48	1.43	0-0664
4500	2.0	34.689	-180	(-.1)	-221	2.44	1.40	0-0665

TABLE 4 (continued)  
Seawater samples from the Pacific Ocean Weather Stations

Depth (m)	Temp (°C)	Salinity (O/CO)	$\delta^{14}\text{C}$	$\delta^{13}\text{C}$	$\Delta^{14}\text{C}$	$\sum \text{CO}_2$ (mM)	$^{14}\text{C}$ at/L ( $\times 10^{-5}$ )	UW no.
Station: NOVEMBER			30.0°N	140.0°W				
Date: 5/5/73								
0	18.22	34.894	277	(1.3)	210	2.05	1.79	0-0705
100	17.78	34.941	303	1.4	234	2.05	1.83	0-0706
200	16.57	34.724	242	.8	178	2.03	1.73	0-0707
330	10.74	34.136	97	.4	41	2.12	1.60	0-0708
400		34.083	-14	-.3	-63	2.15	1.47	0-0709
700		34.168	-95	-.2	-140	2.36	1.49	0-0711
2000		34.627	-195	-.3	-235	2.41	1.36	0-0713
3000		34.537	-152	-1.0	-193	2.41	1.43	0-0714
4000		34.684	-168	-0.1	-210	2.38	1.38	0-0715
Station: NOVEMBER			30.0°N	140.0°W				
Date: 11/28/73								
0	20.56		270	(-.1)	207	2.04	1.78	0-0877
100	18.30		271	(-.1)	208	2.04	1.78	0-0878
200	9.61					2.05		0-0878A
300	10.69		88	(-.1)	34	2.11	1.59	0-0879
400	8.96		21	-.1	-30	2.16	1.53	0-0880
500	6.55		-68	(-.1)	-115	2.04	1.32	0-0881
700	4.37		-118	(-.1)	-162	2.35	1.44	0-0882
1000	3.50		-168	-1.5	-207	2.40	1.40	0-0883
2000	2.46		-204	(-.1)	-243	2.43	1.36	0-0884
3000	2.19		-187	(-.1)	-227	2.39	1.36	0-0885
4000	2.02		-165	(-.1)	-206	2.39	1.40	0-0886
4300	1.86		-176	(-.1)	-217	2.38	1.37	0-0887
Station: NOVEMBER			30.0°N	140.0°W				
Date: 3/16/74								
0	19.5	35.173	300	1.1	232	2.04	1.82	0-0897
100	18.4	35.031	273	(-.1)	209	2.05	1.79	0-0898
220	12.0	34.173	154	(-.1)	96	2.11	1.68	0-0899
300			75	(-.1)	21	2.13	1.58	0-0900
440	8.2	34.037	0	(-.1)	-49	2.17	1.50	0-0901
552	6.5	33.979	-76	(-.1)	-122	2.24	1.44	0-0902
770	4.3	34.138	-110	-.9	-152	2.35	1.46	0-0903
1015	4.1	34.387	-135	-1.1	-177	2.40	1.45	0-0904
2610	2.6	34.648	-208	(-.1)	-247	2.37	1.32	0-0905
Station: PAPA			50.0°N	145.0°W				
Date: 4/6/68								
50	5.90	32.578	320	-.5	255			0-0177
100	5.13	32.629	221	-.2	161			0-0178
150	4.80	33.567	4	-1.7	-43			0-1584
300	3.80	33.902	-80	-1.5	-127			0-1585
500	3.70	34.147	-120	-1.8	-167			0-1586
1000	2.88	34.411	-160	-2.0	-207			0-1587
2000	1.93	34.589	-165	-1.7	-212			0-1588
3000	1.56	34.655	-170	-.7	-217			0-1589

TABLE 4 (continued)  
Seawater samples from the Pacific Ocean Weather Stations

Depth (m)	Temp (°C)	Salinity (0/00)	$\delta^{14}\text{C}$	$\delta^{13}\text{C}$	$\Delta^{14}\text{C}$	$\Sigma \text{CO}_2$ (mM)	$^{14}\text{C}$ at/L ( $\times 10^{-9}$ )	UW no.
Station: PAPA 50.0°N 145.0°W								
Date: 3/26/69								
0			215	.9	152	2.05	1.71	0-0210
50			215	(-.1)	155	2.07	1.73	0-0211
100	4.23	32.660	210	(-.1)	150	2.10	1.75	0-0212
150	4.14	33.569	38	(-.1)	-13	2.17	1.56	0-0213
300	3.73	33.751	-81	(-.1)	-127	2.33	1.49	0-0214
500	3.50	34.154	-122	(-.1)	-166	2.37	1.45	0-0215
1000	2.80	34.410	-158	(-.1)	-200	2.40	1.41	0-0216
2000	1.90	34.591	-170	(-.1)	-212	2.43	1.41	0-0217
Station: PAPA 50.0°N 145.0°W								
Date: 2/11/69								
50		32.606	210	(-.1)	150	2.05	1.71	0-0226
100	4.5	32.702	169	(-.1)	111	2.08	1.68	0-0227
150		33.513	8	(-.1)	-42	2.17	1.52	0-0228
200	4.1	33.739	-63	(-.1)	-110	2.28	1.48	0-0229
500	3.8	34.138	-103	(-.1)	-148	2.37	1.48	0-0231
Station: PAPA 50.0°N 145.0°W								
Date: 1/18/70								
50	5.82	32.602	208	(-.1)	148	2.10	1.75	0-0235
100	5.80	32.603	220	(-.1)	159	2.01	1.69	0-0236
150	4.00	33.373	201	(-.1)	141	2.17	1.79	0-0237
200	3.90	33.652	172	(-.1)	114	2.28	1.84	0-0238
500	3.54	34.109	-127	(-.1)	-170	2.33	1.42	0-0239
Station: PAPA 50.0°N 145.0°W								
Date: 7/5/70								
100	5.14	32.824	180	.4	120	2.09	1.70	0-0290
150	4.55	33.476	44	(-.1)	-8	2.15	1.55	0-0291
300	4.06	33.950	-89	(-.1)	-134	2.36	1.50	0-0292
500	3.85	34.127	-124	(-.1)	-168	2.39	1.46	0-0293
1000	3.00	34.380	-161	(-.1)	-203	2.40	1.41	0-0294
2000	2.18	34.573	-177	(-.1)	-218	2.42	1.39	0-0295
3000	1.90	34.645	-188	1.5	-231	2.43	1.38	0-0296
Station: PAPA 50.0°N 145.0°W								
Date: 11/14/71								
0	7.50	32.630	201	(-.1)	141	2.05	1.70	0-0514
50	7.51	32.635	227	(-.1)	166	2.05	1.73	0-0515
100	7.26	32.641	185	.3	125	2.11	1.72	0-0516
150	4.27	33.622	37	(-.1)	-15	2.20	1.58	0-0517
200	4.20	33.784	8	(-.1)	-42	2.29	1.60	0-0518
300	3.94	33.919	-48	(-.1)	-96	2.31	1.53	0-0519
500	3.64	34.102	-82	(-.1)	-128	2.35	1.50	0-0520
1000	2.85	34.382	-144	(-.1)	-186	2.40	1.43	0-0521
2000	1.94	34.598	-196	(-.1)	-236	2.40	1.35	0-0522
3000	1.62	34.665	-188	-.9	-227	2.40	1.37	0-0523

TABLE 4 (continued)

Seawater samples from the Pacific Ocean Weather Stations

Depth (m)	Temp (°C)	Salinity (0/00)	$\delta^{14}\text{C}$	$\delta^{13}\text{C}$	$\Delta^{14}\text{C}$	$\sum \text{CO}_2$ (mM)	$^{14}\text{C}$ at/L ( $\times 10^{-9}$ )	UW no.
Station: PAPA								
Date: 6/2/73			50.0°N	145.0°W				
0		32.581	268	.2	204	2.12	1.85	0-0717
100	5.06	32.764	160	.0	102	2.08	1.66	0-0718
200	4.41	33.784	14	-.8	-35	2.26	1.59	0-0719
300	3.97	33.910	-67	-1.5	-111	2.34	1.52	0-0720
400	3.79	34.008	-92	-1.0	-136	2.34	1.48	0-0721
Station: PAPA								
Date: 3/1/75			50.0°N	145.0°W				
0			220	(-.1)	159	2.05	1.72	0-0906
50			221	(-.1)	160	2.05	1.72	0-0907
100						2.05		0-0908
150						2.14		0-0909
300						2.26		0-0910
Station: VICTOR								
Date: 3/19/70			34.0°N	164.1°E				
0	13.72	32.556	140	-.9	86	2.09	1.65	0-0282
130	14.02	32.833	148	(-.1)	91	2.02	1.60	0-0283
275	12.26	34.453	138	(-.1)	81	2.11	1.66	0-0284
330	10.14	34.281	49	.5	-4	2.14	1.55	0-0285
440	9.66	34.270	92	(-.1)	38	2.12	1.60	0-0286
500	6.09	33.988	29	(-.1)	-22	2.20	1.57	0-0287
605	5.30	34.033	-15	-.6	-63	2.24	1.53	0-0288
Station: VICTOR								
Date: 9/22/69			34.0°N	164.1°E				
0	25.34	34.421	207	(-.1)	147	2.04	1.70	0-0260
51	20.12	34.767	214	(-.1)	154	2.04	1.70	0-0261
100	17.95	34.808	140	(-.1)	83	2.03	1.60	0-0262
200	16.72	34.610	98	(-.1)	44	2.09	1.59	0-0263
314	14.18	34.566	147	(-.1)	90	2.13	1.68	0-0264
405	10.90	34.390	106	(-.1)	51	2.13	1.63	0-0265
500	7.94	34.211	44	(-.1)	-78	2.20	1.59	0-0266
640	7.52	34.194	36	(-.1)	-15	2.24	1.61	0-0267
920	3.55	34.254	-102	(-.1)	-147	2.31	1.44	0-0270
1010	3.73	34.271	-119	(-.1)	-163	2.31	1.42	0-0271
1717	2.22	34.557	-188	(-.1)	-229	2.32	1.32	0-0272
2030	2.49	34.623	-171	(-.1)	-212	2.32	1.34	0-0273
3460	1.56	34.598	-173	(-.1)	-214	2.33	1.35	0-0274
Station: VICTOR								
Date: 3/19/70			34.0°N	164.1°E				
0	13.72	32.556	140	-.9	86	2.09	1.65	0-0282
130	14.02	32.833	148	(-.1)	91	2.02	1.60	0-0283
275	12.26	34.453	138	(-.1)	81	2.11	1.66	0-0284
330	10.14	34.281	49	.5	-4	2.14	1.55	0-0285
440	9.66	34.270	92	(-.1)	38	2.12	1.60	0-0286
500	6.09	33.988	29	(-.1)	-22	2.20	1.57	0-0287
605	5.30	34.033	-15	-.6	-63	2.24	1.53	0-0288



TABLE 4 (continued)  
Seawater samples from the Pacific Ocean Weather Stations

Depth (m)	Temp (°C)	Salinity (0/00)	$\delta^{14}\text{C}$	$\delta^{13}\text{C}$	$\Delta^{14}\text{C}$	$\sum \text{CO}_2$ (mM)	$^{14}\text{C}$ at/L ( $\times 10^{-3}$ )	UW no.
Station: VICTOR Date: 5/31/71			34.0°N 164.1°E					
0			132	(-.1)	76			0-0369
30			152	(-.1)	95			0-0370
69			100	(-.1)	45			0-0371
150			-25	(-.1)	-73			0-0372
299			-12	(-.1)	-62			0-0373
1300			-176	(-.1)	-217			0-0374
1995			-218	(-.1)	-257			0-0375
2975			-216	(-.1)	-255			0-0376
Station: VICTOR Date: 8/3/71			34.0°N 164.1°E					
10	25.4		126	1.3	67	1.98	1.53	0-0484
102	14.2		69	(-.1)	16	2.06	1.52	0-0485
210	11.6		6	(-.1)	-45	2.09	1.46	0-0486
311	8.5		2	(-.1)	-48	2.12	1.47	0-0487
414	6.9		18	(-.1)	-32	2.13	1.50	0-0488
520	5.6		-127	(-.1)	-170	2.20	1.34	0-0489
712	4.5		-146	-.7	-188	2.36	1.41	0-0490
1065	3.6		-165	(-.1)	-207	2.31	1.35	0-0491
2135	2.3		-209	(-.1)	-248	2.41	1.34	0-0492
3158	2.0		-180	(-.1)	-220	2.33	1.34	0-0493
4086	2.0		-196	-.8	-235	2.29	1.29	0-0494

TABLE 5  
Miscellaneous sea water samples from the Pacific Ocean

Depth (m)	Temp (°C)	Salinity (0/00)	$\delta^{14}\text{C}$	$\delta^{13}\text{C}$	$\Delta^{14}\text{C}$	$\sum \text{CO}_2$ (mM)	$^{14}\text{C}$ at/L ( $\times 10^{-3}$ )	UW no.
Date: 7/1/58			48.7° 130°W					
0			-14	(-.1)	-63			0-0059
2565			-168	(-.1)	-210			0-0037
Date: 7/4/58			49.2°N 135.1°W					
0	15.10	32.480	58	(-.1)	5			0-0038
Date: 7/5/58			49.2°N 136.1°W					
0	15.68	32.510	9	(-.1)	-41			0-0039
3850			-177	(-.1)	-21			0-0040
Date: 7/7/58			49.4°N 140.9°W					
3850			-182	(-.1)	-223			0-0041
Date: 7/8/58			49.7°N 144.7°W					
1000	2.81	34.410	-146	(-.1)	-188			0-0042
4150	1.53	34.700	-152	-.1	-194			0-0043

TABLE 5 (continued)  
 Miscellaneous sea water samples from the Pacific Ocean

Depth (m)	Temp (°C)	Salinity (0/00)	$\delta^{14}\text{C}$	$\delta^{13}\text{C}$	$\Delta^{14}\text{C}$	$\sum \text{CO}_2$ (mM)	$^{14}\text{C}$ at/L ( $\times 10^{-5}$ )	UW no.
Date: 7/10/58			47.1°N	146.7°W				
1000	2.89	34.410	-121	-.1	-165			0-0044
Date: 7/11/58			46.1°N	146.4°W				
1000	2.97	34.380	-167	(-.1)	-208			0-0045
Date: 7/12/58			44.8°N	146.5°W				
0	15.52	33.030	32	2.3	24			0-0046
4950	1.58	34.700	-180	(-.1)	-221			0-0047
Date: 7/14/58			41.3°N	143.6°W				
4500			-143	(-.1)	-185			0-0048
1000	3.11	34.350	-157	2.3	-203			0-0049
Date: 7/16/58			38.4°N	140.7°W				
0	19.47	33.380	44.6	(-.1)	- 8			0-0050
5000	1.56	34.700	-114	(-.1)	-158			0-0051
Date: 7/18/58			39.7°N	134.8°W				
1100	2.92	34.470	-149	(-.1)	-192			0-0052
0	19.12	33.440	24	(-.1)	- 27			0-0053
Date: 7/20/58			40.6°N	132.4°W				
3700	1.55	34.680	-174	-.1	-215			0-0054
Date: 7/21/58			40.1°N	130.7°W				
3700			-156	(-.1)	-198			0-0055
Date: 7/22/58			39.4°N	128.4°W				
0	16.91	32.890	24	(-.1)	- 27			0-0056
Date: 7/26/58			36.4°N	123.0°W				
0	16.45	33.060	20.0	(-.1)	- 31			0-0058
3350	1.58	34.690	-116	(-.1)	- 60			0-0057
Date: 5/5/65			47.7°N	127.3°W				
0			-221	1.3	157			0-0008
200			5	-.8	- 44			0-0009
Date: 6/30/65			48.5°N	133.1°W				
0			190	(-.1)	131			0-0010
50			190	1.8	126			0-0011
100			138	-.3	82			0-0012
150			41	-.3	- 11			0-0013
200			- 28	-.9	- 75			0-0014
250			- 46	-.1	- 93			0-0015

TABLE 5 (continued)  
Miscellaneous sea water samples from the Pacific Ocean

Depth (m)	Temp (°C)	Salinity (0/00)	$\delta^{14}\text{C}$	$\delta^{13}\text{C}$	$\Delta^{14}\text{C}$	$\sum \text{CO}_2$ (mM)	$^{14}\text{C}$ $\mu\text{g/L}$ ( $\times 10^{-3}$ )	UM no.
Date: 10/13/66			48.5°N	128.2°W				
7			14	(-.1)	- 35			0-0065
Date: 10/15/66			47.6°N	128.8°W				
3			44	1.5	- 11			0-0066
Date: 10/18/66			47.0°N	132.0°W				
0			244	.8	180			0-0067
50	13.76	32.543	246	.9	182			0-0068
75	7.60		234	1.2	170			0-0069
100	6.33		208	(-.1)	148			0-0070
150	6.70	33.371	128	-.5	81			0-0071
200	6.62	33.819	14	.5	- 37			0-0072
250	6.04	33.877	- 25	-.4	78			0-0073
300	5.49	33.904	- 48	-.5	- 95			0-0074
350	5.07	33.933	- 70	(-.1)	-116			0-0075
Date: 10/21/66			47.0°N	132.0°W				
3			278	.9	212			0-0076
Date: 10/23/66			47.0°N	132.0°W				
280			- 44	(-.1)	- 88			0-0077
380	4.80	33.964	- 81	(-.1)	-127			0-0078
540	4.17	34.147	-112	-1.8	-153			0-0079
670			-101	-.6	-145			0-0080
Date: 10/27/66			47.0°N	132.0°W				
980	3.36	34.384	-142	-1.6	-182			0-0081
1360			-205	(-.1)	-245			0-0082
Date: 10/29/66			47.0°N	132.0°W				
3			246	1.3	181			0-0083
Date: 2/5/67			53.0°N	138.0°W				
0	5.50	32.600	196	(-.1)	137			0-0086
Date: 2/20/67			59.5°N	146.0°W				
0	4.10	32.400	95	(-.1)	40			0-0087
Date: 2/26/67			57.5°N	148.0°W				
0	3.80	32.500	172	(-.1)	114			0-0088
Date: 3/2/67			52.3°N	153.5°W				
0	3.30	32.700	164	(-.1)	106			0-0089
Date: 3/4/67			53.0°N	144.0°W				
0	3.70	32.700	157	(-.1)	100			0-0090

TABLE 5 (continued)  
Miscellaneous sea water samples from the Pacific Ocean

Depth (m)	Temp (°C)	Salinity (0/00)	$\delta^{14}\text{C}$	$\delta^{13}\text{C}$	$\Delta^{14}\text{C}$	$\sum \text{CO}_2$ (mM)	$^{14}\text{C}$ at/L ( $\times 10^{-9}$ )	UW no.
Date: 6/25/67								
			48.2°N	123.4°W				
5			- 22	(-.1)	- 71			0-0099
45			- 24	(-.1)	- 73			0-0098
90			- 12	(-.1)	- 62			0-0097
Date: 6/25/67								
			48.2°N	124.0°W				
5			- 3	-2.0	- 49			0-0094
80			1.3	(-.1)	- 48			0-0095
160			- 30	(-.1)	- 78			0-0096
Date: 6/25/67								
			48.2°N	124.0°W				
5			- 4	-1.5	- 51			0-0091
100			4	(-.1)	- 46			0-0092
200			- 35	(-.1)	- 83			0-0093
Date: 11/14/67								
			48.2°N	124.0°W				
0			267	.9	201			0-0107
100			148	-.1	91			0-0108
200			6	-1.0	- 42			0-0109
300			- 21	-.4	- 69			0-0110
400			- 44	-.4	- 90			0-0111
Date: 1/22/68								
			14.0°N	102.2°W				
0	28.11	33.895	160	.1	102			0-1564
50	27.95	33.889	130	-.8	75			0-1565
100	20.38	34.270	60	-.9	9			0-1566
150	14.74	34.776	- 15	-1.7	- 61			0-1567
200	12.63	34.838	- 30	.4	- 79			0-1568
300	11.53	34.776	- 9	-.6	- 57			0-1569
500	8.66	34.623	- 40	-1.9	- 84			0-1570
2000	2.30	34.636	-175	-1.8	-213			0-1571
Date: 2/2/68								
			10.0°N	90.3°W				
0	23.89	34.499	- 6	-1.8	- 53			0-1572
50	14.47	34.869	- 4	-1.1	- 51			0-1573
100	13.31	34.888	- 10	-1.3	- 57			0-1574
150	12.83	34.865	- 20	-2.0	- 66			0-1575
200	12.52	34.815	- 4	-2.8	- 48			0-1576
300	10.95	34.755	- 26	-.9	- 70			0-1577
500	8.21	34.628	- 82	-1.0	-126			0-1578
1000	4.80	34.573	-110	-.6	-152			0-1579
2000			-164	-.9	-204			0-1580
3000			-188	(-.1)	-228			0-1581
Date: 1/1/69								
			16.3°S	75.3°W				
0			94	1.4	37			0-0476
50			128	(-.1)	72			0-0477
100			3	(-.1)	- 47			0-0478
500			- 21	-.5	- 69			0-0479
3000			-198	(-.1)	-238			0-0481
4000			-148	(-.1)	-191			0-0482
5500			-149	-.1	-191			0-0483

TABLE 5 (continued)  
Miscellaneous sea water samples from the Pacific Ocean

Depth (m)	Temp (°C)	Salinity (0/00)	$\delta^{14}\text{C}$	$\delta^{13}\text{C}$	$\Delta^{14}\text{C}$	$\Sigma \text{CO}_2$ (mM)	$^{14}\text{C}$ at/L ( $\times 10^{-3}$ )	UW no.
Date: 3/8/69			9.0°N	89.0°W				
200			- 16	(-.1)	- 65			0-0277
300			2	(-.1)	- 48			0-0279
400			- 41	(-.1)	- 89			0-0280
600			- 64	(-.1)	-110			0-0281
Date: 6/21/69			47.0°N	130.7°W				
50			300	(-.1)	236			0-0507
100			246	(-.1)	184			0-0508
200			10	(-.1)	- 40			0-0509
300			- 36	(-.1)	- 84			0-0510
400			- 77	(-.1)	-123			0-0511
500			- 24	(-.1)	- 73			0-0512
600			- 58	(-.1)	-105			0-0513
Date: 3/16/70			39.0°S	105.2°W				
0			232	.7	169	2.00	1.69	0-0305
50			210	(-.1)	150	2.03	1.68	0-0306
100			193	(-.1)	134	2.02	1.66	0-0307
200			88	(-.1)	34	2.05	1.55	0-0308
300			9	(-.1)	- 41	2.15	1.50	0-0309
500			19	(-.1)	- 31	2.16	1.53	0-0310
750			- 34	(-.1)	- 82	2.14	1.44	0-0311
1000			- 70	2.7	-122	2.25	1.46	0-0312
1500			-122	(-.1)	-166	2.29	1.41	0-0313
2000			-131	(-.1)	-175	2.28	1.38	0-0314
2400			-141	(-.1)	-184	2.29	1.37	0-0315
Date: 2/23/72			9.0°N	110.0°W				
0			178	2.6	114	1.95	1.58	0-0524
100			- 38	-.6	- 85	2.34	1.56	0-0525
500			- 71	-.1	-117	2.39	1.54	0-0526
1000			-135	1.1	-180	2.43	1.46	0-0527

TABLE 5 (continued)  
Miscellaneous sea water samples from the Pacific Ocean

Depth (m)	Temp (°C)	Salinity (0/00)	$\delta^{14}\text{C}$	$\delta^{13}\text{C}$	$\Delta^{14}\text{C}$	$\sum \text{CO}_2$ (mM)	$^{14}\text{C}$ at/L ( $\times 10^{-2}$ )	UW no.
CRUISE: PIQUERO III								
Station: Drake's Passage			57.8°S	65.4°W				
Date: 1/25/69								
0	6.50	34.087	50	(.1)	-2			OE-0218
94	4.19	34.176	51	(-.1)	-1			OE-0219
195	3.89	34.180	15	(-.1)	-36			OE-0220
1986	1.94	34.712	-116	(-.1)	-160			OE-0221
3930	1.02	34.719	-96	(-.1)	-141			OE-0222
CRUISE: ARIES - 2								
Station: ST 24(MIS)			59.3°S	166.3°E				
Date: 1/27/71								
0			85	.9	29			O-0463
811	2.41	34.570	-86	-.9	-131	2.25	1.43	O-0465
1208	2.20	34.690	-59	(-.1)	-106	2.25	1.47	O-0466
2375	1.36	24.732	-124	(-.1)	-167	2.24	1.39	O-0468
4368	0.54	34.707	-100	(-.1)	-145			O-0469
CRUISE: ROSS SEA								
Station: S-A1 (MIS)			71.70°S	173.3°E				
Date: 2/11/74								
0			-31	-.6	-78	2.21	1.49	O-0888
100			-58	(-.1)	-105	2.19	1.43	O-0889
200			-80	(-.1)	-126	2.26	1.44	O-0890
300			-102	-.9	-145	2.27	1.42	O-0891
400			-98	-1.0	-141	2.29	1.44	O-0892
500			-95	-1.0	-138	2.27	1.43	O-0893
700			-84	-.9	-128	2.27	1.45	O-0894
1000			-103	.2	-148	2.28	1.42	O-0895
1500			-113	1.1	-160	2.26	1.40	O-0896

TABLE 6  
Air and sea water samples collected by NOAA ship OCEANOGRAPHER on a circumnavigation

Depth (m)	Temp (°C)	Salinity (0/00)	$\delta^{14}\text{C}$	$\delta^{13}\text{C}$	$\Delta^{14}\text{C}$	$\sum \text{CO}_2$ (mM)	$^{14}\text{C}$ at/L ( $\times 10^{-2}$ )	UW no.
Station:			32.9°N	71.9°W				
Date: 4/2/67								
0			168	.1	109			00-0001
Station:			34.9°N	59.4°W				
Date: 4/4/67								
0			162	1.0	102			00-0002
Station:			34.9°N	43.9°W				
Date: 4/6/67								
0			194	-.1	134			00-0003

TABLE 6 (continued)  
Air and sea water samples collected by NOAA ship *OCEANOGRAPHER*

Depth (m)	Temp (°C)	Salinity (0/00)	$\delta^{14}\text{C}$	$\delta^{13}\text{C}$	$\Delta^{14}\text{C}$	$\sum \text{CO}_2$ (mM)	$^{14}\text{C}$ at/L ( $\times 10^{-3}$ )	UW no.
Station: Date: 4/14/67			38.0°N	28.5°W				
0			221	.2	159			00-0004
Station: Date: 4/26/67			36.7°N	08.7°W				
			197	(.1)	138			00-0005
Station: Date: 5/18/67			32.9°N	30.8°E				
Air			743	-9.7	690			00-0006
Station: Date: 6/18/67			18.8°N	65.3°E				
0			176	.3	117			00-0007
Station: Date: 6/18/67			18.8°N	65.3°E				
Air			697	(-10)	46			00-0008
Station: Date: 7/1/67			11.1°N	71.6°E				
0			212	(-.1)	152			
Station: Date: 7/2/67			08.7°N	74.1°E				
0			177	(-.1)	118			00-0010
Station: Date: 7/4/67			05.6°N	82.1°E				
0			163	(-.1)	105			00-0011
Station: Date: 7/6/67			05.1°N	90.4°E				
0			191	(-.1)	132			00-0012
Station: Date: 8/10/67			00.4°S	107.0°E				
Air			695	(-10)	644			00-0014
Station: Date: 8/11/67			04.2°S	110.4°E				
0			179	(-.1)	120			00-0015
Station: Date: 8/15/67			13.2°S	114.1°E				
Air			648	(-10)	599			00-0017

TABLE 6 (continued)  
Air and sea water samples collected by NOAA ship *OCEANOGRAPHER*

Depth (m)	Temp (°C)	Salinity (0/00)	$\delta^{14}\text{C}$	$\delta^{13}\text{C}$	$\Delta^{14}\text{C}$	$\sum \text{CO}_2$ (mM)	$^{14}\text{C}$ at/L ( $\times 10^{-5}$ )	UW no.
Station:			13.2°S	114.1°E				
Date:	8/16/67							
57			169	(-.1)	111			00-0019
100			165	(-.1)	107			00-0020
165			71	(-.1)	18			00-0022
Station:			35.0°S	112.5°E				
Date:	8/30/67							
Air			686	(-10)	635			00-0023
Station:			34.8°S	122.0°E				
Date:	9/1/67							
0			163	(-.1)	105			
Station:			36.5°S	136.5°E				
Date:	9/7/67							
0			180	(-.1)	121			00-0025
Station:			43.0°S	145.2°E				
Date:	9/10/67							
0			185	(-.1)	126			00-0026
Station:			43.1°S	142.2°E				
Date:	9/10/67							
Air			645	(-10)	596			00-0027
Station:			33.5°S	163.1°E				
Date:	9/28/67							
850			142	(-.1)	86			00-0028
Station:			37.9°S	179.5°E				
Date:	10/12/67							
0			125	(-.1)	69			00-0029
Station:			35.0°S	165.0°W				
Date:	10/15/67							
Air			670	(-10)	620			00-0031
Station:			34.6°S	149.8°W				
Date:	10/18/67							
0			204	(-.1)	144			00-0032
Station:			35.0°S	134.2°W				
Date:	10/20/67							
0			182	(-.1)	124			00-0033



TABLE 6 (continued)  
Air and sea water samples collected by NOAA ship *OCEANOGRAPHER*

Depth (m)	Temp (°C)	Salinity (0/00)	$\delta^{14}\text{C}$	$\delta^{13}\text{C}$	$\Delta^{14}\text{C}$	$\sum \text{CO}_2$ (mM)	$^{14}\text{C}$ at/L ( $\times 10^{-9}$ )	UW no.
Station: Date: 10/21/67			35.1°S	130.2°W				
0			253	(-.1)	191			00-0040
50			187	(-.1)	128			00-0039
100			215	(-.1)	154			00-0038
150			216	(-.1)	155			00-0037
200			155	(-.1)	98			00-0036
250			89	(-.1)	35			00-0035
300			81	(-.1)	27			00-0034
Station: Date: 10/23/67			35.0°S	118.9°W				
0			219	(-.1)	158			00-0041
Station: Date: 10/24/67			34.9°S	110.0°W				
Air			663	(-10)	614			00-0042
Station: Date: 10/25/67			34.2°S	104.8°W				
0			207	(-.1)	147			00-0043
Station: Date: 10/29/67			32.9°S	75.3°W				
0			205	(-.1)	145			00-0044
Station: Date: 11/15/67			12.0°S	84.9°W				
Air			675	(-10)	625			00-0046
0			214	(-.1)	154			00-0045
Station: Date: 11/17/67			05.4°S	84.9°W				
0			264	(-.1)	202			00-0047
Station: Date: 11/21/67			02.9°S	92.0°W				
Air			681	(-10)	630			00-0049
Station: Date: 11/26/67			11.2°N	92.0°W				
0			180	(-.1)	121			00-0050
Station: Date: 11/30/67			21.4°N	108.4°W				
0			235	(-.1)	173			00-0051
Air			692	(-10)	641			
Station: Date: 12/5/67			33.6°N	120.8°W				
0			222	(-.1)	161			00-0053

TABLE 7

Surface sea water samples from the Atlantic and Pacific Oceans collected by RV THOMAS THOMPSON

Depth (m)	Temp (°C)	Salinity (O/CO)	$\delta^{14}\text{C}$	$\delta^{13}\text{C}$	$\Delta^{14}\text{C}$	$\Sigma \text{CO}_2$ (mM)	$^{14}\text{C}$ at/L ( $\times 10^{-9}$ )	UW no.
CRUISE: THOMAS THOMPSON - 010								
Station: S-001			38.7°N	71.0°W				
Date: 10/9/65								
0			265	(-.1)	202			0-0028
Station: S-002			20.8°N	73.6°W				
Date: 10/14/65								
0			282	(-.1)	218			0-0035
Station: S-003			11.2°N	80.0°W				
Date: 11/25/65								
0			299	.9	232			0-0029
Station: S-004			07.8°N	84.2°W				
Date: 11/28/65								
0			232	(-.1)	171			00-0030
Station: S-005			15.3°N	99.6°W				
Date: 12/2/65								
0			272	(-.1)	210			00-0031
Station: S-006			33.0°N	117.3°W				
Date: 12/10/65								
0			240	(-.1)	178			00-0032
Station: S-007			39.1°N	123.9°W				
Date: 12/12/65								
0			284	(-.1)	220			00-0033
Station: S-008			42.8°N	124.8°W				
Date: 12/13/65								
0			223	(-.1)	162			00-0034

TABLE 8

Sea water samples from the Pacific Ocean collected by RV *ELTANIN*  
on Cruises 36, 38, 39 and 43

Depth (m)	Temp (°C)	Salinity (0/00)	$\delta^{14}\text{C}$	$\delta^{13}\text{C}$	$\Delta^{14}\text{C}$	$\sum \text{CO}_2$ (mM)	$^{14}\text{C}$ at/L ( $\times 10^{-12}$ )	UW no.
CRUISE: ELTANIN-36								
Station: EL36/00-01-0000			40.0°S	140.0°E				
Date: 10/20/68								
Air			610	(-10)	561			OE-0001
0			170	(-1)	112			OE-0002
Station: EL36/07-02-0896			49.1°S	140.0°E				
Date: 10/26/68								
0	6.91	34.367	93	(-1)	38			OE-0003
75	6.87	34.346	94	(-1)	40			OE-0004
175	5.44	34.168	97	(-1)	42			OE-0005
700	4.20	34.326	-35	(-1)	-83			OE-0007
1000	3.11	34.380	-60	(-1)	-107			OE-0008
2000	2.30	34.714	-40	(-1)	-88			OE-0009
Station: EL36/16-03-0910			61.8°S	140.0°E				
Date: 11/3/68								
Air			610	(-10)	561			OE-0020
0	-1.63	33.958	56	(-1)		2.16	1.58	OE-0011
100	-1.23	34.167	-12	(-1)	-62	2.21	1.51	OE-0012
300	1.89	34.642	-69	(-1)	-116	2.27	1.47	OE-0013
500	1.96	34.711	-86	(-1)	-131	2.25	1.43	OE-0014
700	1.84	34.740	-83	(-1)	-128	2.25	1.43	OE-0015
1000	1.65	34.749	-96	(-1)	-141	2.23	1.40	OE-0016
2000	0.81	34.717	-96	(-1)	-141	2.27	1.43	OE-0017
3000	0.22	34.691	-101	(-1)	-146	2.27	1.42	OE-0018
4000	-0.18	34.683	-97	(-1)	-142	2.25	1.41	OE-0019
Station: EL36/32-04-0935			44.0°S	155.0°E				
Date: 11/21/68								
0			130	.8	72			OE-0021
100	11.27	34.880	122	(-1)	66			OE-0022
300	9.64	34.748	125	(-1)	69			OE-0023
500	8.80	34.636	65	(-1)	12			OE-0024
1000	5.55	34.423	-6	(-1)	-56			OE-0026
3000	1.84	34.616	-97	(-1)	-142			OE-0028
Station: EL36/35-05-0938			50.0°S	155.0°E				
Date: 11/25/68								
0	8.90	34.655	86	(-1)	32			OE-0030
100	8.88	34.623	90	(-1)	36			OE-0031
500	8.09	34.576	68	(-1)	15			OE-0032
1000	6.62	34.411	36	(-1)	-16			OE-0034

TABLE 8 (continued)

Sea water samples from the Pacific Ocean collected by RV *ELTANIN*

Depth (m)	Temp (°C)	Salinity (0/00)	$\delta^{14}\text{C}$	$\delta^{13}\text{C}$	$\Delta^{14}\text{C}$	$\Sigma \text{CO}_2$ (mM)	$^{14}\text{C}$ at/L ( $\times 10^{-3}$ )	UW no.
Station: EL36/35-05-0938 Date: 11/25/80			49.8°S	155.0°E				
1500	3.05	34.434	-62	(-.1)	-108			OE-0035
2000	2.40	34.642	-60	(-.1)	-106			OE-0036
3000	1.74	34.760	-72	.9	-120			OE-0037
Station: EL36/45-06-0951 Date: 12/3/68			62.7°S	154.9°E				
Air			609	(-10)	560			OE-0046
0	1.56	33.999	159	1.4	98			OE-0038
100	-0.58	34.370	82	(-.1)	28			OE-0039
300	1.63	34.721	53	(-.1)	0			OE-0040
500	1.49	34.737	-46	(-.1)	-94			OE-0041
700	-0.74	34.740	-70	(-.1)	-116			OE-0042
1000	1.00	34.728	-7	(-.1)	-56			OE-0043
2000	0.37	34.697	-50	(-.1)	-98			OE-0044
Station: EL36/54-07-0966 Date: 12/12/68			50.0°S	168.2°E				
0	9.35	34.380	126	0	69			OE-0047
300	7.62	34.435	164	-.2	106			OE-0049
500	6.94	34.396	104	-.8	50			OE-0050
Station: EL36/55-08-0000 Date: 12/15/68			42.0°S	176.0°E				
0			144	.2	86			OE-0051
100	13.69	35.196	139	(-.1)	82			OE-0052
500	9.44	34.772	52	(-.1)	0			OE-0053
1000	5.34	34.478	0	(-.1)	-50			OE-0054
1500	3.14	34.567	-89	(-.1)	-135			OE-0055
2000	2.22	34.652	-102	(-.1)	-147			OE-0056
2500	1.80	34.709	-56	-.4	-102			OE-0057
CRUISE: ELTANIN-38								
Station: EL38/07-01-0002 Date: 3/29/69			64.2°S	150.0°E				
100	1.40	34.617	-93	.2	-139			OE-0179
150	1.58	34.654	-81	(-.1)	-127			OE-0180
190	1.68	34.731	-98	(-.1)	-143			OE-0181
400	1.72	34.809	-93	(-.1)	-138			OE-0182
470	1.68	34.804	-84	(-.1)	-130			OE-0183
980	1.24	34.772	-54	-1.3	-99			OE-0184
Station: EL38/08-02-0007 Date: 4/5/69			62.0°S	150.0°E				
0	0.37	33.912	109	-.8	55			OE-0185
300	1.98	34.624	-58	(-.1)	-105			OE-0186
1000	1.65	34.729	-46	-.2	-93			OE-0187
1500	1.13	34.733	-90	(-.1)	-136			OE-0188
2000	0.95	34.706	-79	(-.1)	-125			OE-0189

TABLE 8 (continued)

Sea water samples from the Pacific Ocean collected by RV *ELTANIN*

Depth (m)	Temp (°C)	Salinity (0/00)	$\delta^{14}\text{C}$	$\delta^{13}\text{C}$	$\Delta^{14}\text{C}$	$\Sigma \text{CO}_2$ (mM)	$^{14}\text{C}$ a.t./l. ( $\times 10^{-9}$ )	UW no.
Station: EL38/09-03-0009 Date: 4/20/69			57.3°S	149.5°E				
50	3.59	34.875	28	.6	-25			OE-0190
150	-0.34	34.374	-36	(-.1)	-84			OE-0191
1000	1.98	34.718	-82	(-.1)	-128			OE-0193
1460	1.58	34.772	-89	(-.1)	-134			OE-0194
1940	1.08	34.714	-103	(-.1)	-148			OE-0195
3200	0.39	34.695	-99	2.2	-148	2.21	1.38	OE-0196
Station: EL38/10-04-0012 Date: 4/22/69			54.0°S	151.5°E				
1000	2.53	34.564	-57	(-.1)	-104			OE-0197
1920	1.92	34.747	-82	(-.1)	-127			OE-0198
3900	0.74	34.697	-96	1.6	-144			OE-0199
Station: EL38/11-05-0014 Date: 4/26/69			49.7°S	152.5°E				
50	9.53	34.304	121	1.2	63			OE-0200
100	9.22	34.547	110	(-.1)	55	2.13	1.63	OE-0201
145	8.53	34.562	75	(-.1)	22	2.11	1.57	OE-0202
210	8.77	34.633	69	(-.1)	15	2.10	1.55	OE-0203
320	8.54	34.599	80	(-.1)	26	2.13	1.59	OE-0204
400	7.94	34.528	83	(-.1)	29			OE-0205
510	7.40	34.464	45	(-.1)	-7	2.09	1.51	OE-0206
1000	3.76	34.342	-28	1.4	-79	2.15	1.45	OE-0207
3100	1.40	34.726	-77	(-.1)	-123	2.25	1.44	OE-0209
4200	0.89	34.702	-104	.0	-148	2.22	1.38	OE-0210
Station: EL38/12-06-0019 Date: 5/8/69			40.0°S	152.0°E				
50	15.87	35.333	351	(-.1)	284	2.02	1.87	OE-0091
195	11.95	35.130	173	(-.1)	114	2.06	1.66	OE-0092
480	8.55	34.645	18	(-.1)	-33	2.12	1.49	OE-0093
1000	4.92	34.433	-40	(-.1)	-87	2.18	1.45	OE-0094
3050	1.57	34.726	-113	(-.1)	-157	2.22	1.37	OE-0095
3920	1.15	34.715	-118	(-.1)	-162	2.24	1.38	OE-0096
4600	1.12	34.717	-109	(-.1)	-153	2.27	1.41	OE-0097
CRUISE: ELTANIN-39								
Station: Date: 6/24/69			41.0°S	126.0°E				
0			139.5	(-.1)	83			OE-0165
Station: Date: 6/24/69			42.0°S	126.0°E				
0			123	(-.1)	67			OE-0166
Station: Date: 6/25/69			43.0°S	126.0°E				
			136	(-.1)	79			OE-0167

TABLE 8 (continued)  
Sea water samples from the Pacific Ocean collected by RV *ELTANIN*

Depth (m)	Temp (°C)	Salinity (0/00)	$\delta^{14}\text{C}$	$\delta^{13}\text{C}$	$\Delta^{14}\text{C}$	$\Sigma \text{CO}_2$ (mM)	$^{14}\text{C}$ $\frac{\text{at}}{\text{L}}$ ( $\times 10^{-5}$ )	UW no.
Station: 45.0°S 126.0°E								
Date: 6/25/69								
0			203	(-.1)	143			OE-0169
Station: 46.0°S 126.0°E								
Date: 6/26/69								
0	10.40		157	(-.1)	100			OE-0098 OE-0099
Station: 47.0°S 126.0°E								
Date: 6/27/69								
0	9.50		117	(-.1)	62			OE-0100
Station: 48.0°S 126.0°E								
Date: 6/27/69								
0			140	(-.1)	83			OE-0101
Station: 49.0°S 126.0°E								
Date: 6/28/69								
0			149	(-.1)	92			OE-0102
Station: 51.0°S 126.0°E								
Date: 6/29/69								
0			123	(-.1)	67			OE-0103
Station: 52.0°S 126.0°E								
Date: 7/1/69								
0	4.50		141	(-.1)	85			OE-0104
Station: 54.0°S 126.0°E								
Date: 7/2/69								
0			138	(-.1)	82			OE-0106
Station: 55.0°S 126.0°E								
Date: 7/3/69								
0	2.60		85	-1.2	34			OE-0107
Station: 56.0°S 126.0°E								
Date: 7/4/69								
0	2.50		108	(-.1)	53			OE-0108
Station: EL39/05-01-1138			40.0°S	126.0°E				
Date: 6/23/69								
0	12.00	34.753	145	(-.1)	88			OE-0109
100	11.90	34.765	165	(-.1)	107	2.07	1.66	OE-0171
200	9.49	34.718	100	(-.6)	46			OE-0172
300	9.01	34.674	80	.7	25			OE-0173
500	8.62	34.617	61	1.3	5	2.12	1.55	OE-0174
700	8.01	34.547	23	.6	-29			OE-0175
1000	5.32	34.396	-48	2.1	-100	2.16	1.42	OE-0176
2000	2.52	34.658	-64	.3	-111			OE-0177
3000	1.83	34.741	-110	-.4	-154	2.29	1.42	OE-0178

TABLE 8 (continued)

Sea water samples from the Pacific Ocean collected by RV *ELTANIN*

Depth (m)	Temp (°C)	Salinity (0/00)	$\delta^{14}\text{C}$	$\delta^{13}\text{C}$	$\Delta^{14}\text{C}$	$\sum \text{CO}_2$ (mM)	$^{14}\text{C}$ $\delta_{\text{org}}^{\text{org}}/\text{L}$ ( $\times 10^{-3}$ )	OW no.
Station: EL39/12-02-1150			50.0°S	126.0°E				
Date: 6/29/69								
0	7.14	34.045	136	(-.1)	80			OE-0119
100	7.34	34.058	143	(-.1)	86	2.09	1.65	OE-0255
200	9.35	34.630	103	1.8	44			OE-0256
300	7.82	34.383	102	1.6	43			OE-0257
500	6.77	34.453	-8	1.8	-61	2.15	1.47	OE-0258
700	4.84	34.349	-7	.6	-58			OE-0259
1000	3.10	34.351	-42	.2	-91	2.24	1.48	OE-0260
2000	2.22	34.727	-93	.4	-139			OE-0261
2800	1.58	34.750	-97	.3	-143	2.26	1.42	OE-0262
Station: EL39/16-03-1161			57.8°S	126.5°E				
Date: 7/5/69								
0	1.34	33.829	103	(-.1)	48			OE-0128
100	1.39	34.835	94	1.3	37	2.16	1.63	OE-0211
200	1.36	34.212	37	(-1.1)	-14			OE-0212
540	2.23	34.597	-86	(-.1)	-132	2.28	1.45	OE-0213
1000	2.05	34.727	-106	.3	-151			OE-0214
2000	1.25	34.737	-70	(-.1)	-116	2.30	1.49	OE-0215
3000	0.49	34.737	-105	(-.1)	-150			OE-0216
4000	0.07	34.682	-118	.1	-162			OE-0217
Station: EL39/20-04-1164			52.0°S	134.0°E				
Date: 7/10/69								
0	6.35	34.093	144	(-.1)	87			OE-0218
100	6.37	34.097	138	(-.1)	82	2.12	1.66	OE-0219
200	7.07	34.288	85	(-.1)	31			OE-0220
500	5.20	34.319	-25	(-.1)	-73	2.18	1.47	OE-0221
700	3.85	34.308	-61	(-.1)	-108			OE-0222
1000	3.02	34.424	-88	-.9	-132			OE-0223
2000	2.22	34.707	-67	(-.1)	-113	2.26	1.47	OE-0224
2800	1.47	34.742	-117	-.7	-160			OE-0225
Station: EL39/25-05-1168			42.0°S	142.5°E				
Date: 7/18/69								
0	9.90	34.701	120	1.0	62			OE-0226
100	9.83	34.700	133	(-.1)	77	2.10	1.64	OE-0227
200	9.84	34.701	109	(-.1)	54			OE-0228
300	8.68	34.647	43	(-.1)	-9			OE-0229
500	7.14	34.470	-3	(-.1)	-53	2.16	1.49	OE-0230
700	5.40	34.400	-48	(-.1)	-96			OE-0231
1100	3.43	34.411	-78	-.7	-122			OE-0232
2000	2.30	34.710	-102	(-.1)	-147	2.26	1.41	OE-0233
3000	1.70	34.744	-121	(-.1)	-165			OE-0234
4000	1.07	34.719	-102	-.9	-146			OE-0235
Station: EL39/37-06-1169			40.8°S	154.6°E				
Date: 7/27/69								
0	15.33	35.520	97	(-.1)	43			OE-0155
100	13.69	35.286	89	(-.1)	35	2.11	1.58	OE-0156
200	12.09	35.069	144	(-.1)	86			OE-0157
300	10.98	34.950	99	(-.1)	44			OE-0158
500	9.24	34.704	33	(-.1)	-18	2.13	1.52	OE-0159
700	7.93	34.558	35	(-.1)	-16			OE-0160
1000	5.56	34.462	-44	(-.1)	-92			OE-0161
2000	2.45	34.653	-94	(-.1)	-139	2.28	1.44	OE-0162
3101	1.66	34.736	-95	(-.1)	-140			OE-0163
4000	1.21	34.725	-108	(-.1)	-152			OE-0164

TABLE 8 (continued)

Sea water samples from the Pacific Ocean collected by RV *ELTANIN*

Depth (m)	Temp (°C)	Salinity (0/00)	$\delta^{14}\text{C}$	$\delta^{13}\text{C}$	$\Delta^{14}\text{C}$	$\sum \text{CO}_2$ (mM)	$^{14}\text{C}$ at/L ( $\times 10^{-5}$ )	UW no.
CRUISE: ELTANIN-43								
Station: EL43/04-01-1181			64.0°S	76.9°W				
Date: 4/29/70								
Air			595	(-10)	547			OE-0170
100	-0.68	34.127	2	(-.1)	-48	2.19	1.52	OE-0237
200	1.13	34.372	-36	(-.1)	-84	2.25	1.51	OE-0238
300	1.49	34.459	-79	(-.1)	-125	2.22	1.42	OE-0239
500	2.04	34.607	-104	(-.1)	-148	2.28	1.42	OE-0241
700	2.02	34.668	-17	2.1	-71	2.29	1.55	OE-0242
2000	1.15	34.727	-42	2.0	-94	2.29	1.52	OE-0244
Station: EL43/08-SD-1185			62.5°S	92.8°W				
Date: 5/4/70								
4800	0.44	34.716	-108	-.6	-152	2.3	1.4	OE-0272
Station: EL43/09-02-1186			57.7°S	109.7°W				
Date: 5/9/70								
0	5.65	34.152	192	.5	132	2.16	1.77	OE-0245
100	5.68	34.152	126	(-.1)	70	2.13	1.66	OE-0246
200	5.43	34.223	106	(-.1)	51	2.16	1.65	OE-0247
300	5.03	34.230	79	(-.1)	25	2.15	1.60	OE-0248
400	4.60	34.192	20	(-.1)	-30	2.18	1.54	OE-0249
500	4.34	34.249	-12	(-.1)	-61	2.23	1.53	OE-0250
700	3.46	34.291	-51	(-.1)	-98	2.35	1.48	OE-0251
1000	2.76	34.423	-87	(-.1)	-132	2.32	1.47	OE-0252
2000	2.06	34.732	-80	(-.1)	-125	2.30	1.47	OE-0253
4200	0.74	34.716	-119	1.3	-165	2.34	1.43	OE-0254
Station: EL43/10-03-1187			52.6°S	119.8°W				
Date: 5/11/70								
0	6.62	34.185	138	1.7	77	2.14	1.67	OE-0263
100	6.62	34.241	96	(-.1)	42	2.13	1.61	OE-0264
200	6.56	34.310	94	(-.1)	40	2.15	1.63	OE-0265
300	5.99	34.293	81	(-.1)	27	2.15	1.61	OE-0266
400	5.68	34.284	39	(-.1)	-12	2.15	1.55	OE-0267
500	5.21	34.259	45	(-.1)	-7	2.18	1.58	OE-0268
700	4.46	34.309	-14	.9	-65	2.17	1.48	OE-0269
1000	3.20	34.368	-55	(-.1)	-102			OE-0270
2200	2.03	34.720	-115	-.5	-159	2.33	1.44	OE-0271
Station: EL43/11-04-1188			46.9°S	129.7°W				
Date: 5/13/70								
0	9.91	34.222	165	1.2	104	2.10	1.68	OE-0273
100	9.53	34.268	144	(-.1)	87	2.11	1.66	OE-0274
200	7.07	34.392	66	(-.1)	13	2.14	1.58	OE-0275
300	6.81	34.396	79	(-.1)	25	2.16	1.61	OE-0276
400	6.62	34.386	60	(-.1)	7	2.13	1.56	OE-0277
500	6.37	34.366	49	(-.1)	-3	2.17	1.58	OE-0278
1000	4.28	34.330	-44	.6	-93	2.24	1.50	OE-0280
2000	2.30	34.647	-97	(-.1)	-142	2.33	1.46	OE-0281
4500	1.29	34.720	-117	-.3	-161	2.34	1.44	OE-0282



TABLE 8 (continued)  
Sea water samples from the Pacific Ocean collected by RV *ELTANIN*

Depth (m)	Temp (°C)	Salinity (0/00)	$\delta^{14}\text{C}$	$\delta^{13}\text{C}$	$\Delta^{14}\text{C}$	$\sum \text{CO}_2$ (mM)	$^{14}\text{C}$ at/L ( $\times 10^{-3}$ )	UW no.
Station: EL43/14-05-1190			60.4°S	162.5°W				
Date: 5/24/70								
0	1.80	33.905	43	.7	-11	2.15	1.55	OE-0293
100	1.76	33.945	57	(-.1)	4	2.16	1.58	OE-0294
200	1.66	34.077	0	(-.1)	-50	2.14	1.48	OE-0295
300	2.05	34.243	-57	(-.1)	-104	2.19	1.43	OE-0296
400	2.30	34.363	-74	(-.1)	-120	2.24	1.44	OE-0297
500	2.33	34.459	-84	(-.1)	-130	2.32	1.48	OE-0298
700	2.34	34.584	-101	.6	-147	2.33	1.46	OE-0299
1000	2.21	34.689	-103	(-.1)	-148	2.26	1.41	OE-0300
3000	4.87	34.722	-125	.4	-170	2.30	1.40	OE-0301
Station: EL43/15-06-1191			54.8°S	175.1°W				
Date: 5/27/70								
0	6.56		80	(-.1)	26	2.13	1.59	OE-0283
100	6.50	34.176	102	1.5	44	2.13	1.62	OE-0284
200	5.97	34.291	86	(-.1)	32	2.14	1.60	OE-0285
300	5.03	34.197	56	(-.1)	3	2.16	1.58	OE-0286
400	5.10	34.257	-4	(-.1)	-54	2.18	1.50	OE-0287
500	4.58	34.271	-25	(-.1)	-73	2.23	1.51	OE-0288
700	3.63	34.286	-67	.4	-114	2.23	1.44	OE-0289
1000	2.80	34.356	-80	(-.1)	-126	2.22	1.42	OE-0290
2000	2.18	34.739	-104	(-.1)	-148	2.23	1.39	OE-0291
5218	0.89	34.712	-123	.5	-168	2.27	1.38	OE-0292

TABLE 9  
Sea water samples from the Indian Ocean collected by RV *Eltanin* on Cruise 48

Depth (m)	Temp (°C)	Salinity (0/00)	$\delta^{14}\text{C}$	$\delta^{13}\text{C}$	$\Delta^{14}\text{C}$	$\sum \text{CO}_2$ (mM)	$^{14}\text{C}$ at/L ( $\times 10^{-3}$ )	UW no.
Station: EL48/03-01-1325			41.0°S	100.0°E				
Date: 7/13/71								
0	10.43	34.796	135	1.0	76	2.08	1.62	OE-0311
100	10.47	34.795	140	1.1	80	2.06	1.62	OE-0312
200	10.47	34.775	114	(-.1)	59	2.09	1.61	OE-0313
300	10.19	34.813	101	(-.1)	46	2.11	1.60	OE-0314
500	9.76	34.777	76	2.8	16	2.13	1.57	OE-0315
700	8.82	34.659	49	(-.1)	-4	2.16	1.57	OE-0316
1015	5.73		20	.9	-33	2.20	1.55	OE-0317
2000	2.49	34.659	-91	1.7	-140	2.26	1.43	OE-0318
Station: EL48/04-H1-1326			38.9°S	97.9°E				
Date: 7/14/71								
1010	5.47	34.383	-46	(-.1)	-94	2.20	1.46	OE-0320
4110	2.32	34.714	-108	(-.1)	-152	2.30	1.43	OE-0321

TABLE 9 (continued)

Sea water samples from the Indian Ocean collected by RV *ELTANIN*

Depth (m)	Temp (°C)	Salinity (0/00)	$\delta^{14}\text{C}$	$\delta^{13}\text{C}$	$\Delta^{14}\text{C}$	$\Sigma \text{CO}_2$ (mM)	$^{14}\text{C}$ at/L ( $\times 10^{-3}$ )	UW no.
Station: EL48/06-02-1328			34.0°S	97.5°E				
Date: 7/16/71								
0	14.95	35.565	194	1.0	132	2.08	1.71	OE-0302
100	14.80	35.560	192	(-.1)	132	2.08	1.71	OE-0303
200	12.47	35.319	176	(-.1)	117	2.09	1.69	OE-0304
300	11.48	35.075	134	(-.1)	78	2.11	1.65	OE-0305
500	10.07	34.886	57	(-.1)	5	2.13	1.56	OE-0306
700	8.97	34.702	37	.6	-16	2.16	1.55	OE-0307
1010	5.74	34.413	-28	(-.1)	-76	2.20	1.48	OE-0308
2000	2.50	34.618	-114	(-.1)	-158	2.28	1.41	OE-0309
4250	1.02	34.716	-88	-.5	-133	2.30	1.46	OE-0310
Station: EL48/09-H2-1329			30.5°S	97.6°E				
Date: 7/18/71								
0	17.14	35.896	213	(-.1)	152	2.08	1.74	OE-0322
1010	4.66	34.390	-56	(-.1)	-103	2.20	1.44	OE-0323
3160	1.49	34.735	-120	(-.1)	-164	2.30	1.41	OE-0324
Station: EL48/12-03-1331			28.5°S	93.5°E				
Date: 7/21/71								
0	18.91	35.878	230	.4	168	2.08	1.86	OE-0328
100	18.91	35.878	260	.8	195	2.07	1.79	OE-0329
200	16.79	35.515	163	.6	103	2.09	1.67	OE-0330
300	13.89	35.382	155	1.0	95	2.11	1.67	OE-0331
500	10.99	34.958	90	.8	33	2.13	1.60	OE-0332
700	9.25	34.722	31	1.4	-24	2.13	1.52	OE-0333
1010	6.11	34.426	-47	-.2	-94	2.20	1.46	OE-0334
2000	2.35	34.721	-114	-.8	-157	2.29	1.42	OE-0335
3250	1.40	34.733	-116	-.8	-159	2.30	1.42	OE-0336
Station: EL48/10-H3-1330			28.5°S	97.6°E				
Date: 7/19/71								
0	18.91	35.761	208	(-.1)	147	2.08	1.73	OE-0325
1010	6.11	34.449	-59	(-.1)	-106	2.20	1.44	OE-0326
3950	1.29	34.724	-139	(-.1)	-182	2.30	1.38	OE-0327
Station: EL48/16-H4-1333			35.40°S	91.9°E				
Date: 7/24/71								
0	15.14	35.568	190	.4	130	2.08	1.70	OE-0337
1010	5.46	34.396	-32	.1	-81	2.20	1.48	OE-0338
3510	1.22	34.713	-98	.2	-143	2.30	1.44	OE-0339
Station: EL48/20-04-1334			39.9°S	85.4°E				
Date: 7/28/71								
0	11.74		112	(-1.)	57	2.08	1.60	OE-0340
100	11.72	34.986	139	2.6	76	2.11	1.65	OE-0341
200	11.76	34.987	115	(-.1)	60	2.11	1.62	OE-0342
300	11.51	34.991	106	(-.1)	51	2.11	1.61	OE-0343
500	10.83	34.881	103	(-.1)	48	2.13	1.62	OE-0344
700	10.00	34.806	49	.8	-5	2.11	1.53	OE-0345
1010	6.21	34.434	-38	(-.1)	-86	2.20	1.57	OE-0346
2000	2.60	34.643	-71	(-.1)	-117	2.27	1.47	OE-0347
3320	1.49	34.727	-113	-.6	-156	2.30	1.42	OE-0348

TABLE 9 (continued)

Sea water samples from the Indian Ocean collected by RV *ELTANIN*

Depth (m)	Temp (°C)	Salinity (0/00)	$\delta^{14}\text{C}$	$\delta^{13}\text{C}$	$\Delta^{14}\text{C}$	$\Sigma \text{CO}_2$ (mM)	$^{14}\text{C}$ at/L ( $\times 10^{-3}$ )	UW no.
Station: EL48/22-H5-1335 Date: 7/29/71								
0	12.39	35.063	137	-2	81	2.08	1.63	OE-0349
1010	5.07	34.358	-55	-1.6	-100	2.20	1.45	OE-0350
4360	1.34		-89	(-1)	-135	2.30	1.46	OE-0351
Station: EL48/30-H6-1337 Date: 8/1/71								
0	12.39	35.216	151	.6	92	2.08	1.65	OE-0352
1010	5.84	34.420	-26	(-1)	-75	2.20	1.48	OE-0353
2360	2.15	34.735	-97	1.6	-145	2.27	1.42	OE-0354
Station: EL48/32-05-1338 Date: 8/3/71								
0	13.30		167	2.0	104	2.08	1.66	OE-0356
100	13.09	35.102	154	(-1)	97	2.10	1.67	OE-0357
200	12.03	35.063	144	(-1)	87	2.10	1.66	OE-0358
300	11.59	35.008	114	(-1)	59	2.11	1.62	OE-0359
500	10.98	34.950	60	1.2	4	2.13	1.56	OE-0360
700	9.82	34.801	75	(-1)	21	2.15	1.59	OE-0361
1010	6.02	34.434	-44	(-1)	-92	2.20	1.46	OE-0362
2000	2.54	34.671	-94	(-1)	-140	2.27	1.43	OE-0363
3650	1.27	34.733	-99	.1	-144	2.30	1.44	OE-0364
Station: EL48/37-06-1339 Date: 8/5/71								
0	17.21	35.830	201	2.3	136	2.05	1.69	OE-0365
100	16.21	35.705	183	1.0	122	2.04	1.66	OE-0366
200	13.24	35.255	125	.8	67	2.08	1.61	OE-0367
300	11.69	35.025	108	1.9	48	2.11	1.61	OE-0368
500	10.65	34.930	69	.2	15	2.12	1.57	OE-0369
700	9.33	34.739	19	2.1	-36	2.13	1.49	OE-0370
1010	5.08	34.402	-44	1.8	-95	2.20	1.46	OE-0371
2000	2.46	34.713	-110	(-1)	-154	2.29	1.42	OE-0372
4150	1.34	34.721	-136	1.4	-181	2.30	1.38	OE-0373
Station: EL48/54-07-1343 Date: 8/14/71								
0	15.27	35.772	201	2.1	136	2.06	1.69	OE-0374
100	14.79	35.646	178	1.3	116	2.06	1.67	OE-0375
200	14.49	35.556	184	2.6	119	2.08	1.69	OE-0376
300	11.48	35.060	138	(-1)	81	2.10	1.65	OE-0377
500	9.27	34.726	76	(-1)	23	2.13	1.58	OE-0378
700	8.37	34.608	28	(-1)	-23	2.18	1.55	OE-0379
1010	4.18	34.409	-92	(-1)	-138	2.20	1.39	OE-0380
2000	2.56	34.651	-85	(-1)	-130	2.29	1.46	OE-0381
5100	1.01	34.715	-99	(-1)	-144	2.30	1.44	OE-0382