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# NATIONAL OCEANOGRAPHIC DATA CENTER

MANUAL SERIES

## OCEANOGRAPHIC CONVERSION TABLES FOR USE BY THE INTERNATIONAL INDIAN OCEAN EXPEDITION

PUBLICATION M-1

The National Oceanographic Data Center is sponsored by six government agencies having an interest in the marine environment; it is governed by an Advisory Board composed of representatives of these activities and the National Academy of Sciences. The U. S. Navy Hydrographic Office is assigned responsibility for management of the National Oceanographic Data Center.

The sponsoring agencies are:

ATOMIC ENERGY COMMISSION

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DEPARTMENT OF THE NAVY

NATIONAL SCIENCE FOUNDATION

WEATHER BUREAU

Printed by  
U. S. NAVY HYDROGRAPHIC OFFICE  
WASHINGTON 25, D. C.  
1962

Price 80 cents

FOREWORD

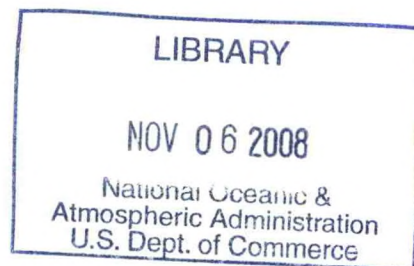
This publication contains tables of the standardized observational units and codes currently used in conjunction with the National Oceanographic Data Center's computer programs. These tables have been excerpted from NODC publication "Processing Physical and Chemical Data From Oceanographic Stations," Publication M-2. It is intended that through the use of these tables International Indian Ocean Expedition participants may make the fullest and most expeditious use of the processing facilities available at the Data Center. Copies of the sample form (page 105) and additional copies of this publication may be obtained by writing to the National Oceanographic Data Center, Washington 25, D. C.

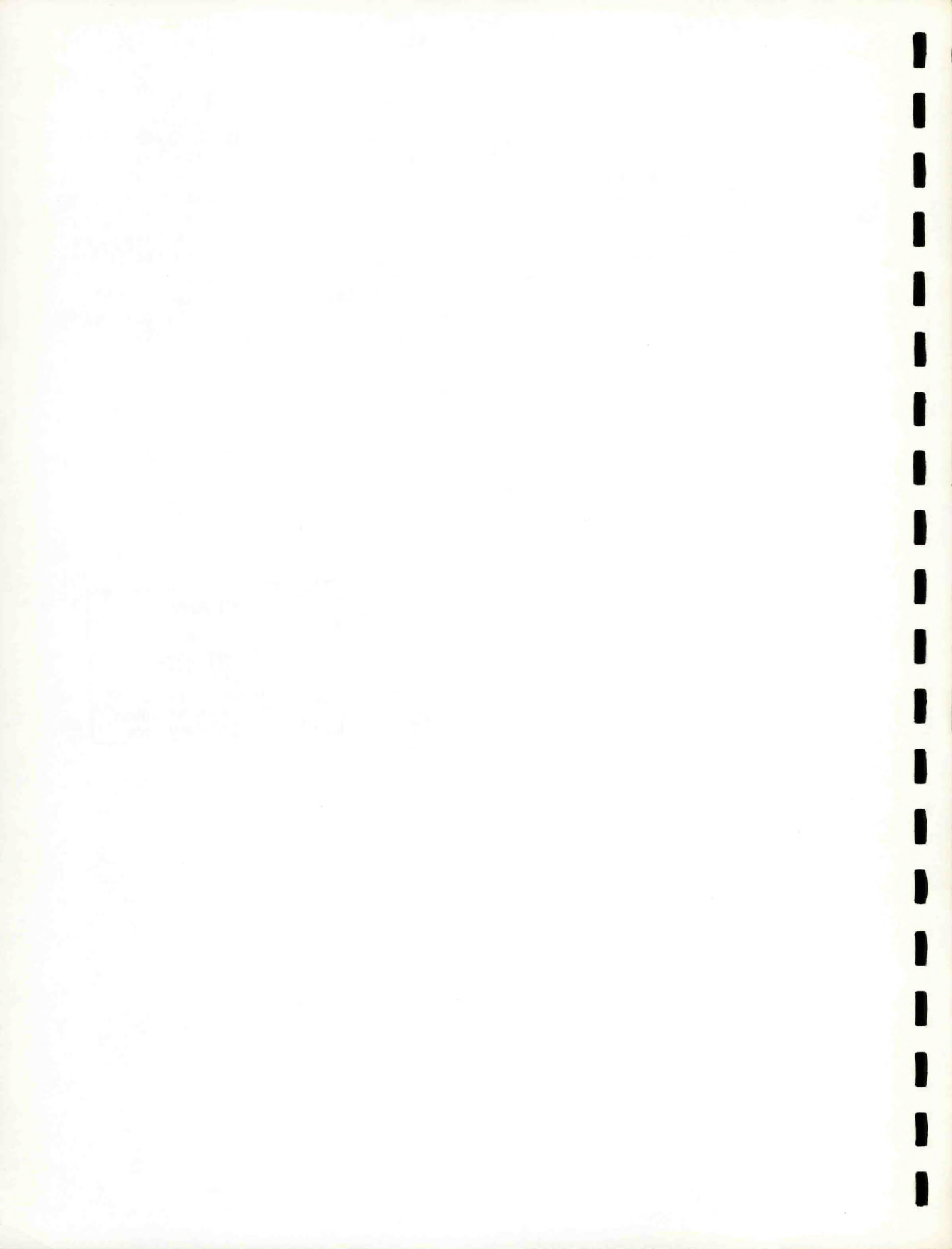
*W. C. Jacobs*

W. C. JACOBS

Director

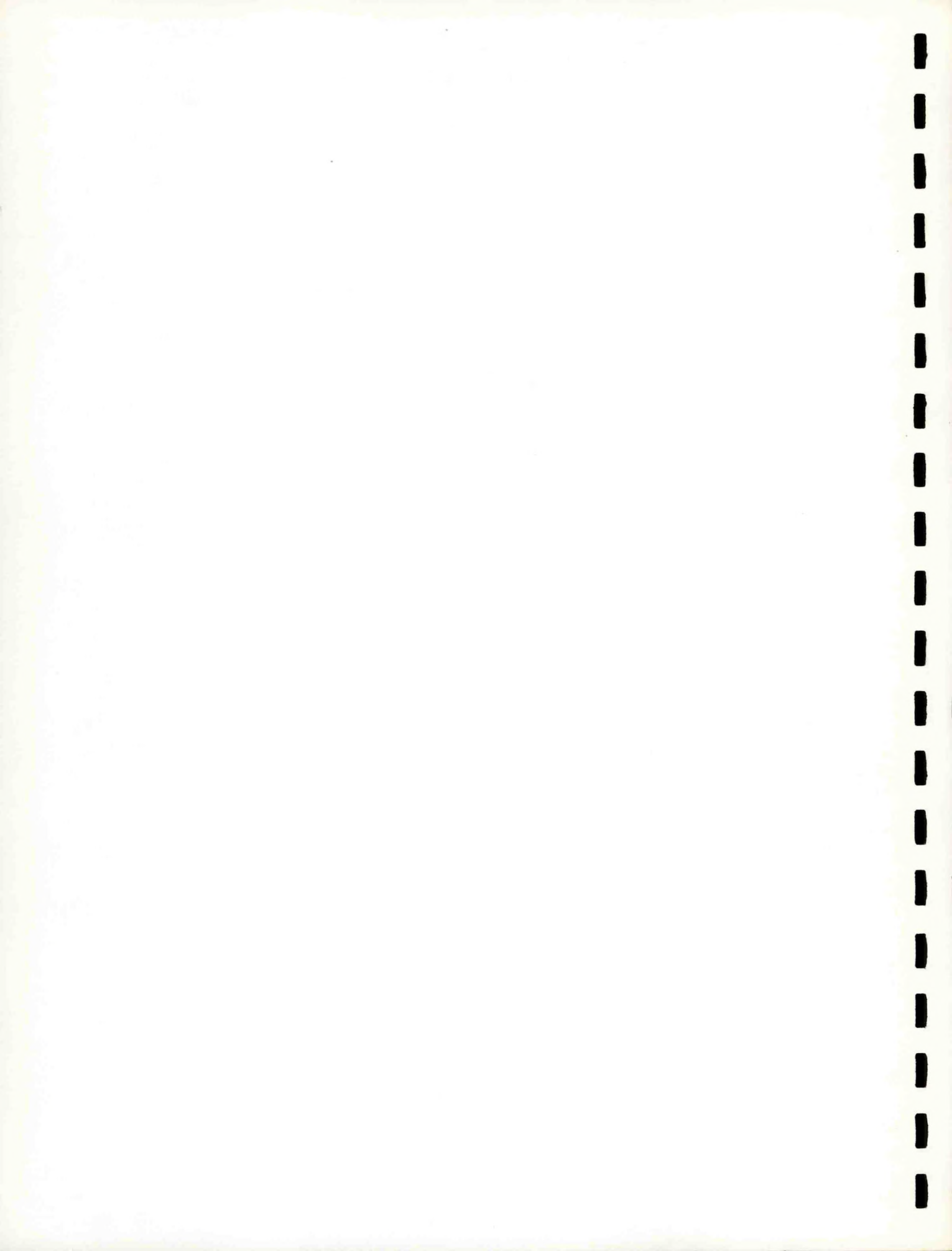
National Oceanographic Data Center





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## INTRODUCTION

As part of the United States' contribution to the International Indian Ocean Expedition, the processing facilities of the National Oceanographic Data Center (NODC) are made available to the Expedition so that the observed data and the interpolated and computed values may be furnished for publication at the earliest possible date. The processing and computing techniques currently used by NODC are geared to a set of standardized observational units and codes. In order to process these data efficiently for the oceanographic community, it is desirable that they be reported in the units or codes which are presently used and programmed for the NODC computers. Submission of data on the NODC Physical and Chemical Data Form for Oceanographic Stations, form NODC-EXP 3167/12 (2-62), and conversion to proper standard units or codes (described in a special tri-lingual table of units) will avoid time consuming delays during processing. (See Appendix I, page 105, for sample Physical and Chemical Data Form.) If the data from a particular cruise or group of stations can be supplied in this standard form, the processing to the publication listing stage can usually be completed in about three months. The publication listing will contain, in addition to the original observations, the following data: interpolated temperature, salinity,  $\sigma_t$ , oxygen, and sound velocity values at standard depths, and computed values of  $\sigma_t$ , sound velocity, specific volume anomaly, and dynamic depth anomaly. Most of these computations are based on formulas published in "The Oceans, Their Physics, Chemistry, and General Biology" by Sverdrup, Fleming, and Johnson.

During the processing of historical data by NODC, a great variety of observational units was encountered; tables were required to convert these units to a series of standard units or codes. These tables have been reproduced as a publication for the sole use of the International Indian Ocean Expedition participants.

TABLE 1

## Country Code

## International Geophysical Year (IGY) Code

<u>CODE</u>	<u>NAME</u>
01	Afghanistan
08	Argentina
09	Australia
10	Austria
11	Belgium
23	Belgian Congo
13	Bolivia
14	Brazil
84	British Caribbean Territories
83	British East African Territories and Indian Ocean Islands
85	British Malaya/Borneo Territories
82	British West African Territories
15	Bulgaria
12	Burma
16	Cambodia
18	Canada
19	Ceylon
20	Chile
21	China
22	Columbia
81	Czechoslovakia
26	Denmark
70	Dominican Republic
28	Ecuador
27	Egypt
75	El Salvador
32	Ethiopia
33	Federation of Rhodesia and Nyasaland
34	Finland
35	France
17	French Cameroons
02	French Equatorial Africa
30	French Oceania
25	French Somaliland
87	French Togoland
03	French West Africa

TABLE 1 (Cont'd)

<u>CODE</u>	<u>NAME</u>
06	Germany
36	Greece
37	Guatemala
38	Haiti
39	Hong Kong
40	Hungary
46	Iceland
41	India
42	Indonesia
44	Iran
43	Iraq
45	Ireland
47	Israel
48	Italy
49	Japan
50	Jordan
24	Korea
51	Laos
52	Lebanon
53	Libya
54	Luxembourg
55	Madagascar
56	Morocco
57	Mexico
64	Netherlands
07	Netherlands Antilles
60	Netherlands New Guinea
59	New Caledonia
61	New Zealand
58	Norway
62	Pakistan
63	Paraguay
72	People's Republic of Albania
65	Peru
66	Philippines
67	Poland
68	Portugal
05	Portuguese East Africa
04	Portuguese West Africa

TABLE 1 (Cont'd)

<u>CODE</u>	<u>NAME</u>
73	Romania
29	Spain
76	Sudan
79	Surinam
77	Sweden
78	Switzerland
80	Syria
86	Thailand
88	Tunisia
89	Turkey
91	Union of South Africa
90	Union of Soviet Socialist Republics
74	United Kingdom of Great Britain and Northern Ireland
31	United States of America
92	Uruguay
93	Venesuela
94	Viet-Nam
95	Yugoslavia

NOTE: 69 and 71 have not been assigned.

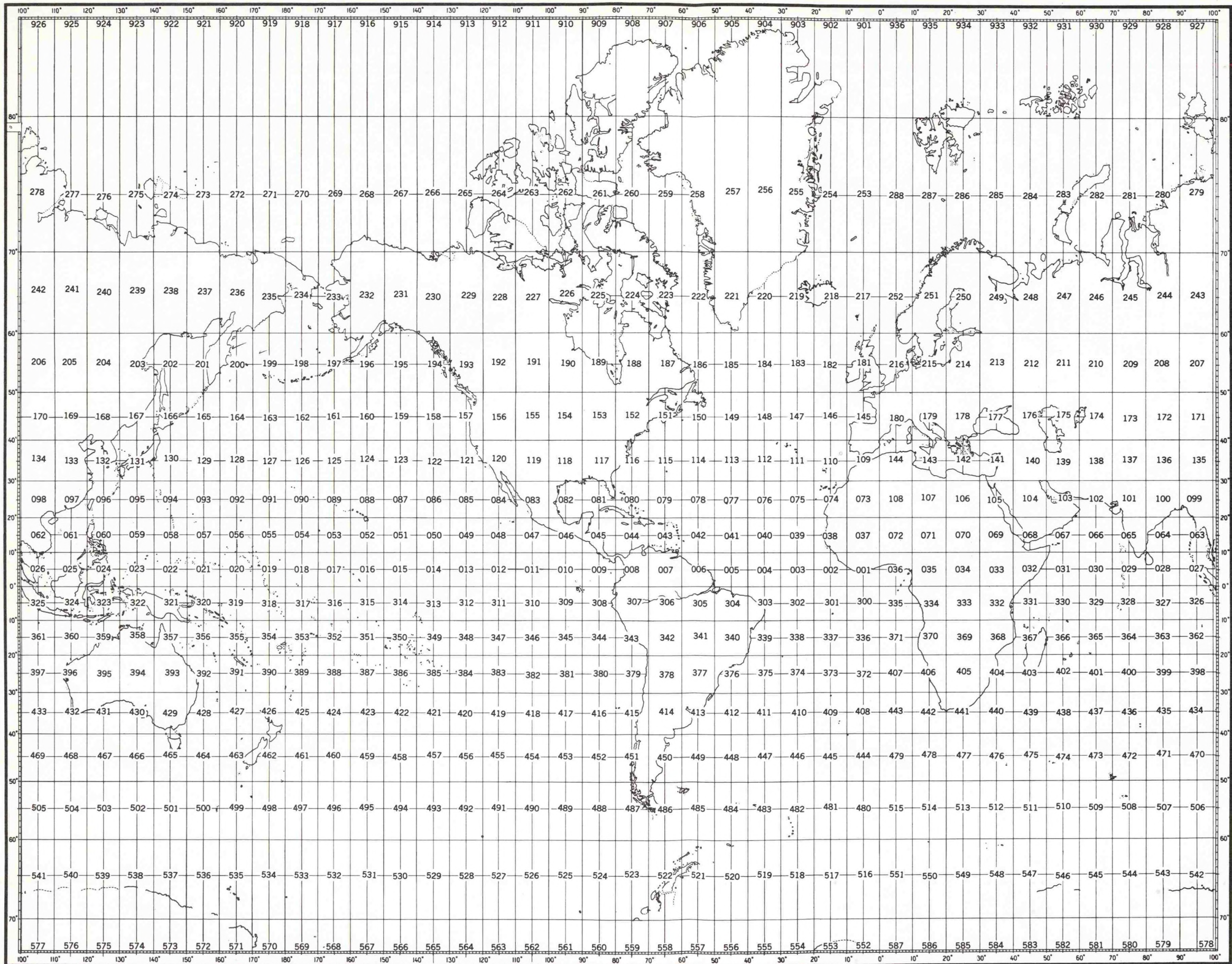
TABLE 2

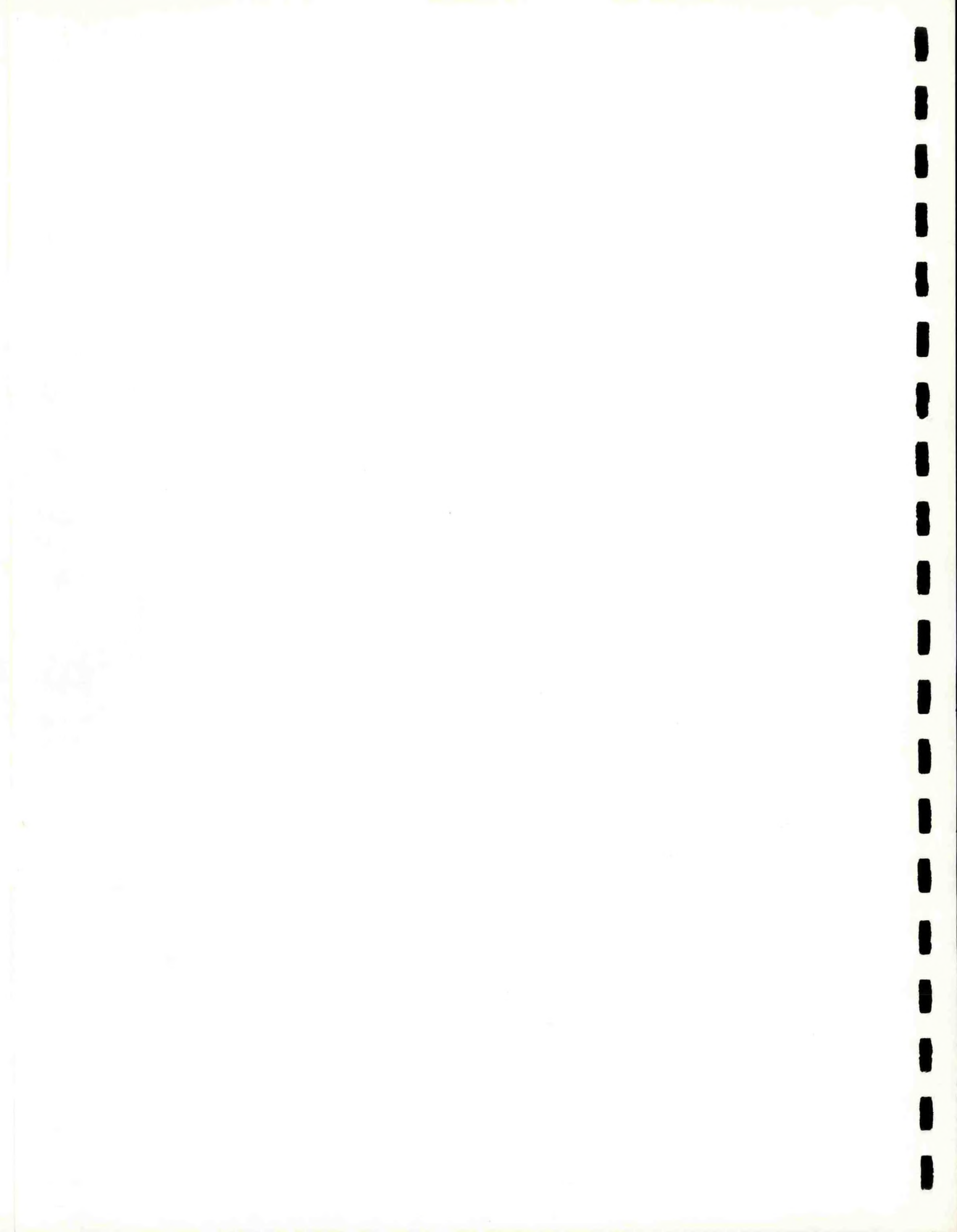
## Tenths Conversion

Conversion from seconds (of position) or minutes (of time)  
to tenths of minutes or hours

Range of Secs. or Mins.	Tenths of Mins. or Hrs.
00 - 05	0
06 - 11	1
12 - 17	2
18 - 23	3
24 - 29	4
30 - 35	5
36 - 41	6
42 - 47	7
48 - 53	8
54 - 59	9

TABLE 3  
MARSDEN SQUARE CHART







Time

Conversion from local time to Greenwich mean time (GMT)

TIME-ZONE CONVERSION TABLE

WEST LONGITUDE												EAST LONGITUDE												
+12	+11	+10	+9	+8	+7	+6	+5	+4	+3	+2	+1	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11	-12
Y	X	W	V	U	T	S	R	Q	P	O	N	Z	A	B	C	D	E	F	G	H	I	K	L	M
172° 30'	177° 30'	182° 30'	187° 30'	192° 30'	197° 30'	202° 30'	207° 30'	212° 30'	217° 30'	222° 30'	227° 30'	232° 30'	237° 30'	242° 30'	247° 30'	252° 30'	257° 30'	262° 30'	267° 30'	272° 30'	277° 30'	282° 30'	287° 30'	292° 30'
24	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	01
02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	01	02
03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	01	02	03
04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	01	02	03	04
05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	01	02	03	04	05
06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	01	02	03	04	05	06
07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	01	02	03	04	05	06	07
08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	01	02	03	04	05	06	07	08
09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	01	02	03	04	05	06	07	08	09
10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	01	02	03	04	05	06	07	08	09	10
11	12	13	14	15	16	17	18	19	20	21	22	23	24	01	02	03	04	05	06	07	08	09	10	11
12	13	14	15	16	17	18	19	20	21	22	23	24	01	02	03	04	05	06	07	08	09	10	11	12
13	14	15	16	17	18	19	20	21	22	23	24	01	02	03	04	05	06	07	08	09	10	11	12	13
14	15	16	17	18	19	20	21	22	23	24	01	02	03	04	05	06	07	08	09	10	11	12	13	14
15	16	17	18	19	20	21	22	23	24	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
16	17	18	19	20	21	22	23	24	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17
18	19	20	21	22	23	24	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18
19	20	21	22	23	24	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21
22	23	24	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22
23	24	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23

PRECEDING DAY

TABLE 4  
FOLLOWING DAY

EXPLANATION:

If day change (diagonal) line is crossed from right to left, subtract one day; from left to right, add one day.

To convert from local time to any other time, locate local time in zone column and proceed horizontally to zone wanted. Example 05 in L (-11) time is 18 GMT of preceding day.

TABLE 5

## Depth

Conversion from fathoms to meters  
(1 fathom = 1.8288 meters)

Fathoms	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
Meters	0	0	0	1	1	1	1	1	1	2
Fathoms	0	1	2	3	4	5	6	7	8	9
00	0000	0002	0004	0005	0007	0009	0011	0013	0015	0016
10	0018	0020	0022	0024	0026	0027	0029	0031	0033	0035
20	0037	0038	0040	0042	0044	0046	0048	0049	0051	0053
30	0055	0057	0059	0060	0062	0064	0066	0068	0069	0071
40	0073	0075	0077	0079	0080	0082	0084	0086	0088	0090
50	0091	0093	0095	0097	0099	0101	0102	0104	0106	0108
60	0110	0112	0113	0115	0117	0119	0121	0123	0124	0126
70	0128	0130	0132	0134	0135	0137	0139	0141	0143	0144
80	0146	0148	0150	0152	0154	0155	0157	0159	0161	0163
90	0165	0166	0168	0170	0172	0174	0176	0177	0179	0181
100	0183	0185	0187	0188	0190	0192	0194	0196	0198	0199
110	0201	0203	0205	0207	0208	0210	0212	0214	0216	0218
120	0219	0221	0223	0225	0227	0229	0230	0232	0234	0236
130	0238	0240	0241	0243	0245	0247	0249	0251	0252	0254
140	0256	0258	0260	0262	0263	0265	0267	0269	0271	0272
150	0274	0276	0278	0280	0282	0283	0285	0287	0289	0291
160	0293	0294	0296	0298	0300	0302	0304	0305	0307	0309
170	0311	0313	0315	0316	0318	0320	0322	0324	0326	0327
180	0329	0331	0333	0335	0336	0338	0340	0342	0344	0346
190	0347	0349	0351	0353	0355	0357	0358	0360	0362	0364
200	0366	0368	0369	0371	0373	0375	0377	0379	0380	0382
210	0384	0386	0388	0390	0391	0393	0395	0397	0399	0401
220	0402	0404	0406	0408	0410	0411	0413	0415	0417	0419
230	0421	0422	0424	0426	0428	0430	0432	0433	0435	0437
240	0439	0441	0443	0444	0446	0448	0450	0452	0454	0455
250	0457	0459	0461	0463	0465	0466	0468	0470	0472	0474
260	0475	0477	0479	0481	0483	0485	0486	0488	0490	0492
270	0494	0496	0497	0499	0501	0503	0505	0507	0508	0510
280	0512	0514	0516	0518	0519	0521	0523	0525	0527	0529
290	0530	0532	0534	0536	0538	0539	0541	0543	0545	0547

TABLE 5 (Cont'd)

## Depth

Conversion from fathoms to meters  
(1 fathom = 1.8288 meters)

Fathoms	00	10	20	30	40	50	60	70	80	90
300	0549	0567	0585	0604	0622	0640	0658	0677	0695	0713
400	0732	0750	0768	0786	0805	0823	0841	0860	0878	0896
500	0914	0933	0951	0969	0988	1006	1024	1042	1061	1079
600	1097	1116	1134	1152	1170	1189	1207	1225	1244	1262
700	1280	1298	1317	1335	1353	1372	1390	1408	1426	1445
800	1463	1481	1500	1518	1536	1554	1573	1591	1609	1628
900	1646	1664	1682	1701	1719	1737	1756	1774	1792	1811

Fathoms	000	100	200	300	400	500	600	700	800	900
1000	1829	2012	2195	2377	2560	2743	2926	3109	3292	3475
2000	3658	3840	4023	4206	4389	4572	4755	4938	5121	5304
3000	5486	5669	5852	6035	6218	6401	6584	6767	6949	7132
4000	7315	7498	7681	7864	8047	8230	8412	8595	8778	8961
5000	9144	9327	9510	9693	9876	10058	10241	10424	10607	10790

TABLE 6

Depth

Conversion from feet to meters (tenths)  
 (1 foot = 0.3048 meter)

Feet	0	1	2	3	4	5	6	7	8	9
00	0.0	0.3	0.6	0.9	1.2	1.5	1.8	2.1	2.4	2.7
10	3.0	3.4	3.7	4.0	4.3	4.6	4.9	5.2	5.5	5.8
20	6.1	6.4	6.7	7.0	7.3	7.6	7.9	8.2	8.5	8.8
30	9.1	9.4	9.8	10.1	10.4	10.7	11.0	11.3	11.6	11.9
40	12.2	12.5	12.8	13.1	13.4	13.7	14.0	14.3	14.6	14.9
50	15.2	15.5	15.8	16.2	16.5	16.8	17.1	17.4	17.7	18.0
60	18.3	18.6	18.9	19.2	19.5	19.8	20.1	20.4	20.7	21.0
70	21.3	21.6	21.9	22.3	22.6	22.9	23.2	23.5	23.8	24.1
80	24.4	24.7	25.0	25.3	25.6	25.9	26.2	26.5	26.8	27.1
90	27.4	27.7	28.0	28.3	28.7	29.0	29.3	29.6	29.9	30.2
100	30.5	30.8	31.1	31.4	31.7	32.0	32.3	32.6	32.9	33.2
110	33.5	33.8	34.1	34.4	34.7	35.1	35.4	35.7	36.0	36.3
120	36.6	36.9	37.2	37.5	37.8	38.1	38.4	38.7	39.0	39.3
130	39.6	39.9	40.2	40.5	40.8	41.1	41.5	41.8	42.1	42.4
140	42.7	43.0	43.3	43.6	43.9	44.2	44.5	44.8	45.1	45.4
150	45.7	46.0	46.3	46.6	46.9	47.2	47.5	47.9	48.2	48.5
160	48.8	49.1	49.4	49.7	50.0	50.3	50.6	50.9	51.2	51.5
170	51.8	52.1	52.4	52.7	53.0	53.3	53.6	53.9	54.3	54.6
180	54.9	55.2	55.5	55.8	56.1	56.4	56.7	57.0	57.3	57.6
190	57.9	58.2	58.5	58.8	59.1	59.4	59.7	60.0	60.4	60.7
200	61.0	61.3	61.6	61.9	62.2	62.5	62.8	63.1	63.4	63.7
210	64.0	64.3	64.6	64.9	65.2	65.5	65.8	66.1	66.4	66.8
220	67.1	67.4	67.7	68.0	68.3	68.6	68.9	69.2	69.5	69.8
230	70.1	70.4	70.7	71.0	71.3	71.6	71.9	72.2	72.5	72.8
240	73.2	73.5	73.8	74.1	74.4	74.7	75.0	75.3	75.6	75.9
250	76.2	76.5	76.8	77.1	77.4	77.7	78.0	78.3	78.6	78.9
260	79.2	79.6	79.9	80.2	80.5	80.8	81.1	81.4	81.7	82.0
270	82.3	82.6	82.9	83.2	83.5	83.8	84.1	84.4	84.7	85.0
280	85.3	85.6	86.0	86.3	86.6	86.9	87.2	87.5	87.8	88.1
290	88.4	88.7	89.0	89.3	89.6	89.9	90.2	90.5	90.8	91.1

TABLE 6 (Cont'd)

Conversion from feet to meters (tenths)  
(1 foot = 0.3048 meter)

Feet	00	10	20	30	40	50	60	70	80	90
300	91.4	94.5	97.5	100.6	103.6	106.7	109.7	112.8	115.8	118.9
400	121.9	125.0	128.0	131.1	134.1	137.2	140.2	143.3	146.3	149.4
500	152.4	155.4	158.5	161.5	164.6	167.6	170.7	173.7	176.8	179.8
600	182.9	185.9	189.0	192.0	195.1	198.1	201.2	204.2	207.3	210.3
700	213.4	216.4	219.5	222.5	225.6	228.6	231.6	234.7	237.7	240.8
800	243.8	246.9	249.9	253.0	256.0	259.1	262.1	265.2	268.2	271.3
900	274.3	277.4	280.4	283.5	286.5	289.6	292.6	295.7	298.7	301.8
1000	304.8	307.8	310.9	313.9	317.0	320.0	323.1	326.1	329.2	332.2
1100	335.3	338.3	341.4	344.4	347.5	350.5	353.6	356.6	359.7	362.7
1200	365.8	368.8	371.9	374.9	378.0	381.0	384.0	387.1	390.1	393.2
1300	396.2	399.3	402.3	405.3	408.4	411.5	414.5	417.6	420.6	423.7
1400	426.7	429.8	432.8	435.9	438.9	442.0	445.0	448.1	451.1	454.2
1500	457.2	460.2	463.3	466.3	469.4	472.4	475.5	478.5	481.6	484.6
1600	487.7	490.7	493.8	496.8	499.9	502.9	506.0	509.0	512.1	515.1
1700	518.2	521.2	524.3	527.3	530.4	533.4	536.4	539.5	542.5	545.6
1800	548.6	551.7	554.7	557.8	560.8	563.9	566.9	570.0	573.0	576.1
1900	579.1	582.2	585.2	588.3	591.3	594.4	597.4	600.5	603.5	606.6
2000	609.6	612.6	615.7	618.7	621.8	624.8	627.9	630.9	634.0	637.0
2100	640.1	643.1	646.2	649.2	652.3	655.3	658.4	661.4	664.5	667.5
2200	670.6	673.6	676.7	679.7	682.8	685.8	688.8	691.9	694.9	698.0
2300	701.0	704.1	707.1	710.2	713.2	716.3	719.3	722.4	725.4	728.5
2400	731.5	734.6	737.6	740.7	743.7	746.8	749.8	752.9	755.9	759.0
2500	762.0	765.0	768.1	771.1	774.2	777.2	780.3	783.3	786.4	789.4
2600	792.5	795.5	798.6	801.6	804.7	807.7	810.8	813.8	816.9	819.9
2700	823.0	826.0	829.1	832.1	835.2	838.2	841.2	844.3	847.3	850.4
2800	853.4	856.5	859.5	862.6	865.6	868.7	871.7	874.8	877.8	880.9
2900	883.9	887.0	890.0	893.1	896.1	899.2	902.2	905.3	908.3	911.4
3000	914.4	917.4	920.5	923.5	926.6	929.6	932.7	935.7	938.8	941.8
3100	944.9	947.9	951.0	954.0	957.1	960.1	963.2	966.2	969.3	972.3
3200	975.4	978.4	981.5	984.5	987.6	990.6	993.6	996.7	999.7	1002.8

TABLE 7

Additional Observations

This table is to be added later.

TABLE 8

## Water Color

Forel-Ule scale and conversions from other color scales

Percent Yellow	Percent Brown	Forel-Ule Scale	Code
0		I	01
2		II	02
5		III	03
9		IV	04
14		V	05
20		VI	06
27		VII	07
35		VIII	08
44		IX	09
54		X	10
65	0	XI	11
	2	XII	12
	5	XIII	13
	9	XIV	14
	14	XV	15
	20	XVI	16
	27	XVII	17
	35	XVIII	18
	44	XIX	19
	54	XX	20
	65	XXI	21

TABLE 9

## Direction

In tens of degrees from which waves and/or winds are coming

Code		Code	
00	Calm (no waves - no motion)	22	215° - 224°
01	5° - 14°	23	225° - 234°
02	15° - 24°	24	235° - 244°
03	25° - 34°	25	245° - 254°
04	35° - 44°	26	255° - 264°
05	45° - 54°	27	265° - 274°
06	55° - 64°	28	275° - 284°
07	65° - 74°	29	285° - 294°
08	75° - 84°	30	295° - 304°
09	85° - 94°	31	305° - 314°
10	95° - 104°	32	315° - 324°
11	105° - 114°	33	325° - 334°
12	115° - 124°	34	335° - 344°
13	125° - 134°	35	345° - 354°
14	135° - 144°	36	355° - 4°
15	145° - 154°		
16	155° - 164°	49	Waves confused, direction indeterminate (waves equal to or less than 4 $\frac{3}{4}$ metres)
17	165° - 174°		
18	175° - 184°		
19	185° - 194°		
20	195° - 204°		
21	205° - 214°	99	{ Waves confused, direction indeterminate (waves greater than 4 $\frac{3}{4}$ metres) Winds variable, or all directions or unknown

Table 9 is a combination of WMO Codes 0885 and 0877.



TABLE 10

## Direction

Conversion from points, quarter points, or a scale of 32, to a scale of 36 points

POINTS	QUARTER POINTS	0-32	CODE	POINTS	QUARTER POINTS	0-32	CODE
N x E	N6E to N14E	1	01	S x W	S6W to S14W	17	19
NNE	N15E to N25E	2	02	SSW	S15W to S25W	18	20
NE x N	N26E to N34E	3	03	SW x S	S26W to S34W	19	21
NE	N35E to N45E	4	04	SW	S35W to S45W	20	22
	N46E to N54E		05		S46W to S54W		23
NE x E	N55E to N65E	5	06	SW x W	S55W to S65W	21	24
ENE	N66E to N74E	6	07	WSW	S66W to S74W	22	25
E x N	N75E to N85E	7	08	W x S	S75W to S85W	23	26
	N86E to N89E		09		S86W to S89W		27
E	E	8	09	W	W	24	27
	S89E to S86E		09		N89W to N86W		27
E x S	S85E to S75E	9	10	W x N	N85W to N75W	25	28
ESE	S74E to S66E	10	11	WNW	N74W to N66W	26	29
SE x E	S65E to S55E	11	12	NW x W	N65W to N55W	27	30
	S54E to S46E		13		N54W to N46W		31
SE	S45E to S35E	12	14	NW	N45W to N35W	28	32
SE x S	S34E to S26E	13	15	NW x N	N34W to N26W	29	33
SSE	S25E to S15E	14	16	NNW	N25W to N15W	30	34
S x E	S14E to S6E	15	17	N x W	N14W to N6W	31	35
	S5E to S1E		18		N5W to N1W		36
S	S	16	18	N	N	32	36
	S1W to S5W		18		N1E to N5E		36
				Variable			99

TABLE 11

## Height

WMO Code 1555 for recording height of the dominant waves

Code		Code	If 50 is added to direction
0	Less than $\frac{1}{4}$ m (1 ft)	0	5 m (16 ft)
1	$\frac{1}{2}$ m (1 $\frac{1}{2}$ ft)	1	5 $\frac{1}{2}$ m (17 $\frac{1}{2}$ ft)
2	1 m (3 ft)	2	6 m (19 ft)
3	1 $\frac{1}{2}$ m (5 ft)	3	6 $\frac{1}{2}$ m (21 ft)
4	2 m (6 $\frac{1}{2}$ ft)	4	7 m (22 $\frac{1}{2}$ ft)
5	2 $\frac{1}{2}$ m (8 ft)	5	7 $\frac{1}{2}$ m (24 ft)
6	3 m (9 $\frac{1}{2}$ ft)	6	8 m (25 $\frac{1}{2}$ ft)
7	3 $\frac{1}{2}$ m (11 ft)	7	8 $\frac{1}{2}$ m (27 ft)
8	4 m (13 ft)	8	9 m (29 ft)
9	4 $\frac{1}{2}$ m (14 ft)	9	9 $\frac{1}{2}$ m (30 $\frac{1}{2}$ ft)
x	Height not determined		

## Notes :

- (1) Each code figure provides for reporting a range of heights. For example : 1 =  $\frac{1}{4}$  m (1 ft) to  $\frac{3}{4}$  m (2  $\frac{1}{2}$  ft) ; 5 = 2  $\frac{1}{4}$  m (7 ft) to 2  $\frac{3}{4}$  m (9 ft) ; 9 = 4  $\frac{1}{4}$  m (13  $\frac{1}{2}$  ft) to 4  $\frac{3}{4}$  m (15 ft), etc.
- (2) If a wave height comes exactly midway between the heights corresponding to two code figures, the lower code figure is reported ; e.g. a height of 2  $\frac{3}{4}$  m is reported by code figure 5.
- (3) In aeronautical forecast codes, only the left-hand table is to be used and code figure 9 has the meaning : 4  $\frac{1}{2}$  m (14 ft) or more.
- (4) The average value of the wave height (vertical distance between trough and crest) is reported, as obtained from the larger well formed waves of the wave system being observed.

TABLE 12

Period

WMO Code 3155 for recording period of dominant waves

Code		Code	
2	5 seconds or less	8	16 or 17 seconds
3	6 or 7 seconds	9	18 or 19 seconds
4	8 or 9 seconds	0	20 or 21 seconds
5	10 or 11 seconds	1	Over 21 seconds
6	12 or 13 seconds	x	Calm, or period not determined
7	14 or 15 seconds		

Notes:

- (1) The period of the waves is the time between the passage of two successive wave crests past a fixed point (it is equal to the wave length divided by the wave speed).
- (2) The average value of the wave period is reported, as obtained from the larger well-formed waves of the wave system being observed.

TABLE 13

## Sea State

WMO Code 3700 for Recording Sea State

Description	Height (†)		Code
	Feet*	Meters	
Calm-glassy	0	0	0
Calm-rippled	0 - $\frac{1}{3}$	0 - 0.1	1
Smooth-wavelet	$\frac{1}{3}$ - $1\frac{2}{3}$	0.1 - 0.5	2
Slight	$1\frac{2}{3}$ - 4	0.5 - 1.25	3
Moderate	4 - 8	1.25 - 2.5	4
Rough	8 - 13	2.5 - 4	5
Very rough	13 - 20	4 - 6	6
High	20 - 30	6 - 9	7
Very high	30 - 45	9 - 14	8
Phenomenal	> 45	> 14	9

(†) The average wave height as obtained from the larger well-formed waves of the wave system being observed.

\* The exact bounding height is to be assigned for the lower code figure, e.g. a height of 4 meters is coded as 5.

TABLE 14

## Wind Speed

Conversion from meters per second to knots  
 (1m/sec = 1.94254 knots)

m/sec	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
knots	0	0	0	1	1	1	1	1	2	2

m/sec	00	01	02	03	04	05	06	07	08	09
00	00	02	04	06	08	10	12	14	16	17
10	19	21	23	25	27	29	31	33	35	37
20	39	41	43	45	47	49	51	52	54	56
30	58	60	62	64	66	68	70	72	74	76
40	78	80	82	84	85	87	89	91	93	95
50	97	99	101	103	105	107	109	111	113	115

TABLE 15

## Wind Speed

Conversion from miles per hour to knots  
(1 mph = 0.86839 knot)

mph	00	01	02	03	04	05	06	07	08	09
00	00	01	02	03	03	04	05	06	07	08
10	09	10	10	11	12	13	14	15	16	16
20	17	18	19	20	21	22	23	23	24	25
30	26	27	28	29	30	30	31	32	33	34
40	35	36	36	37	38	39	40	41	42	43
50	43	44	45	46	47	48	49	49	50	51
60	52	53	54	55	56	56	57	58	59	60
70	61	62	63	63	64	65	66	67	68	69
80	69	70	71	72	73	74	75	76	76	77
90	78	79	80	81	82	82	83	84	85	86
100	87	88	89	89	90	91	92	93	94	95
110	96	96	97	98	99	100	101	102	102	103

TABLE 16

## Wind Speed

Conversion from kilometers per hour to knots  
(1 km/hr = 0.539593 knot)

km/hr	00	01	02	03	04	05	06	07	08	09
00	00	01	01	02	02	03	03	04	04	05
10	05	06	06	07	08	08	09	09	10	10
20	11	11	12	12	13	13	14	15	15	16
30	16	17	17	18	18	19	19	20	21	21
40	22	22	23	23	24	24	25	25	26	26
50	27	28	28	29	29	30	30	31	31	32
60	32	33	33	34	35	35	36	36	37	37
70	38	38	39	39	40	40	41	42	42	43
80	43	44	44	45	45	46	46	47	47	48
90	49	49	50	50	51	51	52	52	53	53
100	54	54	55	56	56	57	57	58	58	59
110	59	60	60	61	62	62	63	63	64	64
120	65	65	66	66	67	67	68	69	69	70
130	70	71	71	72	72	73	73	74	74	75
140	76	76	77	77	78	78	79	79	80	80
150	81	81	82	83	83	84	84	85	85	86
160	86	87	87	88	88	89	90	90	91	91
170	92	92	93	93	94	94	95	96	96	97
180	97	98	98	99	99	100	100	101	101	102

TABLE 17

## Wind Speed

Conversion from feet per second to knots  
(1 ft/sec = 0.5921 knot)

ft/sec	00	01	02	03	04	05	06	07	08	09
00	00	01	01	02	02	03	04	04	05	05
10	06	07	07	08	08	09	09	10	11	11
20	12	12	13	14	14	15	15	16	17	17
30	18	18	19	20	20	21	21	22	22	23
40	24	24	25	25	26	27	27	28	28	29
50	30	30	31	31	32	33	33	34	34	35
60	36	36	37	37	38	38	39	40	40	41
70	41	42	43	43	44	44	45	46	46	47
80	47	48	49	49	50	50	51	52	52	53
90	53	54	54	55	56	56	57	57	58	59
100	59	60	60	61	62	62	63	63	64	65
110	65	66	66	67	67	68	69	69	70	70
120	71	72	72	73	73	74	75	75	76	76
130	77	78	78	79	79	80	81	81	82	82
140	83	83	84	85	85	86	86	87	88	88
150	89	89	90	91	91	92	92	93	94	94
160	95	95	96	97	97	98	98	99	99	100



TABLE 18

## Wind Force

Conversion from knots, meters per second, kilometers per hour, and miles per hour to the Beaufort wind scale

CODE	DESCRIPTIVE TERM	VELOCITY EQUIVALENT AT A STANDARD HEIGHT OF 10 METERS ABOVE OPEN FLAT GROUND			
		mean velocity in knots	meters/sec	km/h	m.p.h.
0	Calm	< 1	0 - 0.2	< 1	< 1
1	Light air	1 - 3	0.3 - 1.5	1 - 5	1 - 3
2	Light breeze	4 - 6	1.6 - 3.3	6 - 11	4 - 7
3	Gentle breeze	7 - 10	3.4 - 5.4	12 - 19	8 - 12
4	Moderate breeze	11 - 16	5.5 - 7.9	20 - 28	13 - 18
5	Fresh breeze	17 - 21	8.0 - 10.7	29 - 38	19 - 24
6	Strong breeze	22 - 27	10.8 - 13.8	39 - 49	25 - 31
7	Near gale	28 - 33	13.9 - 17.1	50 - 61	32 - 38
8	Gale	34 - 40	17.2 - 20.7	62 - 74	39 - 46
9	Strong gale	41 - 47	20.8 - 24.4	75 - 88	47 - 54
10	Storm	48 - 55	24.5 - 28.4	89 - 102	55 - 63
11	Violent storm	56 - 63	28.5 - 32.6	103 - 117	64 - 72
12	Hurricane	64 - 71	32.7 - 36.9	118 - 133	73 - 82
13	—	72 - 80	37.0 - 41.4	134 - 149	83 - 92
14	—	81 - 89	41.5 - 46.1	150 - 166	93 - 103
15	—	90 - 99	46.2 - 50.9	167 - 183	104 - 114
16	—	100 - 108	51.0 - 56.0	184 - 201	115 - 125
17	—	109 - 118	56.1 - 61.2	202 - 220	126 - 136

TABLE 19

## Atmospheric Pressure

Conversion from inches of mercury to millibars\*  
 (1 inch of H<sub>g</sub> = 33.8639 mbs)

Inches	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
27.9	44.8	45.1	45.5	45.8	46.2	46.5	46.8	47.2	47.5	47.9
28.0	48.2	48.5	48.9	49.2	49.5	49.9	50.2	50.6	50.9	51.2
28.1	51.6	51.9	52.3	52.6	52.9	53.3	53.6	53.9	54.3	54.6
28.2	55.0	55.3	55.6	56.0	56.3	56.7	57.0	57.3	57.7	58.0
28.3	58.3	58.7	59.0	59.4	59.7	60.0	60.4	60.7	61.1	61.4
28.4	61.7	62.1	62.4	62.8	63.1	63.4	63.8	64.1	64.4	64.8
28.5	65.1	65.5	65.8	66.1	66.5	66.8	67.2	67.5	67.8	68.2
28.6	68.5	68.8	69.2	69.5	69.9	70.2	70.5	70.9	71.2	71.6
28.7	71.9	72.2	72.6	72.9	73.2	73.6	73.9	74.3	74.6	74.9
28.8	75.3	75.6	76.0	76.3	76.6	77.0	77.3	77.7	78.0	78.3
28.9	78.7	79.0	79.3	79.7	80.0	80.4	80.7	81.0	81.4	81.7
29.0	82.1	82.4	82.7	83.1	83.4	83.7	84.1	84.4	84.8	85.1
29.1	85.4	85.8	86.1	86.5	86.8	87.1	87.5	87.8	88.1	88.5
29.2	88.8	89.2	89.5	89.8	90.2	90.5	90.9	91.2	91.5	91.9
29.3	92.2	92.6	92.9	93.2	93.6	93.9	94.2	94.6	94.9	95.3
29.4	95.6	95.9	96.3	96.6	97.0	97.3	97.6	98.0	98.3	98.6
29.5	99.0	99.3	99.7	00.0	00.3	00.7	01.0	01.4	01.7	02.0
29.6	02.4	02.7	03.0	03.4	03.7	04.1	04.4	04.7	05.1	05.4
29.7	05.8	06.1	06.4	06.8	07.1	07.5	07.8	08.1	08.5	08.8
29.8	09.1	09.5	09.8	10.2	10.5	10.8	11.2	11.5	11.9	12.2
29.9	12.5	12.9	13.2	13.5	13.9	14.2	14.6	14.9	15.2	15.6
30.0	15.9	16.3	16.6	16.9	17.3	17.6	17.9	18.3	18.6	19.0
30.1	19.3	19.6	20.0	20.3	20.7	21.0	21.3	21.7	22.0	22.4
30.2	22.7	23.0	23.4	23.7	24.0	24.4	24.7	25.1	25.4	25.7
30.3	26.1	26.4	26.8	27.1	27.4	27.8	28.1	28.4	28.8	29.1
30.4	29.5	29.8	30.1	30.5	30.8	31.2	31.5	31.8	32.2	32.5
30.5	32.8	33.2	33.5	33.9	34.2	34.5	34.9	35.2	35.6	35.9
30.6	36.2	36.6	36.9	37.3	37.6	37.9	38.3	38.6	38.9	39.3
30.7	39.6	40.0	40.3	40.6	41.0	41.3	41.7	42.0	42.3	42.7
30.8	43.0	43.3	43.7	44.0	44.4	44.7	45.0	45.4	45.7	46.1
30.9	46.4	46.7	47.1	47.4	47.7	48.1	48.4	48.8	49.1	49.4
31.0	49.8	50.1	50.5	50.8	51.1	51.5	51.8	52.2	52.5	52.8

\*The hundreds and thousands digits are not recorded; the true range of this table is 944.8 - 1052.8 mbs.

TABLE 20

## Atmospheric Pressure

Conversion from millimeters of mercury to millibars\*  
(1 mm of Hg = 1.33322 mbs)

mm of Hg	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
708	43.9	44.1	44.2	44.3	44.5	44.6	44.7	44.9	45.0	45.1
709	45.3	45.4	45.5	45.7	45.8	45.9	46.1	46.2	46.3	46.5
710	46.6	46.7	46.9	47.0	47.1	47.3	47.4	47.5	47.7	47.8
711	47.9	48.1	48.2	48.3	48.5	48.6	48.7	48.9	49.0	49.1
712	49.3	49.4	49.5	49.7	49.8	49.9	50.1	50.2	50.3	50.5
713	50.6	50.7	50.9	51.0	51.1	51.3	51.4	51.5	51.7	51.8
714	51.9	52.1	52.2	52.3	52.5	52.6	52.7	52.9	53.0	53.1
715	53.3	53.4	53.5	53.7	53.8	53.9	54.1	54.2	54.3	54.5
716	54.6	54.7	54.9	55.0	55.1	55.3	55.4	55.5	55.7	55.8
717	55.9	56.1	56.2	56.3	56.5	56.6	56.7	56.9	57.0	57.1
718	57.3	57.4	57.5	57.7	57.8	57.9	58.1	58.2	58.3	58.5
719	58.6	58.7	58.9	59.0	59.1	59.3	59.4	59.5	59.7	59.8
720	59.9	60.1	60.2	60.3	60.5	60.6	60.7	60.9	61.0	61.1
721	61.3	61.4	61.5	61.7	61.8	61.9	62.1	62.2	62.3	62.5
722	62.6	62.7	62.9	63.0	63.1	63.3	63.4	63.5	63.7	63.8
723	63.9	64.1	64.2	64.3	64.5	64.6	64.7	64.9	65.0	65.1
724	65.3	65.4	65.5	65.7	65.8	65.9	66.1	66.2	66.3	66.5
725	66.6	66.7	66.9	67.0	67.1	67.3	67.4	67.5	67.7	67.8
726	67.9	68.1	68.2	68.3	68.5	68.6	68.7	68.9	69.0	69.1
727	69.3	69.4	69.5	69.7	69.8	69.9	70.1	70.2	70.3	70.5
728	70.6	70.7	70.9	71.0	71.1	71.3	71.4	71.5	71.7	71.8
729	71.9	72.1	72.2	72.3	72.5	72.6	72.7	72.9	73.0	73.1
730	73.3	73.4	73.5	73.7	73.8	73.9	74.1	74.2	74.3	74.5
731	74.6	74.7	74.9	75.0	75.1	75.3	75.4	75.5	75.7	75.8
732	75.9	76.1	76.2	76.3	76.5	76.6	76.7	76.9	77.0	77.1
733	77.3	77.4	77.5	77.7	77.8	77.9	78.1	78.2	78.3	78.5
734	78.6	78.7	78.9	79.0	79.1	79.3	79.4	79.5	79.7	79.8
735	79.9	80.1	80.2	80.3	80.5	80.6	80.7	80.9	81.0	81.1

\*The hundreds digit is not recorded. The true range of this part of Table 20 is 943.9 mbs - 981.1 mbs.

TABLE 20 (Cont'd)

## Atmospheric Pressure

Conversion from millimeters of mercury to millibars\* (Cont'd)  
 (1 mm of Hg = 1.33322 mbs)

mm of Hg	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
736	81.3	81.4	81.5	81.7	81.8	81.9	82.1	82.2	82.3	82.5
737	82.6	82.7	82.9	83.0	83.1	83.3	83.4	83.5	83.7	83.8
738	83.9	84.1	84.2	84.3	84.5	84.6	84.7	84.9	85.0	85.1
739	85.3	85.4	85.5	85.7	85.8	85.9	86.1	86.2	86.3	86.5
740	86.6	86.7	86.9	87.0	87.1	87.3	87.4	87.5	87.7	87.8
741	87.9	88.1	88.2	88.3	88.5	88.6	88.7	88.9	89.0	89.1
742	89.3	89.4	89.5	89.7	89.8	89.9	90.1	90.2	90.3	90.5
743	90.6	90.7	90.9	91.0	91.1	91.3	91.4	91.5	91.7	91.8
744	91.9	92.1	92.2	92.3	92.5	92.6	92.7	92.9	93.0	93.1
745	93.3	93.4	93.5	93.7	93.8	93.9	94.1	94.2	94.3	94.5
746	94.6	94.7	94.9	95.0	95.1	95.3	95.4	95.5	95.7	95.8
747	95.9	96.1	96.2	96.3	96.5	96.6	96.7	96.9	97.0	97.1
748	97.3	97.4	97.5	97.7	97.8	97.9	98.1	98.2	98.3	98.5
749	98.6	98.7	98.9	99.0	99.1	99.3	99.4	99.5	99.7	99.8
750	99.9	00.1	00.2	00.3	00.5	00.6	00.7	00.9	01.0	01.1
751	01.3	01.4	01.5	01.7	01.8	01.9	02.1	02.2	02.3	02.5
752	02.6	02.7	02.9	03.0	03.1	03.3	03.4	03.5	03.7	03.8
753	03.9	04.1	04.2	04.3	04.5	04.6	04.7	04.9	05.0	05.1
754	05.3	05.4	05.5	05.7	05.8	05.9	06.1	06.2	06.3	06.5
755	06.6	06.7	06.9	07.0	07.1	07.3	07.4	07.5	07.7	07.8
756	07.9	08.1	08.2	08.3	08.5	08.6	08.7	08.9	09.0	09.1
757	09.3	09.4	09.5	09.7	09.8	09.9	10.1	10.2	10.3	10.5
758	10.6	10.7	10.9	11.0	11.1	11.3	11.4	11.5	11.7	11.8
759	11.9	12.1	12.2	12.3	12.5	12.6	12.7	12.9	13.0	13.1
760	13.3	13.4	13.5	13.7	13.8	13.9	14.1	14.2	14.3	14.5
761	14.6	14.7	14.9	15.0	15.1	15.3	15.4	15.5	15.7	15.8
762	15.9	16.1	16.2	16.3	16.4	16.6	16.7	16.8	17.0	17.1
763	17.2	17.4	17.5	17.6	17.8	17.9	18.0	18.2	18.3	18.4
764	18.6	18.7	18.8	19.0	19.1	19.2	19.4	19.5	19.6	19.8
765	19.9	20.0	20.2	20.3	20.4	20.6	20.7	20.8	21.0	21.1

\*The hundreds and thousands digits are not recorded. The true range of this part of Table 20 is 981.3 mbs - 1021.1 mbs.

TABLE 20 (Cont'd)

## Atmospheric Pressure

Conversion from millimeters of mercury to millibars\* (Cont'd)  
 (1 mm of Hg = 1.33322 mbs)

mm of Hg	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
766	21.2	21.4	21.5	21.6	21.8	21.9	22.0	22.2	22.3	22.4
767	22.6	22.7	22.8	23.0	23.1	23.2	23.4	23.5	23.6	23.8
768	23.9	24.0	24.2	24.3	24.4	24.6	24.7	24.8	25.0	25.1
769	25.2	25.4	25.5	25.6	25.8	25.9	26.0	26.2	26.3	26.4
770	26.6	26.7	26.8	27.0	27.1	27.2	27.4	27.5	27.6	27.8
771	27.9	28.0	28.2	28.3	28.4	28.6	28.7	28.8	29.0	29.1
772	29.2	29.4	29.5	29.6	29.8	29.9	30.0	30.2	30.3	30.4
773	30.6	30.7	30.8	31.0	31.1	31.2	31.4	31.5	31.6	31.8
774	31.9	32.0	32.2	32.3	32.4	32.6	32.7	32.8	33.0	33.1
775	33.2	33.4	33.5	33.6	33.8	33.9	34.0	34.2	34.3	34.4
776	34.6	34.7	34.8	35.0	35.1	35.2	35.4	35.5	35.6	35.8
777	35.9	36.0	36.2	36.3	36.4	36.6	36.7	36.8	37.0	37.1
778	37.2	37.4	37.5	37.6	37.8	37.9	38.0	38.2	38.3	38.4
779	38.6	38.7	38.8	39.0	39.1	39.2	39.4	39.5	39.6	39.8
780	39.9	40.0	40.2	40.3	40.4	40.6	40.7	40.8	41.0	41.1
781	41.2	41.4	41.5	41.6	41.8	41.9	42.0	42.2	42.3	42.4
782	42.6	42.7	42.8	43.0	43.1	43.2	43.4	43.5	43.6	43.8
783	43.9	44.0	44.2	44.3	44.4	44.6	44.7	44.8	45.0	45.1
784	45.2	45.4	45.5	45.6	45.8	45.9	46.0	46.2	46.3	46.4
785	46.6	46.7	46.8	47.0	47.1	47.2	47.4	47.5	47.6	47.8
786	47.9	48.0	48.2	48.3	48.4	48.6	48.7	48.8	49.0	49.1
787	49.2	49.4	49.5	49.6	49.8	49.9	50.0	50.2	50.3	50.4

\*The hundreds and thousands digits are not recorded. The true range of this part of Table 20 is 1021.2 mbs. - 1050.4 mbs.

TABLE 21

## Temperature

Conversion from Fahrenheit to Centigrade

°F	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
130	54.4	54.5	54.6	54.6	54.7	54.7	54.8	54.8	54.9	54.9
129	53.9	53.9	54.0	54.1	54.1	54.2	54.2	54.3	54.3	54.4
128	53.3	53.4	53.5	53.6	53.6	53.6	53.7	53.7	53.8	53.8
127	52.8	52.8	52.9	52.9	53.0	53.1	53.1	53.2	53.2	53.3
126	52.2	52.3	52.3	52.4	52.4	52.5	52.6	52.6	52.7	52.7
125	51.7	51.7	51.8	51.8	51.9	51.9	52.0	52.1	52.1	52.2
124	51.1	51.2	51.2	51.3	51.3	51.4	51.4	51.5	51.6	51.6
123	50.6	50.6	50.7	50.7	50.8	50.8	50.9	50.9	51.0	51.1
122	50.0	50.1	50.1	50.2	50.2	50.3	50.3	50.4	50.4	50.5
121	49.4	49.5	49.6	49.6	49.7	49.7	49.8	49.8	49.9	49.9
120	48.9	48.9	49.0	49.1	49.1	49.2	49.2	49.3	49.3	49.4
119	48.3	48.4	48.4	48.5	48.6	48.6	48.7	48.7	48.8	48.8
118	47.8	47.8	47.9	47.9	48.0	48.1	48.1	48.2	48.2	48.3
117	47.2	47.3	47.3	47.4	47.4	47.5	47.6	47.6	47.7	47.7
116	46.7	46.7	46.8	46.8	46.9	46.9	47.0	47.1	47.1	47.2
115	46.1	46.2	46.2	46.3	46.3	46.4	46.4	46.5	46.6	46.6
114	45.6	45.6	45.7	45.7	45.8	45.8	45.9	45.9	46.0	46.1
113	45.0	45.1	45.1	45.2	45.2	45.3	45.3	45.4	45.4	45.5
112	44.4	44.5	44.6	44.7	44.7	44.7	44.8	44.8	44.9	44.9
111	43.9	43.9	44.0	44.1	44.1	44.2	44.2	44.3	44.3	44.4
110	43.3	43.4	43.4	43.5	43.6	43.6	43.7	43.7	43.8	43.8
109	42.8	42.8	42.9	43.0	43.0	43.1	43.1	43.2	43.2	43.3
108	42.2	42.3	42.3	42.4	42.4	42.5	42.6	42.6	42.7	42.7
107	41.7	41.7	41.8	41.8	41.9	41.9	42.0	42.1	42.1	42.2
106	41.1	41.2	41.2	41.3	41.3	41.4	41.4	41.5	41.6	41.6
105	40.6	40.6	40.7	40.7	40.8	40.8	40.9	40.9	41.0	41.1
104	40.0	40.1	40.1	40.2	40.2	40.3	40.3	40.4	40.4	40.5

TABLE 21 (Cont'd)

## Temperature

Conversion from Fahrenheit to Centigrade

°F	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
103	39.4	39.5	39.6	39.6	39.7	39.7	39.8	39.8	39.9	39.9
102	38.9	38.9	39.0	39.1	39.1	39.2	39.2	39.3	39.3	39.4
101	38.3	38.4	38.4	38.5	38.6	38.6	38.7	38.7	38.8	38.8
100	37.8	37.8	37.9	37.9	38.0	38.1	38.1	38.2	38.2	38.3
99	37.2	37.3	37.3	37.4	37.4	37.5	37.6	37.6	37.7	37.7
98	36.7	36.7	36.8	36.8	36.9	36.9	37.0	37.1	37.1	37.2
97	36.1	36.2	36.2	36.2	36.3	36.4	36.4	36.5	36.6	36.6
96	35.6	35.6	35.7	35.7	35.8	35.8	35.9	35.9	36.0	36.1
95	35.0	35.1	35.1	35.2	35.2	35.3	35.3	35.4	35.4	35.5
94	34.4	34.5	34.6	34.6	34.7	34.7	34.8	34.8	34.9	34.9
93	33.9	33.9	34.0	34.1	34.1	34.2	34.2	34.3	34.3	34.4
92	33.3	33.4	33.4	33.5	33.6	33.6	33.7	33.7	33.8	33.8
91	32.8	32.8	32.9	32.9	33.0	33.1	33.1	33.2	33.2	33.3
90	32.2	32.3	32.3	32.4	32.4	32.5	32.6	32.6	32.7	32.7
89	31.7	31.7	31.8	31.8	31.9	31.9	32.0	32.1	32.1	32.2
88	31.1	31.2	31.2	31.3	31.3	31.4	31.4	31.5	31.6	31.6
87	30.6	30.6	30.7	30.7	30.8	30.8	30.9	30.9	31.0	31.1
86	30.0	30.1	30.1	30.2	30.2	30.3	30.3	30.4	30.4	30.5
85	29.4	29.5	29.6	29.6	29.7	29.7	29.8	29.8	29.9	29.9
84	28.9	28.9	29.0	29.1	29.1	29.2	29.2	29.3	29.3	29.3
83	28.3	28.4	28.4	28.5	28.6	28.6	28.7	28.7	28.8	28.8
82	27.8	27.8	27.9	28.9	28.0	28.1	28.1	28.2	28.2	28.3
81	27.2	27.3	27.3	27.4	27.4	27.5	27.6	27.6	27.7	27.7
80	26.7	26.7	26.8	26.8	26.9	26.9	27.0	27.1	27.1	27.2
79	26.1	26.2	26.2	26.3	26.3	26.4	26.4	26.5	26.6	26.6
78	25.6	25.6	25.7	25.7	25.8	25.8	25.9	25.9	26.0	26.1
77	25.0	25.1	25.1	25.2	25.2	25.3	25.3	25.4	25.4	25.5

TABLE 21 (Cont'd)

## Temperature

## Conversion from Fahrenheit to Centigrade

°F	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
76	24.4	24.5	24.6	24.6	24.7	24.7	24.8	24.8	24.9	24.9
75	23.9	23.9	24.0	24.1	24.1	24.2	24.2	24.3	24.3	24.4
74	23.3	23.4	23.4	23.5	23.6	23.6	23.7	23.7	23.8	23.8
73	22.8	22.8	22.9	22.9	23.0	23.1	23.1	23.2	23.2	23.3
72	22.2	22.3	22.3	22.4	22.4	22.5	22.6	22.6	22.7	22.7
71	21.7	21.7	21.8	21.8	21.9	21.9	22.0	22.1	22.1	22.2
70	21.1	21.2	21.2	21.3	21.3	21.4	21.4	21.5	21.6	21.6
69	20.6	20.6	20.7	20.7	20.8	20.8	20.9	20.9	21.0	21.1
68	20.0	20.1	20.1	20.2	20.2	20.3	20.3	20.4	20.4	20.5
67	19.4	19.5	19.6	19.6	19.7	19.7	19.8	19.8	19.9	19.9
66	18.9	18.9	19.0	19.1	19.1	19.2	19.2	19.3	19.3	19.4
65	18.3	18.4	18.4	18.5	18.6	18.6	18.7	18.7	18.8	18.8
64	17.8	17.8	17.9	17.9	18.0	18.1	18.1	18.2	18.2	18.3
63	17.2	17.3	17.3	17.4	17.4	17.5	17.6	17.6	17.7	17.7
62	16.7	16.7	16.8	16.8	16.9	16.9	17.0	17.1	17.1	17.2
61	16.1	16.2	16.2	16.3	16.3	16.4	16.4	16.5	16.6	16.6
60	15.6	15.6	15.7	15.7	15.8	15.8	15.9	15.9	16.0	16.1
59	15.0	15.1	15.1	15.2	15.2	15.3	15.3	15.4	15.4	15.5
58	14.4	14.5	14.6	14.6	14.7	14.7	14.8	14.8	14.9	14.9
57	13.9	13.9	14.0	14.1	14.1	14.2	14.2	14.3	14.3	14.4
56	13.3	13.4	13.4	13.5	13.6	13.6	13.7	13.7	13.8	13.8
55	12.8	12.8	12.9	12.9	13.0	13.1	13.1	13.2	13.2	13.3
54	12.2	12.3	12.3	12.4	12.4	12.5	12.6	12.6	12.7	12.7
53	11.7	11.7	11.8	11.8	11.9	11.9	12.0	12.1	12.1	12.2
52	11.1	11.2	11.2	11.3	11.3	11.4	11.4	11.5	11.6	11.6
51	10.6	10.6	10.7	10.7	10.8	10.8	10.9	10.9	11.0	11.1
50	10.0	10.1	10.1	10.2	10.2	10.3	10.3	10.4	10.4	10.5



TABLE 21 (Cont'd)

## Temperature

Conversion from Fahrenheit to Centigrade

°F	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
49	09.4	09.5	09.6	09.6	09.7	09.7	09.8	09.8	09.9	09.9
48	08.9	08.9	09.0	09.1	09.1	09.2	09.2	09.3	09.3	09.4
47	08.3	08.4	08.4	08.5	08.6	08.6	08.7	08.7	08.8	08.8
46	07.8	07.8	07.9	07.9	08.0	08.1	08.1	08.2	08.2	08.3
45	07.2	07.3	07.3	07.4	07.4	07.5	07.6	07.6	07.7	07.7
44	06.7	06.7	06.8	06.8	06.9	06.9	07.0	07.1	07.1	07.2
43	06.1	06.2	06.2	06.3	06.3	06.4	06.4	06.5	06.6	06.6
42	05.6	05.6	05.7	05.7	05.8	05.8	05.9	05.9	06.0	06.1
41	05.0	05.1	05.1	05.2	05.2	05.3	05.3	05.4	05.4	05.5
40	04.4	04.5	04.6	04.6	04.7	04.7	04.8	04.8	04.9	04.9
39	03.9	03.9	04.0	04.1	04.1	04.2	04.2	04.3	04.3	04.4
38	03.3	03.4	03.4	03.5	03.6	03.6	03.7	03.7	03.8	03.8
37	02.8	02.8	02.9	02.9	03.0	03.1	03.1	03.2	03.2	03.3
36	02.2	02.3	02.3	02.4	02.4	02.5	02.6	02.6	02.7	02.7
35	01.7	01.7	01.8	01.8	01.9	01.9	02.0	02.1	02.1	02.2
34	01.1	01.2	01.2	01.3	01.3	01.4	01.4	01.5	01.6	01.6
33	00.6	00.6	00.7	00.7	00.8	00.8	00.9	00.9	01.0	01.1
32	00.0	00.1	00.1	00.2	00.2	00.3	00.3	00.4	00.4	00.5
31	-00.6	-00.5	-00.4	-00.4	-00.3	-00.3	-00.2	-00.2	-00.1	-00.1
30	-01.1	-01.1	-01.0	-00.9	-00.9	-00.8	-00.8	-00.7	-00.7	-00.6
29	-01.7	-01.6	-01.6	-01.5	-01.4	-01.4	-01.3	-01.3	-01.2	-01.2
28	-02.2	-02.2	-02.1	-02.1	-02.0	-01.9	-01.9	-01.8	-01.8	-01.7
27	-02.8	-02.7	-02.7	-02.6	-02.6	-02.5	-02.4	-02.4	-02.3	-02.3
26	-03.3	-03.3	-03.2	-03.2	-03.1	-03.1	-03.0	-02.9	-02.9	-02.8
25	-03.9	-03.8	-03.8	-03.7	-03.7	-03.6	-03.6	-03.5	-03.4	-03.4
24	-04.4	-04.4	-04.3	-04.3	-04.2	-04.2	-04.1	-04.1	-04.0	-03.9
23	-05.0	-04.9	-04.9	-04.8	-04.8	-04.7	-04.7	-04.6	-04.6	-04.5

TABLE 21 (Cont'd)

## Temperature

Conversion from Fahrenheit to Centigrade

°F	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
22	-05.6	-05.5	-05.4	-05.4	-05.3	-05.3	-05.2	-05.2	-05.1	-05.1
21	-06.1	-06.1	-06.0	-05.9	-05.9	-05.9	-05.8	-05.7	-05.7	-05.6
20	-06.7	-06.6	-06.6	-06.5	-06.4	-06.4	-06.3	-06.3	-06.2	-06.2
19	-07.2	-08.2	-07.1	-07.1	-07.0	-06.9	-06.9	-06.8	-06.8	-06.7
18	-07.8	-07.7	-07.7	-07.6	-07.6	-07.5	-07.4	-07.4	-07.3	-07.3
17	-08.3	-08.3	-08.2	-08.2	-08.1	-08.1	-08.0	-07.9	-07.9	-07.8
16	-08.9	-08.8	-08.8	-08.7	-08.7	-08.6	-08.6	-08.5	-08.4	-08.4
15	-09.4	-09.4	-09.3	-09.3	-09.2	-09.2	-09.1	-09.1	-09.0	-08.9
14	-10.0	-09.9	-09.9	-09.8	-09.8	-09.7	-09.7	-09.6	-09.6	-09.5
13	-10.6	-10.5	-10.4	-10.4	-10.3	-10.3	-10.2	-10.2	-10.1	-10.1
12	-11.1	-11.1	-11.0	-10.9	-10.9	-10.8	-10.8	-10.7	-10.7	-10.6
11	-11.7	-11.6	-11.6	-11.5	-11.4	-11.4	-11.3	-11.3	-11.2	-11.2
10	-12.2	-12.2	-12.1	-12.1	-12.0	-11.9	-11.9	-11.8	-11.8	-11.7
9	-12.8	-12.7	-12.7	-12.6	-12.6	-12.5	-12.4	-12.4	-12.3	-12.3
8	-13.3	-13.3	-13.2	-13.2	-13.1	-13.1	-13.0	-12.9	-12.9	-12.8
7	-13.9	-13.8	-13.8	-13.7	-13.7	-13.6	-13.6	-13.5	-13.4	-13.4
6	-14.4	-14.4	-14.3	-14.3	-14.2	-14.2	-14.1	-14.1	-14.0	-13.9
5	-15.0	-14.9	-14.9	-14.8	-14.8	-14.7	-14.7	-14.6	-14.6	-14.5
4	-15.6	-15.5	-15.4	-15.4	-15.3	-15.3	-15.2	-15.2	-15.1	-15.1
3	-16.1	-16.1	-16.0	-15.9	-15.9	-15.8	-15.8	-15.7	-15.7	-15.6
2	-16.7	-16.6	-16.6	-16.5	-16.4	-16.4	-16.3	-16.3	-16.2	-16.2
1	-17.2	-17.2	-17.1	-17.1	-17.0	-16.9	-16.9	-16.8	-16.8	-16.7
0	-17.8	-17.7	-17.7	-17.6	-17.6	-17.5	-17.4	-17.4	-17.3	-17.3
-0	-17.8	-17.8	-17.9	-17.9	-18.0	-18.1	-18.1	-18.2	-18.2	-18.3
-1	-18.3	-18.4	-18.4	-18.5	-18.6	-18.6	-18.7	-18.7	-18.8	-18.8
-2	-18.9	-18.9	-19.0	-19.1	-19.1	-19.2	-19.2	-19.3	-19.3	-19.4
-3	-19.4	-19.5	-19.6	-19.6	-19.7	-19.7	-19.8	-19.8	-19.9	-19.9

TABLE 21 (Cont'd)

## Temperature

Conversion from Fahrenheit to Centigrade

°F	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
-4	-20.0	-20.1	-20.1	-20.2	-20.2	-20.3	-20.3	-20.4	-20.4	-20.5
-5	-20.6	-20.6	-20.7	-20.7	-20.3	-20.8	-20.9	-20.9	-21.0	-21.1
-6	-21.1	-21.2	-21.2	-21.3	-21.3	-21.4	-21.4	-21.5	-21.6	-21.6
-7	-21.7	-21.7	-21.8	-21.8	-21.9	-21.9	-22.0	-22.1	-22.1	-22.2
-8	-22.2	-22.3	-22.3	-22.4	-22.4	-22.5	-22.6	-22.6	-22.7	-22.7
-9	-22.8	-22.8	-22.9	-22.9	-23.0	-23.1	-23.1	-23.2	-23.2	-23.3
-10	-23.3	-23.4	-23.4	-23.5	-23.6	-23.6	-23.7	-23.7	-23.8	-23.8
-11	-23.9	-23.9	-24.0	-24.1	-24.1	-24.2	-24.2	-24.3	-24.3	-24.4
-12	-24.4	-24.5	-24.6	-24.6	-24.7	-24.7	-24.8	-24.8	-24.9	-24.9
-13	-25.0	-25.1	-25.1	-25.2	-25.2	-25.3	-25.3	-25.4	-25.4	-25.5
-14	-25.6	-25.6	-25.7	-25.7	-25.8	-25.8	-25.9	-26.9	-26.0	-26.1
-15	-26.1	-26.2	-26.2	-26.3	-26.3	-26.4	-26.4	-26.5	-26.6	-26.6
-16	-26.7	-26.7	-26.8	-26.8	-26.9	-26.9	-27.0	-27.1	-27.1	-27.2
-17	-27.2	-27.3	-27.3	-27.4	-27.4	-27.5	-27.6	-27.6	-27.7	-27.7
-18	-27.8	-27.8	-27.9	-28.9	-28.0	-28.1	-28.1	-28.2	-28.2	-28.3
-19	-28.3	-28.4	-28.4	-28.5	-28.6	-28.6	-28.7	-28.7	-28.8	-28.8
-20	-28.9	-28.9	-29.0	-29.1	-29.1	-29.2	-29.2	-29.3	-29.3	-29.4
-21	-29.4	-29.5	-29.6	-29.6	-29.7	-29.7	-29.8	-29.8	-29.9	-29.9
-22	-30.0	-30.1	-30.1	-30.2	-30.2	-30.3	-30.3	-30.4	-30.4	-30.5
-23	-30.6	-30.6	-30.7	-30.7	-30.8	-30.8	-30.9	-30.9	-31.0	-31.1
-24	-31.1	-31.2	-31.2	-31.3	-31.3	-31.4	-31.4	-31.6	-31.6	-31.6
-25	-31.7	-31.7	-31.8	-31.8	-31.9	-31.9	-32.0	-32.1	-32.1	-32.2
-26	-32.2	-32.3	-32.3	-32.4	-32.4	-32.5	-32.6	-32.6	-32.7	-32.7
-27	-32.8	-32.8	-32.9	-32.9	-33.0	-33.1	-33.1	-33.2	-33.2	-33.3
-28	-33.3	-33.4	-33.4	-33.5	-33.6	-33.6	-33.7	-33.7	-33.8	-33.8
-29	-33.9	-33.9	-34.0	-34.1	-34.1	-34.2	-34.2	-34.3	-34.3	-34.4
-30	-34.4	-34.5	-34.6	-34.6	-34.7	-34.7	-34.8	-34.8	-34.9	-34.9

TABLE 21 (Cont'd)

## Temperature

Conversion from Fahrenheit to Centigrade

°F	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
-31	-35.0	-35.1	-35.1	-35.2	-35.2	-35.3	-35.3	-35.4	-35.4	-35.5
-32	-35.6	-35.6	-35.7	-35.7	-35.8	-35.8	-35.9	-35.9	-36.0	-36.1
-33	-36.1	-36.2	-36.2	-36.3	-36.3	-36.4	-36.4	-36.5	-36.6	-36.6
-34	-36.7	-36.7	-36.8	-36.8	-36.9	-36.9	-37.0	-37.1	-37.1	-37.2
-35	-37.2	-37.3	-37.3	-37.4	-37.4	-37.5	-37.6	-37.6	-37.7	-37.7
-36	-37.8	-37.8	-37.9	-37.9	-38.0	-38.1	-38.1	-38.2	-38.2	-38.3
-37	-38.3	-38.4	-38.4	-38.4	-38.5	-38.6	-38.6	-38.7	-38.7	-38.8
-38	-38.9	-38.9	-39.0	-39.1	-39.1	-39.2	-39.2	-39.3	-39.3	-39.4
-39	-39.4	-39.5	-39.6	-39.6	-39.7	-39.7	-39.8	-39.8	-39.9	-39.9
-40	-40.0	-40.1	-40.1	-40.2	-40.2	-40.3	-40.3	-40.4	-40.4	-40.5
-41	-40.6	-40.6	-40.7	-40.7	-40.8	-40.8	-40.9	-40.9	-41.0	-41.1
-42	-41.1	-41.2	-41.2	-41.3	-41.3	-41.4	-41.4	-41.5	-41.6	-41.6
-43	-41.7	-41.7	-41.8	-41.8	-41.9	-41.9	-42.0	-42.1	-42.1	-42.2
-44	-42.2	-42.3	-42.3	-42.4	-42.4	-42.6	-42.6	-42.6	-42.7	-42.7
-45	-42.8	-42.8	-42.9	-42.9	-43.0	-43.1	-43.1	-43.2	-43.2	-43.3
-46	-43.3	-43.4	-43.4	-43.5	-43.6	-43.6	-43.7	-43.7	-43.8	-43.8
-47	-43.9	-43.9	-44.0	-44.1	-44.1	-44.2	-44.2	-44.3	-44.3	-44.4
-48	-44.4	-44.5	-44.6	-44.6	-44.7	-44.7	-44.8	-44.8	-44.9	-44.9
-49	-45.0	-45.1	-45.1	-45.2	-45.2	-45.3	-45.3	-45.4	-45.4	-45.5
-50	-45.6	-45.6	-45.7	-45.7	-45.8	-45.8	-45.9	-45.9	-46.0	-46.1
-51	-46.1	-46.2	-46.2	-46.3	-46.3	-46.4	-46.4	-46.5	-46.5	-46.6
-52	-46.7	-46.7	-46.8	-46.8	-46.9	-46.9	-47.0	-47.1	-47.1	-47.2
-55	-47.2	-47.3	-47.3	-47.4	-47.4	-47.5	-47.6	-47.6	-47.7	-47.7
-54	-47.8	-47.8	-47.9	-47.9	-48.0	-48.1	-48.1	-48.2	-48.2	-48.3
-55	-48.3	-48.4	-48.4	-48.5	-48.6	-48.6	-48.7	-48.7	-48.8	-48.8
-56	-48.9	-48.9	-49.0	-49.1	-49.1	-49.2	-49.2	-49.3	-49.3	-49.4
-57	-49.4	-49.5	-49.6	-49.6	-49.7	-49.7	-49.8	-49.8	-49.9	-49.9

TABLE 21 (Cont'd)

## Temperature

Conversion from Fahrenheit to Centigrade

°F	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
-58	-50.0	-50.1	-50.1	-50.2	-50.2	-50.3	-50.3	-50.4	-50.4	-50.5
-59	-50.6	-50.6	-50.7	-50.7	-50.8	-50.8	-50.9	-50.9	-51.0	-51.1
-60	-51.1	-51.2	-51.2	-51.3	-51.3	-51.4	-51.4	-51.5	-51.6	-51.6
-61	-51.7	-51.7	-51.8	-51.8	-51.9	-51.9	-52.0	-52.1	-52.1	-52.2
-62	-52.2	-52.3	-52.3	-52.4	-52.4	-52.5	-52.6	-52.6	-52.7	-52.7
-63	-52.8	-52.8	-52.9	-52.9	-53.0	-53.1	-53.1	-53.2	-53.2	-53.3
-64	-53.3	-53.4	-53.4	-53.5	-53.6	-53.6	-53.7	-53.7	-53.8	-53.8
-65	-53.9	-53.9	-54.0	-54.1	-54.1	-54.2	-54.2	-54.3	-54.3	-54.4
-66	-54.4	-54.6	-54.6	-54.6	-54.7	-54.7	-54.8	-54.8	-54.9	-54.9
-67	-55.0	-55.1	-55.1	-55.2	-55.2	-55.3	-55.3	-55.4	-55.4	-55.5
-68	-55.6	-55.6	-55.7	-55.7	-55.8	-55.8	-55.9	-55.9	-56.0	-56.1
-69	-56.1	-56.2	-56.2	-56.3	-56.3	-56.4	-56.4	-56.5	-56.6	-56.6
-70	-56.7	-56.7	-56.8	-56.8	-56.9	-56.9	-57.0	-57.1	-57.1	-57.2

TABLE 22

Present Weather

WMO Code 4501 for recording present weather

Code  
figure

- 0 Clear (no cloud at any level)
- 1 Partly cloudy (scattered or broken)
- 2 Continuous layer(s) of cloud(s)
- 3 Sandstorm, duststorm, or blowing snow
- 4 Fog, thick dust or haze
- 5 Drizzle
- 6 Rain
- 7 Snow, or rain and snow mixed
- 8 Shower(s)
- 9 Thunderstorm(s)

TABLE 23

## Present Weather

Conversion from Beaufort weather notation to WMO Code 4501

<u>Abbreviation</u>	<u>Description</u>	<u>Code</u>
b.	Blue sky whether with clear or hazy atmosphere, or sky not more than one-quarter clouded.	0
bc.	Sky between one-quarter and three-quarters clouded.	1
c.	Mainly cloudy (not less than three-quarters covered.)	1
d.	Drizzle or fine rain.	5
e.	Wet air without rain falling.	4
f.	Fog.	4
fe.	Wet fog.	4
g.	Gloomy.	2
h.	Hail.	9
kq.	Line squall.	9
l.	Lightning	9
m.	Mist.	4
o.	Overcast sky (i.e., the whole sky covered with unbroken cloud).	2
p.	Passing showers.	8
q.	Squalls.	9
r.	Rain.	6
rs.	Sleet (i.e., rain and snow together).	7
s.	Snow.	7
t.	Thunder.	9
tl.	Thunderstorm.	9
u.	Ugly, threatening sky.	2
v.	Unusual visibility.	0
z.	Dust haze; the turbid atmosphere of dry weather.	4

TABLE 24

Present Weather

Conversion from 1936 International Meteorological Organization Code to the  
WMO Code 4501

	<u>Code Underlined</u>	WMO Code 4501 (modified)
	ABBREVIATED DESCRIPTION OF SKY AND SPECIAL PHENOMENA	
00	Cloudless	0
01	Partly cloudy.	1
02	Cloudy.	1
03	Overcast.	2
04	Low fog, on ground or over sea.	4
05	Haze (but visibility greater than 2,000 m., 2,200 yds).	4
06	Dust devils seen.	4
07	Distant lightning.	9
08	Light fog or mist (visibility between 1,000 and 2,000 m., 1,100 and 2,200 yds).	4
09	Fog at a distance, but not at the ship.	4
10	Precipitation within sight.	6
11	Thunder, without precipitation at the ship.	9
12	Dust storm within sight, but not at the ship.	3
13	Ugly, threatening sky.	9
14	Squally weather.	9
15	Heavy squalls. } in last 3 hours	9
16	Waterspouts seen. }	9

PRECIPITATION IN LAST HOUR BUT NOT AT TIME OF OBSERVATION

20	Precipitation (rain, drizzle, hail, snow, or sleet)	-
21	Drizzle	5
22	Rain	6
23	Snow	6
24	Rain and snow or sleet	6
25	Rain shower (s).	7
26	Snow shower (s).	7
27	Hail or rain and hail shower (s).	8
28	Slight thunderstorm.	7
29	Heavy thunderstorm.	9

} other than showers

} in last hour  
but not at  
time of  
observation.



TABLE 24 (Cont'd)

Conversion from 1936 International Meteorological Organization Code to the

WMO Code 4501

DUST STORMS AND STORMS OF DRIFTING SNOW		WMO
(Visibility less than 1,000 m., 1,100 yards)		Code
		4501
		(modified)
30	Dust or sand storm.	3
31	Dust or sand storm, has decreased.	3
32	Dust or sand storm, no appreciable change.	3
33	Dust or sand storm, has increased.	3
34	Line of dust storms.	-
35	Storm of drifting snow.	3
36	Slight storm of drifting snow	3
37	Heavy storm of drifting snow	3
38	Slight storm of drifting snow	3
39	Heavy storm of drifting snow	3
	} generally low.	
	} generally high.	
FOG		
(Visibility less than 1,000 m., 1,100 yards)		
40	Fog.	4
41	Moderate fog in last hour	4
42	Thick fog in last hour	4
43	Fog, sky discernible	4
44	Fog, sky not discernible	4
45	Fog, sky discernible	4
46	Fog, sky not discernible	4
47	Fog, sky discernible	4
48	Fog, sky not discernible	4
49	Fog in patches.	4
} but not at time of observation.		
} has become thinner during last hour.		
} no appreciable change during last hour		
} has begun or become thicker during last hour		
DRIZZLE		
(Precipitation consisting of numerous minute drops)		
50	Drizzle	5
51	Intermittent	5
52	Continuous	5
53	Intermittent	5
54	Continuous	5
55	Intermittent	5
56	Continuous	5
57	Drizzle and fog.	-
58	Slight or moderate	5
59	Thick	5
} slight drizzle.		
} moderate drizzle.		
} thick drizzle.		
} drizzle and rain.		

TABLE 24 (Cont'd)

Conversion from 1936 International Meteorological Organization Code to the  
WMO Code 4501

RAIN

60	Rain.			6
61	Intermittent	}	slight rain.	6
62	Continuous			6
63	Intermittent	}	moderate rain.	6
64	Continuous			6
65	Intermittent	}	heavy rain.	6
66	Continuous			6
67	Rain and fog.			-
68	Slight or moderate	}	rain and snow, mixed.	7
69	Heavy			7

SNOW

70	Snow or sleet			7
71	Intermittent	}	slight snow in flakes	7
72	Continuous			7
73	Intermittent	}	moderate snow in flakes	7
74	Continuous			7
75	Intermittent	}	heavy snow in flakes	7
76	Continuous			7
77	Snow and fog.			-
78	Granular snow (frozen drizzle).			7
79	Ice crystals;			7

SHOWERS (S)

80	Shower (s)			8
81	Shower (s) of slight or moderate	}	rain	8
82	Shower (s) of heavy			8
83	Shower (s) of slight or moderate	}	snow	7
84	Shower (s) of heavy			7
85	Shower (s) of slight or moderate	}	rain and snow.	7
86	Shower (s) of heavy			7
87	Shower (s) of granular snow			7
88	Shower (s) of slight or moderate	}	hail, or rain and hail.	7
89	Shower (s) of heavy			7

TABLE 24 (Cont'd)

Conversion from 1936 International Meteorological Organization Code to the

		WMO Code 4501		WMO Code 4501 (modified)
		THUNDERSTORM		
90	Thunderstorm			9
91	Rain at time	} thunderstorm during last hour, but not at time of observation.		9
92	Snow, or sleet at time			9
93	Thunderstorm, slight without hail or soft hail, but with rain (or snow)			9
94	Thunderstorm slight with soft hail	} at time of observation.		9
95	Thunderstorm moderate without hail, but with rain (or snow)			9
96	Thunderstorm moderate with soft hail			9
97	Thunderstorm heavy without hail, but with rain (or snow)			9
98	Thunderstorm combined with dust storm			9
99	Thunderstorm heavy with hail			9

TABLE 25

Present Weather

WMO Code 4677 for recording present weather

		Code figure	
		ww	
No meteors except photometeors	}	00	Cloud development not observed or not observable
		01	Clouds generally dissolving or becoming less developed
		02	State of sky on the whole unchanged
		03	Clouds generally forming or developing
Haze, dust, sand or smoke	}	04	Visibility reduced by smoke, e. g. veldt or forest fires, industrial smoke or volcanic ashes
		05	Haze
		06	Widespread dust in suspension in the air, not raised by wind at or near the station at the time of observation
		07	Dust or sand raised by wind at or near the station at the time of observation, but no well developed dust whirl(s) or sand whirl(s), and no duststorm or sandstorm seen
		08	Well developed dust whirl(s) or sand whirl(s) seen at or near the station during the preceding hour or at the time of observation, but no duststorm or sandstorm
		09	Duststorm or sandstorm within sight at the time of observation, or at the station during the preceding hour
		10	Mist
		11	} shallow fog or ice fog at the station, whether on land or sea, not deeper than about 2 metres on land or 10 metres at sea
		12	
		13	Lightning visible, no thunder heard
		14	Precipitation within sight, not reaching the ground or the surface of the sea
		15	Precipitation within sight, reaching the ground or the surface of the sea, but distant (i. e. estimated to be more than 5 km) from the station
		16	Precipitation within sight, reaching the ground or the surface of the sea, near to, but not at the station
		17	Thunderstorm, but no precipitation at the time of observation
		18	} at or within sight of the station during the preceding hour or at the time of observation
		19	

\* The expression "at the station" refers to a land station or a ship.

\*\* Tornado cloud or waterspout.

TABLE 25 (Cont'd)

ww = 20 - 29 Precipitation, fog, ice fog or thunderstorm at the station during the preceding hour but not at the time of observation

## Code figure

ww

20	Drizzle (not freezing) or snow grains	} not falling as shower(s)
21	Rain (not freezing)	
22	Snow	
23	Rain and snow or ice pellets, type (a)	
24	Freezing drizzle or freezing rain	
25	Shower(s) of rain	
26	Shower(s) of snow, or of rain and snow	
27	Shower(s) of hail*, or of rain and hail*	
28	Fog or ice fog	
29	Thunderstorm (with or without precipitation)	

ww = 30 - 39 Duststorm, sandstorm, drifting or blowing snow

ww

30	} Slight or moderate dust-storm or sandstorm	} - has decreased during the preceding hour - no appreciable change during the preceding hour - has begun or has increased during the preceding hour
31		
32		
33	} Severe duststorm or sandstorm	} - has decreased during the preceding hour - no appreciable change during the preceding hour - has begun or has increased during the preceding hour
34		
35		
36	Slight or moderate blowing snow	} generally low (below eye level)
37	Heavy drifting snow	
38	Slight or moderate blowing snow	} generally high (above eye level)
39	Heavy blowing snow	

ww = 40 - 49 Fog or ice fog at the time of observation

ww

40	Fog or ice fog at a distance at the time of observation, but not at the station during the preceding hour, the fog or ice fog extending to a level above that of the observer	
41	Fog or ice fog in patches	
42	Fog or ice fog, sky visible	} has become thinner during the preceding hour
43	Fog or ice fog, sky invisible	

\* Hail, ice pellets, type (b), snow pellets. French: grêle, grésil ou neige roulée.

TABLE 25 (Cont'd)

Code figure	
44	Fog or ice fog, sky visible
45	Fog or ice fog, sky invisible
46	Fog or ice fog, sky visible
47	Fog or ice fog, sky invisible
48	Fog, depositing rime, sky visible
49	Fog, depositing rime, sky invisible
<hr/>	
ww = 50 - 99	<i>Precipitation at the station at the time of observation</i>
<hr/>	
ww = 50 - 59	Drizzle
<hr/>	
ww	
50	Drizzle, not freezing, intermittent
51	Drizzle, not freezing, continuous
52	Drizzle, not freezing, intermittent
53	Drizzle, not freezing, continuous
54	Drizzle, not freezing, intermittent
55	Drizzle, not freezing, continuous
56	Drizzle, freezing, slight
57	Drizzle, freezing, moderate or heavy (dense)
58	Drizzle and rain, slight
59	Drizzle and rain, moderate or heavy
<hr/>	
ww = 60 - 69	Rain
<hr/>	
ww	
60	Rain, not freezing, intermittent
61	Rain, not freezing, continuous
62	Rain, not freezing, intermittent
63	Rain, not freezing, continuous
64	Rain, not freezing, intermittent
65	Rain, not freezing, continuous
66	Rain, freezing, slight
67	Rain, freezing, moderate or heavy
68	Rain or drizzle and snow, slight
69	Rain or drizzle and snow, moderate or heavy
<hr/>	
ww = 70 - 79	Solid precipitation not in showers
<hr/>	
ww	
70	Intermittent fall of snow flakes
71	Continuous fall of snow flakes
72	Intermittent fall of snow flakes
73	Continuous fall of snow flakes

TABLE 25 (Cont'd)

Code figure		
74	Intermittent fall of snow flakes	} heavy at time of observation
75	Continuous fall of snow flakes	
76	Ice prisms (with or without fog)	
77	Snow grains (with or without fog)	
78	Isolated starlike snow crystals (with or without fog)	
79	Ice pellets, type (a)	
<hr/>		
ww = 80 - 99	Showery precipitation, or precipitation with current or recent thunderstorm	
<hr/>		
ww		
80	Rain shower(s), slight	
81	Rain shower(s), moderate or heavy	
82	Rain shower(s), violent	
83	Shower(s) of rain and snow mixed, slight	
84	Shower(s) of rain and snow mixed, moderate or heavy	
85	Snow shower(s), slight	
86	Snow shower(s), moderate or heavy	
87	} Shower(s) of snow pellets or ice pellets, type (b), with or without rain or rain and snow mixed	- slight
88		- moderate or heavy
89	} Shower(s) of hail*, with or without rain or rain and snow mixed, not associated with thunder	- slight
90		- moderate or heavy
91	Slight rain at time of observation	} thunderstorm during the preceding hour but not at time of observation
92	Moderate or heavy rain at time of observation	
93	Slight snow, or rain and snow mixed or hail** at time of observation	
94	Moderate or heavy snow, or rain and snow mixed or hail** at time of observation	
95	Thunderstorm, slight or moderate, without hail**, but with rain and/or snow at time of observation	} thunderstorm at time of observation
96	Thunderstorm, slight or moderate, with hail** at time of observation	
97	Thunderstorm, heavy, without hail**, but with rain and/or snow at time of observation	
98	Thunderstorm combined with dust-storm or sandstorm at time of observation	
99	Thunderstorm, heavy, with hail** at time of observation	

\* French: grêle.

\*\* Hail, ice pellets, type (b), snow pellets. French: grêle, grésil ou neige roulée.

TABLE 26

Cloud Type (Genus)

WMO Code 0500 for recording cloud type (genus)

Code

0	Cirrus . . . . .	Ci
1	Cirrocumulus . . . . .	Cc
2	Cirrostratus . . . . .	Cs
3	Alto cumulus . . . . .	Ac
4	Altostratus . . . . .	As
5	Nimbostratus . . . . .	Ns
6	Stratocumulus . . . . .	Sc
7	Stratus . . . . .	St
8	Cumulus . . . . .	Cu
9	Cumulonimbus . . . . .	Cb
x	Cloud not visible owing to darkness, fog, duststorm, sandstorm, or other analogous phenomena	



TABLE 27

## Cloud Amount

WMO Code 2700 for recording cloud amount

## Code

0	0	0
1	1 okta or less, but not zero	$\frac{1}{10}$ or less, but not zero
2	2 oktas	$\frac{2}{10} - \frac{3}{10}$
3	3 oktas	$\frac{4}{10}$
4	4 oktas	$\frac{5}{10}$
5	5 oktas	$\frac{6}{10}$
6	6 oktas	$\frac{7}{10} - \frac{8}{10}$
7	7 oktas or more, but not 8 oktas	$\frac{9}{10}$ or more, but not $\frac{10}{10}$
8	8 oktas	$\frac{10}{10}$
9	Sky obscured, or cloud amount cannot be estimated	

TABLE 28

Visibility

WMO Code 4300 for recording visibility at surface

Code

0	Less than 50 metres	(less than 55 yards)
1	50-200 metres	(approx. 55-220 yards)
2	200-500 metres	(approx. 220-550 yards)
3	500-1,000 metres	(approx. 550 yards-5/8 n.m.)
4	1- 2 km	(approx. 5/8-1 n.m.)
5	2- 4 km	(approx. 1- 2 n.m.)
6	4-10 km	(approx. 2- 6 n.m.)
7	10-20 km	(approx. 6-12 n.m.)
8	20-50 km	(approx. 12-30 n.m.)
9	50 km or more	(30 n.m. or more)

TABLE 29

Precision of Measurement

This table is to be added later.

TABLE 30

## Salinity

Conversion from chlorinity to salinity ‰

Cl	S	Cl	S	Cl	S	Cl	S
0.01	0.05	0.40	0.75	0.80	1.47	1.20	2.20
.02	.07	.41	.77	.81	.49	.21	.21
.03	.08	.42	.79	.82	.51	.22	.23
.04	.10	.43	.81	.83	.53	.23	.25
.05	.12	.44	.82	.84	.55	.24	.27
.06	.14	.45	.84	.85	.56	.25	.29
.07	.16	.46	.86	.86	.58	.26	.30
.08	.17	.47	.88	.87	.60	.27	.32
.09	.19	.48	.90	.88	.62	.28	.34
		.49	.91	.89	.64	.29	.36
0.10	0.21						
.11	.23	0.50	0.93	0.90	1.65	1.30	2.38
.12	.25	.51	.95	.91	.67	.31	.39
.13	.26	.52	.97	.92	.69	.32	.41
.14	.28	.53	.99	.93	.71	.33	.43
.15	.30	.54	1.00	.94	.73	.34	.45
.16	.32	.55	1.02	.95	.74	.35	.47
.17	.34	.56	1.04	.96	.76	.36	.48
.18	.35	.57	1.06	.97	.78	.37	.50
.19	.37	.58	1.08	.98	.80	.38	.52
		.59	1.09	.99	.82	.39	.54
0.20	0.39						
.21	.41	0.60	1.11	1.00	1.84		
.22	.43	.61	1.13	.01	.85		
.23	.45	.62	1.15	.02	.87		
.24	.46	.63	1.17	.03	.89		
.25	.48	.64	1.19	.04	.91		
.26	.50	.65	1.20	.05	.93		
.27	.52	.66	1.22	.06	.94		
.28	.54	.67	1.24	.07	.96		
.29	.55	.68	1.26	.08	.98		
		.69	1.28	.09	2.00		
0.30	0.57						
.31	.59	0.70	1.29	1.10	2.02		
.32	.61	.71	1.31	.11	.03		
.33	.63	.72	1.33	.12	.05		
.34	.64	.73	1.35	.13	.07		
.35	.66	.74	1.37	.14	.09		
.36	.68	.75	1.38	.15	.11		
.37	.70	.76	1.40	.16	.12		
.38	.72	.77	1.42	.17	.14		
.39	.73	.78	1.44	.18	.16		
		.79	1.46	.19	.18		

TABLE 30 (Cont'd)

## Salinity

Conversion from chlorinity to salinity (‰)

Cl	S	Cl	S	Cl	S	Cl	S
1.40	2.56	1.80	3.28	2.20	4.00	2.60	4.72
.41	.58	.81	.30	.21	.02	.61	.74
.42	.59	.82	.32	.22	.04	.62	.76
.43	.61	.83	.33	.23	.06	.63	.78
.44	.63	.84	.35	.24	.07	.64	.80
.45	.65	.85	.37	.25	.09	.65	.81
.46	.67	.86	.39	.26	.11	.66	.83
.47	.68	.87	.41	.27	.13	.67	.85
.48	.70	.88	.42	.28	.15	.68	.87
.49	.72	.89	.44	.29	.16	.69	.89
1.50	2.74	1.90	3.46	2.30	4.18	2.70	4.90
.51	.76	.91	.48	.31	.20	.71	.92
.52	.77	.92	.50	.32	.22	.72	.94
.53	.79	.93	.51	.33	.24	.73	.96
.54	.81	.94	.53	.34	.25	.74	.98
.55	.83	.95	.55	.35	.27	.75	.99
.56	.85	.96	.57	.36	.29	.76	5.01
.57	.86	.97	.59	.37	.31	.77	.03
.58	.88	.98	.60	.38	.33	.78	.05
.59	.90	.99	.62	.39	.34	.79	.07
1.60	2.92	2.00	3.64	2.40	4.36	2.80	5.08
.61	.94	.01	.66	.41	.38	.81	.10
.62	.95	.02	.68	.42	.40	.82	.12
.63	.97	.03	.69	.43	.42	.83	.14
.64	.99	.04	.71	.44	.43	.84	.16
.65	3.01	.05	.73	.45	.45	.85	.17
.66	.03	.06	.75	.46	.47	.86	.19
.67	.04	.07	.77	.47	.49	.87	.21
.68	.06	.08	.78	.48	.51	.88	.23
.69	.08	.09	.80	.49	.52	.89	.25
1.70	3.10	2.10	3.82	2.50	4.54	2.90	5.26
.71	.12	.11	.84	.51	.56	.91	.28
.72	.13	.12	.86	.52	.58	.92	.30
.73	.15	.13	.87	.53	.60	.93	.32
.74	.17	.14	.89	.54	.61	.94	.34
.75	.19	.15	.91	.55	.63	.95	.35
.76	.21	.16	.93	.56	.65	.96	.37
.77	.22	.17	.95	.57	.67	.97	.39
.78	.24	.18	.96	.58	.69	.98	.41
.79	.26	.19	.98	.59	.70	.99	.43

TABLE 30 (Cont'd)

## Salinity

Conversion from chlorinity to salinity (‰)

Cl	S	Cl	S	Cl	S	Cl	S
3.00	5.45	3.40	6.17	3.80	6.89	4.20	7.61
.01	.46	.41	.19	.81	.91	.21	.63
.02	.48	.42	.20	.82	.93	.22	.65
.03	.50	.43	.22	.83	.94	.23	.67
.04	.52	.44	.24	.84	.96	.24	.68
.05	.54	.45	.26	.85	.98	.25	.70
.06	.55	.46	.28	.86	7.00	.26	.72
.07	.57	.47	.29	.87	.02	.27	.74
.08	.59	.48	.31	.88	.03	.28	.76
.09	.61	.49	.33	.89	.05	.29	.77
3.10	5.63	3.50	6.35	3.90	7.07	4.30	7.79
.11	.64	.51	.37	.91	.09	.31	.81
.12	.66	.52	.38	.92	.11	.32	.83
.13	.68	.53	.40	.93	.12	.33	.85
.14	.70	.54	.42	.94	.14	.34	.86
.15	.72	.55	.44	.95	.16	.35	.88
.16	.73	.56	.46	.96	.18	.36	.90
.17	.75	.57	.47	.97	.20	.37	.92
.18	.77	.58	.49	.98	.21	.38	.94
.19	.79	.59	.51	.99	.23	.39	.95
3.20	5.81	3.60	6.53	4.00	7.25	4.40	7.97
.21	.82	.61	.55	.01	.27	.41	.99
.22	.84	.62	.56	.02	.29	.42	8.01
.23	.86	.63	.58	.03	.30	.43	.03
.24	.88	.64	.60	.04	.32	.44	.04
.25	.90	.65	.62	.05	.34	.45	.06
.26	.91	.66	.64	.06	.36	.46	.08
.27	.93	.67	.65	.07	.38	.47	.10
.28	.95	.68	.67	.08	.39	.48	.12
.29	.97	.69	.69	.09	.41	.49	.13
3.30	5.99	3.70	6.71	4.10	7.43	4.50	8.15
.31	6.00	.71	.73	.11	.45	.51	.17
.32	.02	.72	.74	.12	.47	.52	.19
.33	.04	.73	.76	.13	.48	.53	.21
.34	.06	.74	.78	.14	.50	.54	.22
.35	.08	.75	.80	.15	.52	.55	.24
.36	.09	.76	.82	.16	.54	.56	.26
.37	.11	.77	.83	.17	.56	.57	.28
.38	.13	.78	.85	.18	.57	.58	.30
.39	.15	.79	.87	.19	.59	.59	.31

TABLE 30 (Cont'd)

## Salinity

Conversion from chlorinity to salinity (‰)

C1	S	C1	S	C1	S	C1	S
4.60	8.33	5.00	9.06	5.40	9.78	5.80	10.50
.61	.35	.01	.07	.41	.80	.81	.52
.62	.37	.02	.09	.42	.81	.82	.54
.63	.39	.03	.11	.43	.83	.83	.55
.64	.41	.04	.13	.44	.85	.84	.57
.65	.42	.05	.15	.45	.87	.85	.59
.66	.44	.06	.16	.46	.89	.86	.61
.67	.46	.07	.18	.47	.90	.87	.63
.68	.48	.08	.20	.48	.92	.88	.64
.69	.50	.09	.22	.49	.94	.89	.66
4.70	8.51	5.10	9.24	5.50	9.96	5.90	10.68
.71	.53	.11	.25	.51	.98	.91	.70
.72	.55	.12	.27	.52	.99	.92	.72
.73	.57	.13	.29	.53	10.01	.93	.73
.74	.59	.14	.31	.54	.03	.94	.75
.75	.60	.15	.33	.55	.05	.95	.77
.76	.62	.16	.34	.56	.07	.96	.79
.77	.64	.17	.36	.57	.08	.97	.81
.78	.66	.18	.38	.58	.10	.98	.82
.79	.68	.19	.40	.59	.12	.99	.84
4.80	8.69	5.20	9.42	5.60	10.14	6.00	10.86
.81	.71	.21	.43	.61	.16	.01	.88
.82	.73	.22	.45	.62	.17	.02	.90
.83	.75	.23	.47	.63	.19	.03	.91
.84	.77	.24	.49	.64	.21	.04	.93
.85	.78	.25	.51	.65	.23	.05	.95
.86	.80	.26	.52	.66	.25	.06	.97
.87	.82	.27	.54	.67	.26	.07	.99
.88	.84	.28	.56	.68	.28	.08	11.00
.89	.86	.29	.58	.69	.30	.09	.02
4.90	8.87	5.30	9.60	5.70	10.32	6.10	11.04
.91	.89	.31	.61	.71	.34	.11	.06
.92	.91	.32	.63	.72	.35	.12	.08
.93	.93	.33	.65	.73	.37	.13	.09
.94	.95	.34	.67	.74	.39	.14	.11
.95	.96	.35	.69	.75	.41	.15	.13
.96	.98	.36	.70	.76	.43	.16	.15
.97	9.00	.37	.72	.77	.44	.17	.17
.98	.02	.38	.74	.78	.46	.18	.18
.99	.04	.39	.76	.79	.48	.19	.20

TABLE 30 (Cont'd)

## Salinity

Conversion from chlorinity to salinity (‰)

Cl	S	Cl	S	Cl	S	Cl	S
6.20	11.22	6.60	11.94	7.00	12.67	7.40	13.39
.21	.24	.61	.96	.01	.68	.41	.41
.22	.26	.62	.98	.02	.70	.42	.42
.23	.28	.63	12.00	.03	.72	.43	.44
.24	.29	.64	.02	.04	.74	.44	.46
.25	.31	.65	.03	.05	.76	.45	.48
.26	.33	.66	.05	.06	.77	.46	.50
.27	.35	.67	.07	.07	.79	.47	.51
.28	.37	.68	.09	.08	.81	.48	.53
.29	.38	.69	.11	.09	.83	.49	.55
6.30	11.40	6.70	12.12	7.10	12.85	7.50	13.57
.31	.42	.71	.14	.11	.86	.51	.59
.32	.44	.72	.16	.12	.88	.52	.60
.33	.46	.73	.18	.13	.90	.53	.62
.34	.47	.74	.20	.14	.92	.54	.64
.35	.49	.75	.21	.15	.94	.55	.66
.36	.51	.76	.23	.16	.95	.56	.68
.37	.53	.77	.25	.17	.97	.57	.69
.38	.55	.78	.27	.18	.99	.58	.71
.39	.56	.79	.29	.19	13.01	.59	.73
6.40	11.58	6.80	12.30	7.20	13.03	7.60	13.75
.41	.60	.81	.32	.21	.04	.61	.77
.42	.62	.82	.34	.22	.06	.62	.78
.43	.64	.83	.36	.23	.08	.63	.80
.44	.65	.84	.38	.24	.10	.64	.82
.45	.67	.85	.39	.25	.12	.65	.84
.46	.69	.86	.41	.26	.13	.66	.86
.47	.71	.87	.43	.27	.15	.67	.87
.48	.73	.88	.45	.28	.17	.68	.89
.49	.74	.89	.47	.29	.19	.69	.91
6.50	11.76	6.90	12.48	7.30	13.21	7.70	13.93
.51	.78	.91	.50	.31	.22	.71	.95
.52	.80	.92	.52	.32	.24	.72	.96
.53	.82	.93	.54	.33	.26	.73	.98
.54	.83	.94	.56	.34	.28	.74	14.00
.55	.85	.95	.57	.35	.30	.75	.02
.56	.87	.96	.59	.36	.31	.76	.04
.57	.89	.97	.61	.37	.33	.77	.05
.58	.91	.98	.63	.38	.35	.78	.07
.59	.92	.99	.65	.39	.37	.79	.09



TABLE 30 (Cont'd)

## Salinity

Conversion from chlorinity to salinity (‰)

Cl	S	Cl	S	Cl	S	Cl	S
7.80	14.11	8.20	14.83	8.60	15.55	9.00	16.28
.81	.13	.21	.85	.61	.57	.01	.29
.82	.15	.22	.87	.62	.59	.02	.31
.83	.16	.23	.89	.63	.61	.03	.33
.84	.18	.24	.90	.64	.63	.04	.35
.85	.20	.25	.92	.65	.64	.05	.37
.86	.22	.26	.94	.66	.66	.06	.38
.87	.24	.27	.96	.67	.68	.07	.40
.88	.25	.28	.98	.68	.70	.08	.42
.89	.27	.29	.99	.69	.72	.09	.44
7.90	14.29	8.30	15.01	8.70	15.73	9.10	16.46
.91	.31	.31	.03	.71	.75	.11	.47
.92	.33	.32	.05	.72	.77	.12	.49
.93	.34	.33	.07	.73	.79	.13	.51
.94	.36	.34	.08	.74	.81	.14	.53
.95	.38	.35	.10	.75	.82	.15	.55
.96	.40	.36	.12	.76	.84	.16	.56
.97	.42	.37	.14	.77	.86	.17	.58
.98	.43	.38	.16	.78	.88	.18	.60
.99	.45	.39	.17	.79	.90	.19	.62
8.00	14.47	8.40	15.19	8.80	15.91	9.20	16.64
.01	.49	.41	.21	.81	.93	.21	.65
.02	.51	.42	.23	.82	.95	.22	.67
.03	.52	.43	.25	.83	.97	.23	.69
.04	.54	.44	.26	.84	.99	.24	.71
.05	.56	.45	.28	.85	16.00	.25	.73
.06	.58	.46	.30	.86	.02	.26	.74
.07	.60	.47	.32	.87	.04	.27	.76
.08	.61	.48	.34	.88	.06	.28	.78
.09	.63	.49	.35	.89	.08	.29	.80
8.10	14.65	8.50	15.37	8.90	16.09	9.30	16.82
.11	.67	.51	.39	.91	.11	.31	.83
.12	.69	.52	.41	.92	.13	.32	.85
.13	.70	.53	.43	.93	.15	.33	.87
.14	.72	.54	.44	.94	.17	.34	.89
.15	.74	.55	.46	.95	.18	.35	.91
.16	.76	.56	.48	.96	.20	.36	.92
.17	.78	.57	.50	.97	.22	.37	.94
.18	.79	.58	.52	.98	.24	.38	.96
.19	.81	.59	.53	.99	.26	.39	.98

TABLE 30 (Cont'd)

## Salinity

Conversion from chlorinity to salinity (‰)

C1	S	C1	S	C1	S	C1	S
9.40	17.00	9.80	17.72	10.20	18.44	10.60	19.16
.41	.02	.81	.74	.21	.46	.61	.18
.42	.03	.82	.76	.22	.48	.62	.20
.43	.05	.83	.77	.23	.50	.63	.22
.44	.07	.84	.79	.24	.51	.64	.24
.45	.09	.85	.81	.25	.53	.65	.25
.46	.11	.86	.83	.26	.55	.66	.27
.47	.12	.87	.85	.27	.57	.67	.29
.48	.14	.88	.86	.28	.59	.68	.31
.49	.16	.89	.88	.29	.60	.69	.33
9.50	17.18	9.90	17.90	10.30	18.62	10.70	19.34
.51	.20	.91	.92	.31	.64	.71	.36
.52	.21	.92	.94	.32	.66	.72	.38
.53	.23	.93	.95	.33	.68	.73	.40
.54	.25	.94	.97	.34	.69	.74	.42
.55	.27	.95	.99	.35	.71	.75	.43
.56	.29	.96	18.01	.36	.73	.76	.45
.57	.30	.97	.03	.37	.75	.77	.47
.58	.32	.98	.04	.38	.77	.78	.49
.59	.34	.99	.06	.39	.78	.79	.51
9.60	17.36	10.00	18.08	10.40	18.80	10.80	19.52
.61	.38	.01	.10	.41	.82	.81	.54
.62	.39	.02	.12	.42	.84	.82	.56
.63	.41	.03	.13	.43	.86	.83	.58
.64	.43	.04	.15	.44	.87	.84	.60
.65	.45	.05	.17	.45	.89	.85	.61
.66	.47	.06	.19	.46	.91	.86	.63
.67	.48	.07	.21	.47	.93	.87	.65
.68	.50	.08	.22	.48	.95	.88	.67
.69	.52	.09	.24	.49	.96	.89	.69
9.70	17.54	10.10	18.26	10.50	18.98	10.90	19.70
.71	.56	.11	.28	.51	19.00	.91	.72
.72	.57	.12	.30	.52	.02	.92	.74
.73	.59	.13	.31	.53	.04	.93	.76
.74	.61	.14	.33	.54	.05	.94	.78
.75	.63	.15	.35	.55	.07	.95	.79
.76	.65	.16	.37	.56	.09	.96	.81
.77	.66	.17	.39	.57	.11	.97	.83
.78	.68	.18	.40	.58	.13	.98	.85
.79	.70	.19	.42	.59	.14	.99	.87

TABLE 30 (Cont'd)

## Salinity

Conversion from chlorinity to salinity (‰)

C1	S	C1	S	C1	S	C1	S
11.00	19.89	11.40	20.61	11.80	21.33	12.20	22.05
.01	.90	.41	.63	.81	.35	.21	.07
.02	.92	.42	.64	.82	.37	.22	.09
.03	.94	.43	.66	.83	.38	.23	.11
.04	.96	.44	.68	.84	.40	.24	.12
.05	.98	.45	.70	.85	.42	.25	.14
.06	.99	.46	.72	.86	.44	.26	.16
.07	20.01	.47	.73	.87	.46	.27	.18
.08	.03	.48	.75	.88	.47	.28	.20
.09	.05	.49	.77	.89	.49	.29	.21
11.10	20.07	11.50	20.79	11.90	21.51	12.30	22.23
.11	.08	.51	.81	.91	.53	.31	.25
.12	.10	.52	.82	.92	.55	.32	.27
.13	.12	.53	.84	.93	.56	.33	.29
.14	.14	.54	.86	.94	.58	.34	.30
.15	.16	.55	.88	.95	.60	.35	.32
.16	.17	.56	.90	.96	.62	.36	.34
.17	.19	.57	.91	.97	.64	.37	.36
.18	.21	.58	.93	.98	.65	.38	.38
.19	.23	.59	.95	.99	.67	.39	.39
11.20	20.25	11.60	20.97	12.00	21.69	12.40	22.41
.21	.26	.61	.99	.01	.71	.41	.43
.22	.28	.62	21.00	.02	.73	.42	.45
.23	.30	.63	.02	.03	.74	.43	.47
.24	.32	.64	.04	.04	.76	.44	.48
.25	.34	.65	.06	.05	.78	.45	.50
.26	.35	.66	.08	.06	.80	.46	.52
.27	.37	.67	.09	.07	.82	.47	.54
.28	.39	.68	.11	.08	.83	.48	.56
.29	.41	.69	.13	.09	.85	.49	.57
11.30	20.43	11.70	21.15	12.10	21.87	12.50	22.59
.31	.44	.71	.17	.11	.89	.51	.61
.32	.46	.72	.18	.12	.91	.52	.63
.33	.48	.73	.20	.13	.92	.53	.65
.34	.50	.74	.22	.14	.94	.54	.66
.35	.52	.75	.24	.15	.96	.55	.68
.36	.53	.76	.26	.16	.98	.56	.70
.37	.55	.77	.27	.17	22.00	.57	.72
.38	.57	.78	.29	.18	.01	.58	.74
.39	.59	.79	.31	.19	.03	.59	.75

TABLE 30 (Cont'd)

## Salinity

Conversion from chlorinity to salinity (‰)

C1	S	C1	S	C1	S	C1	S
12.60	22.77	13.00	23.50	13.40	24.22	13.80	24.94
.61	.79	.01	.51	.41	.24	.81	.96
.62	.81	.02	.53	.42	.25	.82	.98
.63	.83	.03	.55	.43	.27	.83	.99
.64	.85	.04	.57	.44	.29	.84	25.01
.65	.86	.05	.59	.45	.31	.85	.03
.66	.88	.06	.60	.46	.33	.86	.05
.67	.90	.07	.62	.47	.34	.87	.07
.68	.92	.08	.64	.48	.36	.88	.08
.69	.94	.09	.66	.49	.38	.89	.10
12.70	22.95	13.10	23.68	13.50	24.40	13.90	25.12
.71	.97	.11	.69	.51	.42	.91	.14
.72	.99	.12	.71	.52	.43	.92	.16
.73	23.01	.13	.73	.53	.45	.93	.17
.74	.03	.14	.75	.54	.47	.94	.19
.75	.04	.15	.77	.55	.49	.95	.21
.76	.06	.16	.78	.56	.51	.96	.23
.77	.08	.17	.80	.57	.52	.97	.25
.78	.10	.18	.82	.58	.54	.98	.26
.79	.12	.19	.84	.59	.56	.99	.28
12.80	23.13	13.20	23.86	13.60	24.58	14.00	25.30
.81	.15	.21	.87	.61	.60	.01	.32
.82	.17	.22	.89	.62	.61	.02	.34
.83	.19	.23	.91	.63	.63	.03	.35
.84	.21	.24	.93	.64	.65	.04	.37
.85	.22	.25	.95	.65	.67	.05	.39
.86	.24	.26	.96	.66	.69	.06	.41
.87	.26	.27	.98	.67	.70	.07	.43
.88	.28	.28	24.00	.68	.72	.08	.44
.89	.30	.29	.02	.69	.74	.09	.46
12.90	23.31	13.30	24.04	13.70	24.76	14.10	25.48
.91	.33	.31	.05	.71	.78	.11	.50
.92	.35	.32	.07	.72	.79	.12	.52
.93	.37	.33	.09	.73	.81	.13	.53
.94	.39	.34	.11	.74	.83	.14	.55
.95	.40	.35	.13	.75	.85	.15	.57
.96	.42	.36	.14	.76	.87	.16	.59
.97	.44	.37	.16	.77	.88	.17	.61
.98	.46	.38	.18	.78	.90	.18	.62
.99	.48	.39	.20	.79	.92	.19	.64

TABLE 30 (Cont'd)

## Salinity

Conversion from chlorinity to salinity (‰)

C1	S	C1	S	C1	S	C1	S
14.20	25.66	14.60	26.38	15.00	27.11	15.40	27.83
.21	.68	.61	.40	.01	.12	.41	.85
.22	.70	.62	.42	.02	.14	.42	.86
.23	.72	.63	.44	.03	.16	.43	.88
.24	.73	.64	.46	.04	.18	.44	.90
.25	.75	.65	.47	.05	.20	.45	.92
.26	.77	.66	.49	.06	.21	.46	.94
.27	.79	.67	.51	.07	.23	.47	.95
.28	.81	.68	.53	.08	.25	.48	.97
.29	.82	.69	.55	.09	.27	.49	.99
14.30	25.84	14.70	26.56	15.10	27.29	15.50	28.01
.31	.86	.71	.58	.11	.30	.51	.03
.32	.88	.72	.60	.12	.32	.52	.04
.33	.90	.73	.62	.13	.34	.53	.06
.34	.91	.74	.64	.14	.36	.54	.08
.35	.93	.75	.65	.15	.38	.55	.10
.36	.95	.76	.67	.16	.39	.56	.12
.37	.97	.77	.69	.17	.41	.57	.13
.38	.99	.78	.71	.18	.43	.58	.15
.39	26.00	.79	.73	.19	.45	.59	.17
14.40	26.02	14.80	26.74	15.20	27.47	15.60	28.19
.41	.04	.81	.76	.21	.48	.61	.21
.42	.06	.82	.78	.22	.50	.62	.22
.43	.08	.83	.80	.23	.52	.63	.24
.44	.09	.84	.82	.24	.54	.64	.26
.45	.11	.85	.83	.25	.56	.65	.28
.46	.13	.86	.85	.26	.57	.66	.30
.47	.15	.87	.87	.27	.59	.67	.31
.48	.17	.88	.89	.28	.61	.68	.33
.49	.18	.89	.91	.29	.63	.69	.35
14.50	26.20	14.90	26.92	15.30	27.65	15.70	28.37
.51	.22	.91	.94	.31	.66	.71	.39
.52	.24	.92	.96	.32	.68	.72	.40
.53	.26	.93	.98	.33	.70	.73	.42
.54	.27	.94	27.00	.34	.72	.74	.44
.55	.29	.95	.01	.35	.74	.75	.46
.56	.31	.96	.03	.36	.75	.76	.48
.57	.33	.97	.05	.37	.77	.77	.49
.58	.35	.98	.07	.38	.79	.78	.51
.59	.36	.99	.09	.39	.81	.79	.53

TABLE 30 (Cont'd)

## Salinity

Conversion from chlorinity to salinity (‰)

Cl	S	Cl	S	Cl	S	Cl	S
15.80	28.55	16.20	29.27	16.60	29.99	17.00	30.72
.81	.57	.21	.29	.61	30.01	.01	.73
.82	.59	.22	.31	.62	.03	.02	.75
.83	.60	.23	.33	.63	.05	.03	.77
.84	.62	.24	.34	.64	.07	.04	.79
.85	.64	.25	.36	.65	.08	.05	.81
.86	.66	.26	.38	.66	.10	.06	.82
.87	.68	.27	.40	.67	.12	.07	.84
.88	.69	.28	.42	.68	.14	.08	.86
.89	.71	.29	.43	.69	.16	.09	.88
15.90	28.73	16.30	29.45	16.70	30.17	17.10	30.90
.91	.75	.31	.47	.71	.19	.11	.91
.92	.77	.32	.49	.72	.21	.12	.93
.93	.78	.33	.51	.73	.23	.13	.95
.94	.80	.34	.52	.74	.25	.14	.97
.95	.82	.35	.54	.75	.26	.15	.99
.96	.84	.36	.56	.76	.28	.16	31.00
.97	.86	.37	.58	.77	.30	.17	.02
.98	.87	.38	.60	.78	.32	.18	.04
.99	.89	.39	.61	.79	.34	.19	.06
16.00	28.91	16.40	29.63	16.80	30.35	17.20	31.08
.01	.93	.41	.65	.81	.37	.21	.09
.02	.95	.42	.67	.82	.39	.22	.11
.03	.96	.43	.69	.83	.41	.23	.13
.04	.98	.44	.70	.84	.43	.24	.15
.05	29.00	.45	.72	.85	.44	.25	.17
.06	.02	.46	.74	.86	.46	.26	.18
.07	.04	.47	.76	.87	.48	.27	.20
.08	.05	.48	.78	.88	.50	.28	.22
.09	.07	.49	.79	.89	.52	.29	.24
16.10	29.09	16.50	29.81	16.90	30.53	17.30	31.26
.11	.11	.51	.83	.91	.55	.31	.27
.12	.13	.52	.85	.92	.57	.32	.29
.13	.14	.53	.87	.93	.59	.33	.31
.14	.16	.54	.88	.94	.61	.34	.33
.15	.18	.55	.90	.95	.62	.35	.35
.16	.20	.56	.92	.96	.64	.36	.36
.17	.22	.57	.94	.97	.66	.37	.38
.18	.23	.58	.96	.98	.68	.38	.40
.19	.25	.59	.97	.99	.70	.39	.42

TABLE 30 (Cont'd)

## Salinity

Conversion from chlorinity to salinity (‰)

C1	S	C1	S	C1	S	C1	S
17.40	31.44	17.80	32.16	18.20	32.88	18.60	33.60
.41	.46	.81	.18	.21	.90	.61	.62
.42	.47	.82	.20	.22	.92	.62	.64
.43	.49	.83	.21	.23	.94	.63	.66
.44	.51	.84	.23	.24	.95	.64	.68
.45	.53	.85	.25	.25	.97	.65	.69
.46	.55	.86	.27	.26	.99	.66	.71
.47	.56	.87	.29	.27	33.01	.67	.73
.48	.58	.88	.30	.28	.03	.68	.75
.49	.60	.89	.32	.29	.04	.69	.77
17.50	31.62	17.90	32.34	18.30	33.06	18.70	33.78
.51	.64	.91	.36	.31	.08	.71	.80
.52	.65	.92	.38	.32	.10	.72	.82
.53	.67	.93	.39	.33	.12	.73	.84
.54	.69	.94	.41	.34	.13	.74	.86
.55	.71	.95	.43	.35	.15	.75	.87
.56	.73	.96	.45	.36	.17	.76	.89
.57	.74	.97	.47	.37	.19	.77	.91
.58	.76	.98	.48	.38	.21	.78	.93
.59	.78	.99	.50	.39	.22	.79	.95
17.60	31.80	18.00	32.52	18.40	33.24	18.80	33.96
.61	.82	.01	.54	.41	.26	.81	.98
.62	.83	.02	.56	.42	.28	.82	34.00
.63	.85	.03	.57	.43	.30	.83	.02
.64	.87	.04	.59	.44	.31	.84	.04
.65	.89	.05	.61	.45	.33	.85	.05
.66	.91	.06	.63	.46	.35	.86	.07
.67	.92	.07	.65	.47	.37	.87	.09
.68	.94	.08	.66	.48	.39	.88	.11
.69	.96	.09	.68	.49	.40	.89	.13
17.70	31.98	18.10	32.70	18.50	33.42	18.90	34.14
.71	32.00	.11	.72	.51	.44	.91	.16
.72	.01	.12	.74	.52	.46	.92	.18
.73	.03	.13	.75	.53	.48	.93	.20
.74	.05	.14	.77	.54	.49	.94	.22
.75	.07	.15	.79	.55	.51	.95	.23
.76	.09	.16	.81	.56	.53	.96	.25
.77	.10	.17	.83	.57	.55	.97	.27
.78	.12	.18	.84	.58	.57	.98	.29
.79	.14	.19	.86	.59	.58	.99	.31

TABLE 30 (Cont'd)

## Salinity

Conversion from chlorinity to salinity (‰)

C1	S	C1	S	C1	S	C1	S
19.00	34.33	19.40	35.05	19.80	35.77	20.20	36.49
.01	.34	.41	.07	.81	.79	.21	.51
.02	.36	.42	.08	.82	.81	.22	.53
.03	.38	.43	.10	.83	.82	.23	.55
.04	.40	.44	.12	.84	.84	.24	.56
.05	.42	.45	.14	.85	.86	.25	.58
.06	.43	.46	.16	.86	.88	.26	.60
.07	.45	.47	.17	.87	.90	.27	.62
.08	.47	.48	.19	.88	.91	.28	.64
.09	.49	.49	.21	.89	.93	.29	.65
19.10	34.51	19.50	35.23	19.90	35.95	20.30	36.67
.11	.52	.51	.25	.91	.97	.31	.69
.12	.54	.52	.26	.92	.99	.32	.71
.13	.56	.53	.28	.93	36.00	.33	.73
.14	.58	.54	.30	.94	.02	.34	.74
.15	.60	.55	.32	.95	.04	.35	.76
.16	.61	.56	.34	.96	.06	.36	.78
.17	.63	.57	.35	.97	.08	.37	.80
.18	.65	.58	.37	.98	.09	.38	.82
.19	.67	.59	.39	.99	.11	.39	.83
19.20	34.69	19.60	35.41	20.00	36.13	20.40	36.85
.21	.70	.61	.43	.01	.15	.41	.87
.22	.72	.62	.44	.02	.17	.42	.89
.23	.74	.63	.46	.03	.18	.43	.91
.24	.76	.64	.48	.04	.20	.44	.92
.25	.78	.65	.50	.05	.22	.45	.94
.26	.79	.66	.52	.06	.24	.46	.96
.27	.81	.67	.53	.07	.26	.47	.98
.28	.83	.68	.55	.08	.27	.48	37.00
.29	.85	.69	.57	.09	.29	.49	.01
19.30	34.87	19.70	35.59	20.10	36.31	20.50	37.03
.31	.88	.71	.61	.11	.33	.51	.05
.32	.90	.72	.62	.12	.35	.52	.07
.33	.92	.73	.64	.13	.36	.53	.09
.34	.94	.74	.66	.14	.38	.54	.10
.35	.96	.75	.68	.15	.40	.55	.12
.36	.97	.76	.70	.16	.42	.56	.14
.37	.99	.77	.71	.17	.44	.57	.16
.38	35.01	.78	.73	.18	.45	.58	.18
.39	.03	.79	.75	.19	.47	.59	.19



TABLE 30 (Cont'd)

## Salinity

Conversion from chlorinity to salinity (‰)

C1	S	C1	S	C1	S	C1	S
20.60	37.21	21.00	37.94	21.40	38.66	21.80	39.38
.61	.23	.01	.95	.41	.68	.81	.40
.62	.25	.02	.97	.42	.69	.82	.42
.63	.27	.03	.99	.43	.71	.83	.43
.64	.29	.04	38.01	.44	.73	.84	.45
.65	.30	.05	.03	.45	.75	.85	.47
.66	.32	.06	.04	.46	.77	.86	.49
.67	.34	.07	.06	.47	.78	.87	.51
.68	.36	.08	.08	.48	.80	.88	.52
.69	.38	.09	.10	.49	.82	.89	.54
20.70	37.39	21.10	38.12	21.50	38.84	21.90	39.56
.71	.41	.11	.13	.51	.86	.91	.58
.72	.43	.12	.15	.52	.87	.92	.60
.73	.45	.13	.17	.53	.89	.93	.61
.74	.47	.14	.19	.54	.91	.94	.63
.75	.48	.15	.21	.55	.93	.95	.65
.76	.50	.16	.22	.56	.95	.96	.67
.77	.52	.17	.24	.57	.96	.97	.69
.78	.54	.18	.26	.58	.98	.98	.70
.79	.56	.19	.28	.59	39.00	.99	.72
20.80	37.57	21.20	38.30	21.60	39.02	22.00	39.74
.81	.59	.21	.31	.61	.04	.01	.76
.82	.61	.22	.33	.62	.05	.02	.78
.83	.63	.23	.35	.63	.07	.03	.79
.84	.65	.24	.37	.64	.09	.04	.81
.85	.66	.25	.39	.65	.11	.05	.83
.86	.68	.26	.40	.66	.13	.06	.85
.87	.70	.27	.42	.67	.14	.07	.87
.88	.72	.28	.44	.68	.16	.08	.88
.89	.74	.29	.46	.69	.18	.09	.90
20.90	37.75	21.30	38.48	21.70	39.20	22.10	39.92
.91	.77	.31	.49	.71	.22	.11	.94
.92	.79	.32	.51	.72	.23	.12	.96
.93	.81	.33	.53	.73	.25	.13	.97
.94	.83	.34	.55	.74	.27	.14	.99
.95	.84	.35	.57	.75	.29	.15	40.01
.96	.86	.36	.58	.76	.31	.16	.03
.97	.88	.37	.60	.77	.32	.17	.05
.98	.90	.38	.62	.78	.34	.18	.06
.99	.92	.39	.64	.79	.36	.19	.08

TABLE 30 (Cont'd)

## Salinity

Conversion from chlorinity to salinity (‰)

Cl	S	Cl	S
22.20	40.10	22.60	40.82
.21	.12	.61	.84
.22	.14	.62	.86
.23	.16	.63	.88
.24	.17	.64	.90
.25	.19	.65	.91
.26	.21	.66	.93
.27	.23	.67	.95
.28	.25	.68	.97
.29	.26	.69	.99
22.30	40.28	22.70	41.00
.31	.30	.71	.02
.32	.32	.72	.04
.33	.34	.73	.06
.34	.35	.74	.08
.35	.37	.75	.09
.36	.39	.76	.11
.37	.41	.77	.13
.38	.43	.78	.15
.39	.44	.79	.17
22.40	40.46	22.80	41.18
.41	.48	.81	.20
.42	.50	.82	.22
.43	.52	.83	.24
.44	.53	.84	.26
.45	.55	.85	.27
.46	.57	.86	.29
.47	.59	.87	.31
.48	.61	.88	.33
.49	.62	.89	.35
22.50	40.64	22.90	41.36
.51	.66	.91	.38
.52	.68	.92	.40
.53	.70	.93	.42
.54	.71	.94	.44
.55	.73	.95	.45
.56	.75	.96	.47
.57	.77	.97	.49
.58	.79	.98	.51
.59	.80	.99	.53
		23.00	41.55

TABLE 31

## Oxygen

Conversion from milligrams per liter to milliliters per liter (NTP)  
(1 mg/l = 0.6998 ml/l)

Milligrams per Liter of O <sub>2</sub>	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
0.0	0.00	0.01	0.01	0.02	0.03	0.03	0.04	0.05	0.06	0.06
0.1	0.07	0.08	0.08	0.09	0.10	0.10	0.11	0.12	0.13	0.13
0.2	0.14	0.15	0.15	0.16	0.17	0.17	0.18	0.19	0.20	0.20
0.3	0.21	0.22	0.22	0.23	0.24	0.24	0.25	0.26	0.27	0.27
0.4	0.28	0.29	0.29	0.30	0.31	0.31	0.32	0.33	0.34	0.34
0.5	0.35	0.36	0.36	0.37	0.38	0.38	0.39	0.40	0.41	0.41
0.6	0.42	0.43	0.43	0.44	0.45	0.45	0.46	0.47	0.48	0.48
0.7	0.49	0.50	0.50	0.51	0.52	0.52	0.53	0.54	0.55	0.55
0.8	0.56	0.57	0.57	0.58	0.59	0.59	0.60	0.61	0.62	0.62
0.9	0.63	0.64	0.64	0.65	0.66	0.66	0.67	0.68	0.69	0.69

milligrams/liter	milliliters/liter	milligrams/liter	milliliters/liter
1.0	0.70	12.0	8.40
2.0	1.40	13.0	9.10
3.0	2.10	14.0	9.80
4.0	2.80	15.0	10.50
5.0	3.50	16.0	11.20
6.0	4.20	17.0	11.90
7.0	4.90	18.0	12.60
8.0	5.60	19.0	13.30
9.0	6.30	20.0	14.00
10.0	7.00	21.0	14.70
11.0	7.70	22.0	15.40

Example: Convert 5.65 milligrams/liter of O<sub>2</sub> to milliliters/liter.

$$5.00 \text{ milligrams/liter} = 3.50$$

$$0.65 \text{ milligrams/liter} = 0.45$$

$$\underline{3.95} \text{ milliliters/liter (ans.)}$$

TABLE 32

## Oxygen

Conversion from milligram-atoms per liter to milliliters per liter  
 (1 milligram-atom per liter of  $O_2$  = 11.196 milliliters per liter of  $O_2$ )

Milligram-atoms/liter of $O_2$	.000	.001	.002	.003	.004	.005	.006	.007	.008	.009
0.00	0.00	0.01	0.02	0.03	0.04	0.06	0.07	0.08	0.09	0.10
0.01	0.11	0.12	0.13	0.15	0.16	0.17	0.18	0.19	0.20	0.21
0.02	0.22	0.24	0.25	0.26	0.27	0.28	0.29	0.30	0.31	0.32
0.03	0.34	0.35	0.36	0.37	0.38	0.39	0.40	0.41	0.43	0.44
0.04	0.45	0.46	0.47	0.48	0.49	0.50	0.52	0.53	0.54	0.55
0.05	0.56	0.57	0.58	0.59	0.60	0.62	0.63	0.64	0.65	0.66
0.06	0.67	0.68	0.69	0.71	0.72	0.73	0.74	0.75	0.76	0.77
0.07	0.78	0.79	0.81	0.82	0.83	0.84	0.85	0.86	0.87	0.88
0.08	0.90	0.91	0.92	0.93	0.94	0.95	0.96	0.97	0.99	1.00
0.09	1.01	1.02	1.03	1.04	1.05	1.06	1.07	1.09	1.10	1.11
0.10	1.12	1.13	1.14	1.15	1.16	1.18	1.19	1.20	1.21	1.22
0.11	1.23	1.24	1.25	1.27	1.28	1.29	1.30	1.31	1.32	1.33
0.12	1.34	1.35	1.37	1.38	1.39	1.40	1.41	1.42	1.43	1.44
0.13	1.46	1.47	1.48	1.49	1.50	1.51	1.52	1.53	1.55	1.56
0.14	1.57	1.58	1.59	1.60	1.61	1.62	1.63	1.65	1.66	1.67
0.15	1.68	1.69	1.70	1.71	1.72	1.74	1.75	1.76	1.77	1.78
0.16	1.79	1.80	1.81	1.82	1.84	1.85	1.86	1.87	1.88	1.89
0.17	1.90	1.91	1.93	1.94	1.95	1.96	1.97	1.98	1.99	2.00
0.18	2.02	2.03	2.04	2.05	2.06	2.07	2.08	2.09	2.10	2.12
0.19	2.13	2.14	2.15	2.16	2.17	2.18	2.19	2.21	2.22	2.23
0.20	2.24	2.25	2.26	2.27	2.28	2.30	2.31	2.32	2.33	2.34
0.21	2.35	2.36	2.37	2.38	2.40	2.41	2.42	2.43	2.44	2.45
0.22	2.46	2.47	2.49	2.50	2.51	2.52	2.53	2.54	2.55	2.56
0.23	2.58	2.59	2.60	2.61	2.62	2.63	2.64	2.65	2.66	2.68
0.24	2.69	2.70	2.71	2.72	2.73	2.74	2.75	2.77	2.78	2.79
0.25	2.80	2.81	2.82	2.83	2.84	2.85	2.87	2.88	2.89	2.90
0.26	2.91	2.92	2.93	2.94	2.96	2.97	2.98	2.99	3.00	3.01
0.27	3.02	3.03	3.05	3.06	3.07	3.08	3.09	3.10	3.11	3.12
0.28	3.13	3.15	3.16	3.17	3.18	3.19	3.20	3.21	3.22	3.24
0.29	3.25	3.26	3.27	3.28	3.29	3.30	3.31	3.33	3.34	3.35
0.30	3.36	3.37	3.38	3.39	3.40	3.41	3.43	3.44	3.45	3.46

TABLE 32 (Cont'd)

## Oxygen

Conversion from milligram-atoms per liter to milliliters per liter  
 (1 milligram-atom per liter of O<sub>2</sub> = 11.196 milliliters per liter of O<sub>2</sub>)

Milligram-atoms/liter of O <sub>2</sub>	.000	.001	.002	.003	.004	.005	.006	.007	.008	.009
0.31	3.47	3.48	3.49	3.50	3.52	3.53	3.54	3.55	3.56	3.57
0.32	3.58	3.59	3.61	3.62	3.63	3.64	3.65	3.66	3.67	3.68
0.33	3.69	3.71	3.72	3.73	3.74	3.75	3.76	3.77	3.78	3.80
0.34	3.81	3.82	3.83	3.84	3.85	3.86	3.87	3.89	3.90	3.91
0.35	3.92	3.93	3.94	3.95	3.96	3.97	3.99	4.00	4.01	4.02
0.36	4.03	4.04	4.05	4.06	4.08	4.09	4.10	4.11	4.12	4.13
0.37	4.14	4.15	4.16	4.18	4.19	4.20	4.21	4.22	4.23	4.24
0.38	4.25	4.27	4.28	4.29	4.30	4.31	4.32	4.33	4.34	4.36
0.39	4.37	4.38	4.39	4.40	4.41	4.42	4.43	4.44	4.46	4.47
0.40	4.48	4.49	4.50	4.51	4.52	4.53	4.55	4.56	4.57	4.58
0.41	4.59	4.60	4.61	4.62	4.64	4.65	4.66	4.67	4.68	4.69
0.42	4.70	4.71	4.72	4.74	4.75	4.76	4.77	4.78	4.79	4.80
0.43	4.81	4.83	4.84	4.85	4.86	4.87	4.88	4.89	4.90	4.92
0.44	4.93	4.94	4.95	4.96	4.97	4.98	4.99	5.00	5.02	5.03
0.45	5.04	5.05	5.06	5.07	5.08	5.09	5.11	5.12	5.13	5.14
0.46	5.15	5.16	5.17	5.18	5.19	5.21	5.22	5.23	5.24	5.25
0.47	5.26	5.27	5.28	5.30	5.31	5.32	5.33	5.34	5.35	5.36
0.48	5.37	5.39	5.40	5.41	5.42	5.43	5.44	5.45	5.46	5.47
0.49	5.49	5.50	5.51	5.52	5.53	5.54	5.55	5.56	5.58	5.59
0.50	5.60	5.61	5.62	5.63	5.64	5.65	5.67	5.68	5.69	5.70
0.51	5.71	5.72	5.73	5.74	5.75	5.77	5.78	5.79	5.80	5.81
0.52	5.82	5.83	5.84	5.86	5.87	5.88	5.89	5.90	5.91	5.92
0.53	5.93	5.95	5.96	5.97	5.98	5.99	6.00	6.01	6.02	6.03
0.54	6.05	6.06	6.07	6.08	6.09	6.10	6.11	6.12	6.14	6.15
0.55	6.16	6.17	6.18	6.19	6.20	6.21	6.22	6.24	6.25	6.26
0.56	6.27	6.28	6.29	6.30	6.31	6.33	6.34	6.35	6.36	6.37
0.57	6.38	6.39	6.40	6.42	6.43	6.44	6.45	6.46	6.47	6.48
0.58	6.49	6.50	6.52	6.53	6.54	6.55	6.56	6.57	6.58	6.59
0.59	6.61	6.62	6.63	6.64	6.65	6.66	6.67	6.68	6.70	6.71
0.60	6.72	6.73	6.74	6.75	6.76	6.77	6.78	6.80	6.81	6.82

TABLE 32 (Cont'd)

## Oxygen

Conversion from milligram-atoms per liter to milliliters per liter  
 (1 milligram-atom per liter of  $O_2$  = 11.196 milliliters per liter of  $O_2$ )

Milligram-atoms/liter of $O_2$	.000	.001	.002	.003	.004	.005	.006	.007	.008	.009
0.61	6.83	6.84	6.85	6.86	6.87	6.89	6.90	6.91	6.92	6.93
0.62	6.94	6.95	6.96	6.98	6.99	7.00	7.01	7.02	7.03	7.04
0.63	7.05	7.06	7.08	7.09	7.10	7.11	7.12	7.13	7.14	7.15
0.64	7.17	7.18	7.19	7.20	7.21	7.22	7.23	7.24	7.26	7.27
0.65	7.28	7.29	7.30	7.31	7.32	7.33	7.34	7.36	7.37	7.38
0.66	7.39	7.40	7.41	7.42	7.43	7.45	7.46	7.47	7.48	7.49
0.67	7.50	7.51	7.52	7.53	7.55	7.56	7.57	7.58	7.59	7.60
0.68	7.61	7.62	7.64	7.65	7.66	7.67	7.68	7.69	7.70	7.71
0.69	7.73	7.74	7.75	7.76	7.77	7.78	7.79	7.80	7.81	7.83
0.70	7.84	7.85	7.86	7.87	7.88	7.89	7.90	7.92	7.93	7.94
0.71	7.95	7.96	7.97	7.98	7.99	8.01	8.02	8.03	8.04	8.05
0.72	8.06	8.07	8.08	8.09	8.11	8.12	8.13	8.14	8.15	8.16
0.73	8.17	8.18	8.20	8.21	8.22	8.23	8.24	8.25	8.26	8.27
0.74	8.29	8.30	8.31	8.32	8.33	8.34	8.35	8.36	8.37	8.39
0.75	8.40	8.41	8.42	8.43	8.44	8.45	8.46	8.48	8.49	8.50
0.76	8.51	8.52	8.53	8.54	8.55	8.56	8.58	8.59	8.60	8.61
0.77	8.62	8.63	8.64	8.65	8.67	8.68	8.69	8.70	8.71	8.72
0.78	8.73	8.74	8.76	8.77	8.78	8.79	8.80	8.81	8.82	8.83
0.79	8.84	8.86	8.87	8.88	8.89	8.90	8.91	8.92	8.93	8.95
0.80	8.96	8.97	8.98	8.99	9.00	9.01	9.02	9.04	9.05	9.06
0.81	9.07	9.08	9.09	9.10	9.11	9.12	9.14	9.15	9.16	9.17
0.82	9.18	9.19	9.20	9.21	9.23	9.24	9.25	9.26	9.27	9.28
0.83	9.29	9.30	9.32	9.33	9.34	9.35	9.36	9.37	9.38	9.39
0.84	9.40	9.42	9.43	9.44	9.45	9.46	9.47	9.48	9.49	9.51
0.85	9.52	9.53	9.54	9.55	9.56	9.57	9.58	9.59	9.61	9.62
0.86	9.63	9.64	9.65	9.66	9.67	9.68	9.70	9.71	9.72	9.73
0.87	9.74	9.75	9.76	9.77	9.79	9.80	9.81	9.82	9.83	9.84
0.88	9.85	9.86	9.87	9.89	9.90	9.91	9.92	9.93	9.94	9.95
0.89	9.96	9.98	9.99	10.00	10.01	10.02	10.03	10.04	10.05	10.07
0.90	10.08	10.09	10.10	10.11	10.12	10.13	10.14	10.15	10.17	10.18

TABLE 32 (Cont'd)

## Oxygen

Conversion from milligram-atoms per liter to milliliters per liter  
 (1 milligram-atom per liter of  $O_2$  = 11.196 milliliters per liter of  $O_2$ )

Milligram-atoms/liter of $O_2$	.000	.001	.002	.003	.004	.005	.006	.007	.008	.009
0.91	10.19	10.20	10.21	10.22	10.23	10.24	10.26	10.27	10.28	10.29
0.92	10.30	10.31	10.32	10.33	10.35	10.36	10.37	10.38	10.39	10.40
0.93	10.41	10.42	10.43	10.45	10.46	10.47	10.48	10.49	10.50	10.51
0.94	10.52	10.54	10.55	10.56	10.57	10.58	10.59	10.60	10.61	10.63
0.95	10.64	10.65	10.66	10.67	10.68	10.69	10.70	10.71	10.73	10.74
0.96	10.75	10.76	10.77	10.78	10.79	10.80	10.82	10.83	10.84	10.85
0.97	10.86	10.87	10.88	10.89	10.90	10.92	10.93	10.94	10.95	10.96
0.98	10.97	10.98	10.99	11.01	11.02	11.03	11.04	11.05	11.06	11.07
0.99	11.08	11.10	11.11	11.12	11.13	11.14	11.15	11.16	11.17	11.18
1.00	11.20	11.21	11.22	11.23	11.24	11.25	11.26	11.27	11.29	11.30
1.01	11.31	11.32	11.33	11.34	11.35	11.36	11.38	11.39	11.40	11.41
1.02	11.42	11.43	11.44	11.45	11.46	11.48	11.49	11.50	11.51	11.52
1.03	11.53	11.54	11.55	11.57	11.58	11.59	11.60	11.61	11.62	11.63
1.04	11.64	11.66	11.67	11.68	11.69	11.70	11.71	11.72	11.73	11.74
1.05	11.76	11.77	11.78	11.79	11.80	11.81	11.82	11.83	11.85	11.86
1.06	11.87	11.88	11.89	11.90	11.91	11.92	11.93	11.95	11.96	11.97
1.07	11.98	11.99	12.00	12.01	12.02	12.04	12.05	12.06	12.07	12.08
1.08	12.09	12.10	12.11	12.13	12.14	12.15	12.16	12.17	12.18	12.19
1.09	12.20	12.21	12.23	12.24	12.25	12.26	12.27	12.28	12.29	12.30
1.10	12.32	12.33	12.34	12.35	12.36	12.37	12.38	12.39	12.41	12.42
1.11	12.43	12.44	12.45	12.46	12.47	12.48	12.49	12.51	12.52	12.53
1.12	12.54	12.55	12.56	12.57	12.58	12.60	12.61	12.62	12.63	12.64
1.13	12.65	12.66	12.67	12.69	12.70	12.71	12.72	12.73	12.74	12.75
1.14	12.76	12.77	12.79	12.80	12.81	12.82	12.83	12.84	12.85	12.86
1.15	12.88	12.89	12.90	12.91	12.92	12.93	12.94	12.95	12.96	12.98
1.16	12.99	13.00	13.01	13.02	13.03	13.04	13.05	13.07	13.08	13.09
1.17	13.10	13.11	13.12	13.13	13.14	13.16	13.17	13.18	13.19	13.20
1.18	13.21	13.22	13.23	13.24	13.26	13.27	13.28	13.29	13.30	13.31
1.19	13.32	13.33	13.35	13.36	13.37	13.38	13.39	13.40	13.41	13.42
1.20	13.44	13.45	13.46	13.47	13.48	13.49	13.50	13.51	13.52	13.54

TABLE 32 (Cont'd)

## Oxygen

Conversion from milligram-atoms per liter to milliliters per liter  
 (1 milligram-atom per liter of  $O_2$  = 11.196 milliliters per liter of  $O_2$ )

Milligram-atoms/liter of $O_2$	.000	.001	.002	.003	.004	.005	.006	.007	.008	.009
1.21	13.55	13.56	13.57	13.58	13.59	13.60	13.61	13.63	13.64	13.65
1.22	13.66	13.67	13.68	13.69	13.70	13.72	13.73	13.74	13.75	13.76
1.23	13.77	13.78	13.79	13.80	13.82	13.83	13.84	13.85	13.86	13.87
1.24	13.88	13.89	13.91	13.92	13.93	13.94	13.95	13.96	13.97	13.98
1.25	14.00	14.01	14.02	14.03	14.04	14.05	14.06	14.07	14.08	14.10
1.26	14.11	14.12	14.13	14.14	14.15	14.16	14.17	14.19	14.20	14.21
1.27	14.22	14.23	14.24	14.25	14.26	14.27	14.29	14.30	14.31	14.32
1.28	14.33	14.34	14.35	14.36	14.38	14.39	14.40	14.41	14.42	14.43
1.29	14.44	14.45	14.47	14.48	14.49	14.50	14.51	14.52	14.53	14.54
1.30	14.55	14.57	14.58	14.59	14.60	14.61	14.62	14.63	14.64	14.66
1.31	14.67	14.68	14.69	14.70	14.71	14.72	14.73	14.75	14.76	14.77
1.32	14.78	14.79	14.80	14.81	14.82	14.83	14.85	14.86	14.87	14.88
1.33	14.89	14.90	14.91	14.92	14.94	14.95	14.96	14.97	14.98	14.99
1.34	15.00									



TABLE 33

## Phosphorus

Conversion from micrograms per liter of inorganic P  
to microgram-atoms per liter of P

(1  $\mu\text{g}$  of P = 0.032285  $\mu\text{g-at}$  of P)

Micrograms per Liter of inorganic P	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
00	0.00	0.00	0.01	0.01	0.01	0.02	0.02	0.02	0.03	0.03

Micrograms per Liter of in- organic P	0.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0
00	0.00	0.03	0.06	0.10	0.13	0.16	0.19	0.23	0.26	0.29
10	0.32	0.36	0.39	0.42	0.45	0.48	0.52	0.55	0.58	0.61
20	0.65	0.68	0.71	0.74	0.77	0.81	0.84	0.87	0.90	0.94
30	0.97	1.00	1.03	1.07	1.10	1.13	1.16	1.19	1.23	1.26
40	1.29	1.32	1.36	1.39	1.42	1.45	1.49	1.52	1.55	1.58
50	1.61	1.65	1.68	1.71	1.74	1.78	1.81	1.84	1.87	1.90
60	1.94	1.97	2.00	2.03	2.07	2.10	2.13	2.16	2.20	2.23
70	2.26	2.29	2.32	2.36	2.39	2.42	2.45	2.49	2.52	2.55
80	2.58	2.62	2.65	2.68	2.71	2.74	2.78	2.81	2.84	2.87
90	2.91	2.94	2.97	3.00	3.03	3.07	3.10	3.13	3.16	3.20
100	3.23	3.26	3.29	3.33	3.36	3.39	3.42	3.45	3.49	3.52
110	3.55	3.58	3.62	3.65	3.68	3.71	3.75	3.78	3.81	3.84
120	3.87	3.91	3.94	3.97	4.00	4.04	4.07	4.10	4.13	4.16

TABLE 34

## Phosphate

Conversion from micrograms per liter of  $\text{PO}_4$  to  
microgram-atoms per liter of  $\text{PO}_4\text{-P}$

(1 ug of  $\text{PO}_4$  = 0.010529 ug-at of  $\text{PO}_4\text{-P}$ )

Micrograms per Liter of $\text{PO}_4$	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01

Micrograms per Liter of $\text{PO}_4$	0.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0
00	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
20	0.21	0.22	0.23	0.24	0.25	0.26	0.27	0.28	0.29	0.31
30	0.32	0.33	0.34	0.35	0.36	0.37	0.38	0.39	0.40	0.41
40	0.42	0.43	0.44	0.45	0.46	0.47	0.48	0.49	0.51	0.52
50	0.53	0.54	0.55	0.56	0.57	0.58	0.59	0.60	0.61	0.62
60	0.63	0.64	0.65	0.66	0.67	0.68	0.69	0.71	0.72	0.73
70	0.74	0.75	0.76	0.77	0.78	0.79	0.80	0.81	0.82	0.83
80	0.84	0.85	0.86	0.87	0.88	0.89	0.91	0.92	0.93	0.94
90	0.95	0.96	0.97	0.98	0.99	1.00	1.01	1.02	1.03	1.04
100	1.05	1.06	1.07	1.08	1.10	1.11	1.12	1.13	1.14	1.15
110	1.16	1.17	1.18	1.19	1.20	1.21	1.22	1.23	1.24	1.25
120	1.26	1.27	1.28	1.30	1.31	1.32	1.33	1.34	1.35	1.36
130	1.37	1.38	1.39	1.40	1.41	1.42	1.43	1.44	1.45	1.46
140	1.47	1.48	1.50	1.51	1.52	1.53	1.54	1.55	1.56	1.57
150	1.58	1.59	1.60	1.61	1.62	1.63	1.64	1.65	1.66	1.67
160	1.68	1.70	1.71	1.72	1.73	1.74	1.75	1.76	1.77	1.78
170	1.79	1.80	1.81	1.82	1.83	1.84	1.85	1.86	1.87	1.88
180	1.90	1.91	1.92	1.93	1.94	1.95	1.96	1.97	1.98	1.99
190	2.00	2.01	2.02	2.03	2.04	2.05	2.06	2.07	2.08	2.10
200	2.11	2.12	2.13	2.14	2.15	2.16	2.17	2.18	2.19	2.20
210	2.21	2.22	2.23	2.24	2.25	2.26	2.27	2.28	2.30	2.31
220	2.32	2.33	2.34	2.35	2.36	2.37	2.38	2.39	2.40	2.41
230	2.42	2.43	2.44	2.45	2.46	2.47	2.48	2.50	2.51	2.52
240	2.53	2.54	2.55	2.56	2.57	2.58	2.59	2.60	2.61	2.62
250	2.63	2.64	2.65	2.66	2.67	2.68	2.70	2.71	2.72	2.73

TABLE 34 (Cont'd)

## Phosphate

Conversion from micrograms per liter of  $\text{PO}_4$  to  
microgram-atoms per liter of  $\text{PO}_4\text{-P}$

Micrograms per Liter of $\text{PO}_4$	0.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0
260	2.74	2.75	2.76	2.77	2.78	2.79	2.80	2.81	2.82	2.83
270	2.84	2.85	2.86	2.87	2.88	2.90	2.91	2.92	2.93	2.94
280	2.95	2.96	2.97	2.98	2.99	3.00	3.01	3.02	3.03	3.04
290	3.05	3.06	3.07	3.08	3.10	3.11	3.12	3.13	3.14	3.15
300	3.16	3.17	3.18	3.19	3.20	3.21	3.22	3.23	3.24	3.25
310	3.26	3.27	3.29	3.30	3.31	3.32	3.33	3.34	3.35	3.36
320	3.37	3.38	3.39	3.40	3.41	3.42	3.43	3.44	3.45	3.46
330	3.47	3.49	3.50	3.51	3.52	3.53	3.54	3.55	3.56	3.57
340	3.58	3.59	3.60	3.61	3.62	3.63	3.64	3.65	3.66	3.67
350	3.69	3.70	3.71	3.72	3.73	3.74	3.75	3.76	3.77	3.78

TABLE 35

## Phosphorus Pentoxide

Conversion from micrograms per liter of  $P_2O_5$  to microgram-atoms per liter of P  
 (1 ug of  $P_2O_5$  = 0.014090 ug-atom of P)

Micrograms per Liter of $P_2O_5$	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01
Micrograms per Liter of $P_2O_5$	0.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0
00	0.00	0.01	0.03	0.04	0.06	0.07	0.08	0.10	0.11	0.13
10	0.14	0.15	0.17	0.18	0.20	0.21	0.23	0.24	0.25	0.27
20	0.28	0.30	0.31	0.32	0.34	0.35	0.37	0.38	0.39	0.41
30	0.42	0.44	0.45	0.46	0.48	0.49	0.51	0.52	0.54	0.55
40	0.56	0.58	0.59	0.61	0.62	0.63	0.65	0.66	0.68	0.69
50	0.70	0.72	0.73	0.75	0.76	0.77	0.79	0.80	0.82	0.83
60	0.85	0.86	0.87	0.89	0.90	0.92	0.93	0.94	0.96	0.97
70	0.99	1.00	1.01	1.03	1.04	1.06	1.07	1.08	1.10	1.11
80	1.13	1.14	1.16	1.17	1.18	1.20	1.21	1.23	1.24	1.25
90	1.27	1.28	1.30	1.31	1.32	1.34	1.35	1.37	1.38	1.39
100	1.41	1.42	1.44	1.45	1.47	1.48	1.49	1.51	1.52	1.54
110	1.55	1.56	1.58	1.59	1.61	1.62	1.63	1.65	1.66	1.68
120	1.69	1.70	1.72	1.73	1.75	1.76	1.78	1.79	1.80	1.82
130	1.83	1.85	1.86	1.87	1.89	1.90	1.92	1.93	1.94	1.96
140	1.97	1.99	2.00	2.01	2.03	2.04	2.06	2.07	2.09	2.10
150	2.11	2.13	2.14	2.16	2.17	2.18	2.20	2.21	2.23	2.24
160	2.25	2.27	2.28	2.30	2.31	2.32	2.34	2.35	2.37	2.38
170	2.40	2.41	2.42	2.44	2.45	2.47	2.48	2.49	2.51	2.52
180	2.54	2.55	2.56	2.58	2.59	2.61	2.62	2.63	2.65	2.66
190	2.68	2.69	2.71	2.72	2.73	2.75	2.76	2.78	2.79	2.80
200	2.82	2.83	2.85	2.86	2.87	2.89	2.90	2.92	2.93	2.94
210	2.96	2.97	2.99	3.00	3.02	3.03	3.04	3.06	3.07	3.09
220	3.10	3.11	3.13	3.14	3.16	3.17	3.18	3.20	3.21	3.23
230	3.24	3.25	3.27	3.28	3.30	3.31	3.33	3.34	3.35	3.37
240	3.38	3.40	3.41	3.42	3.44	3.45	3.47	3.48	3.49	3.51
250	3.52	3.54	3.55	3.56	3.58	3.59	3.61	3.62	3.64	3.65

Note: For values greater than 259, the conversion is to be obtained by addition.

TABLE 36

## Nitrite

Conversion from micrograms per liter of  $\text{NO}_2$  to microgram-atoms per liter of  $\text{NO}_2\text{-N}$   
 (1  $\mu\text{g}$  of  $\text{NO}_2$  = 0.0217365  $\mu\text{g}$  - at of  $\text{NO}_2\text{-N}$ )

Micrograms per Liter of $\text{NO}_2$	0.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0
00	0.00	0.02	0.04	0.07	0.09	0.11	0.13	0.15	0.17	0.20
10	0.22	0.24	0.26	0.28	0.30	0.33	0.35	0.37	0.39	0.41
20	0.43	0.46	0.48	0.50	0.52	0.54	0.57	0.59	0.61	0.63
30	0.65	0.67	0.70	0.72	0.74	0.76	0.78	0.80	0.83	0.85
40	0.87	0.89	0.91	0.93	0.96	0.98	1.00	1.02	1.04	1.07
50	1.09	1.11	1.13	1.15	1.17	1.20	1.22	1.24	1.26	1.28
60	1.30	1.33	1.35	1.37	1.39	1.41	1.43	1.46	1.48	1.50
70	1.52	1.54	1.57	1.59	1.61	1.63	1.65	1.67	1.70	1.72
80	1.74	1.76	1.78	1.80	1.83	1.85	1.87	1.89	1.91	1.93
90	1.96	1.98	2.00	2.02	2.04	2.06	2.09	2.11	2.13	2.15
100	2.17	2.20	2.22	2.24	2.26	2.28	2.30	2.33	2.35	2.37
110	2.39	2.41	2.43	2.46	2.48	2.50	2.52	2.54	2.56	2.59
120	2.61	2.63	2.65	2.67	2.70	2.72	2.74	2.76	2.78	2.80
130	2.83	2.85	2.87	2.89	2.91	2.93	2.96	2.98	3.00	3.02
140	3.04	3.06	3.09	3.11	3.13	3.15	3.17	3.20	3.22	3.24
150	3.26	3.28	3.30	3.33	3.35	3.37	3.39	3.41	3.43	3.46
160	3.48	3.50	3.52	3.54	3.56	3.59	3.61	3.63	3.65	3.67
170	3.70	3.72	3.74	3.76	3.78	3.80	3.83	3.85	3.87	3.89
180	3.91	3.93	3.96	3.98	4.00	4.02	4.04	4.06	4.09	4.11
190	4.13	4.15	4.17	4.20	4.22	4.24	4.26	4.28	4.30	4.33
200	4.35	4.37	4.39	4.41	4.43	4.46	4.48	4.50	4.52	4.54

TABLE 37

## Nitrate

Conversion from micrograms per liter of  $\text{NO}_3$  to microgram-atoms per liter of  $\text{NO}_3\text{-N}$ 

Micrograms per liter of $\text{NO}_3$	00	01	02	03	04	05	06	07	08	09
00	00.0	00.0	00.0	00.0	00.1	00.1	00.1	00.1	00.1	00.1
10	00.2	00.2	00.2	00.2	00.2	00.2	00.3	00.3	00.3	00.3
20	00.3	00.3	00.4	00.4	00.4	00.4	00.4	00.4	00.5	00.5
30	00.5	00.5	00.5	00.5	00.5	00.6	00.6	00.6	00.6	00.6
40	00.6	00.7	00.7	00.7	00.7	00.7	00.7	00.8	00.8	00.8
50	00.8	00.8	00.8	00.9	00.9	00.9	00.9	00.9	00.9	01.0
60	01.0	01.0	01.0	01.0	01.0	01.0	01.1	01.1	01.1	01.1
70	01.1	01.1	01.2	01.2	01.2	01.2	01.2	01.2	01.3	01.3
80	01.3	01.3	01.3	01.3	01.4	01.4	01.4	01.4	01.4	01.4
90	01.5	01.5	01.5	01.5	01.5	01.5	01.5	01.6	01.6	01.6
Micrograms per liter of $\text{NO}_3$	00	10	20	30	40	50	60	70	80	90
100	01.6	01.8	01.9	02.1	02.3	02.4	02.6	02.7	02.9	03.1
200	03.2	03.4	03.5	03.7	03.9	04.0	04.2	04.4	04.5	04.7
300	04.8	05.0	05.2	05.3	05.5	05.6	05.8	06.0	06.1	06.3
400	06.5	06.6	06.8	06.9	07.1	07.3	07.4	07.6	07.7	07.9
500	08.1	08.2	08.4	08.5	08.7	08.9	09.0	09.2	09.4	09.5
600	09.7	09.8	10.0	10.2	10.3	10.5	10.6	10.8	11.0	11.1
700	11.3	11.5	11.6	11.8	11.9	12.1	12.3	12.4	12.6	12.7
800	12.9	13.1	13.2	13.4	13.5	13.7	13.9	14.0	14.2	14.4
900	14.5	14.7	14.8	15.0	15.2	15.3	15.5	15.6	15.8	16.0
1000	16.1	16.3	16.5	16.6	16.8	16.9	17.1	17.3	17.4	17.6
1100	17.7	17.9	18.1	18.2	18.4	18.5	18.7	18.9	19.0	19.2
1200	19.4	19.5	19.7	19.8	20.0	20.2	20.3	20.5	20.6	20.8
1300	21.0	21.1	21.3	21.4	21.6	21.8	21.9	22.1	22.3	22.4
1400	22.6	22.7	22.9	23.1	23.2	23.4	23.5	23.7	23.9	24.0
1500	24.2	24.4	24.5	24.7	24.8	25.0	25.2	25.3	25.5	25.6
1600	25.8	26.0	26.1	26.3	26.4	26.6	26.8	26.9	27.1	27.3
1700	27.4	27.6	27.7	27.9	28.1	28.2	28.4	28.5	28.7	28.9
1800	29.0	29.2	29.4	29.5	29.7	29.8	30.0	30.2	30.3	30.5
1900	30.6	30.8	31.0	31.1	31.3	31.4	31.6	31.8	31.9	32.1
2000	32.3	32.4	32.6	32.7	32.9	33.1	33.2	33.4	33.5	33.7

TABLE 37 (Cont'd)

## Nitrate

Conversion from micrograms per liter of  $\text{NO}_3$  to microgram-atoms per liter of  $\text{NO}_3\text{-N}$ 

Micrograms per liter of $\text{NO}_3$	00	10	20	30	40	50	60	70	80	90
2100	33.9	34.0	34.2	34.4	34.5	34.7	34.8	35.0	35.2	35.3
2200	35.5	35.6	35.8	36.0	36.1	36.3	36.4	36.6	36.8	36.9
2300	37.1	37.3	37.4	37.6	37.7	37.9	38.1	38.2	38.4	38.5
2400	38.7	38.9	39.0	39.2	39.4	39.5	39.7	39.8	40.0	40.2
2500	40.3	40.5	40.6	40.8	41.0	41.1	41.3	41.4	41.6	41.8
2600	41.9	42.1	42.3	42.4	42.6	42.7	42.9	43.1	43.2	43.4
2700	43.5	43.7	43.9	44.0	44.2	44.4	44.5	44.7	44.8	45.0
2800	45.2	45.3	45.5	45.6	45.8	46.0	46.1	46.3	46.4	46.6
2900	46.8	46.9	47.1	47.3	47.4	47.6	47.7	47.9	48.1	48.2
3000	48.4	48.5	48.7	48.9	49.0	49.2	49.4	49.5	49.7	49.8

NOTE: Conversion of values not given directly in the tables are derived by addition.

TABLE 38

## Silicon

Conversion from micrograms per liter of Si to microgram-atoms per liter of Si  
(1  $\mu\text{g}$  of Si = 0.0356049  $\mu\text{g}$ -atom Si)

Micrograms per Liter of Si	00	10	20	30	40	50	60	70	80	90
000	000	000	001	001	001	002	002	002	003	003
100	004	004	004	005	005	005	006	006	006	007
200	007	007	008	008	009	009	009	010	010	010
300	011	011	011	012	012	012	013	013	014	014
400	014	015	015	015	016	016	016	017	017	017
500	018	018	019	019	019	020	020	020	021	021
600	021	022	022	022	023	023	023	024	024	025
700	025	025	026	026	026	027	027	027	028	028
800	028	029	029	030	030	030	031	031	031	032
900	032	032	033	033	033	034	034	035	035	035

Micrograms per Liter of Si	000	100	200	300	400	500	600	700	800	900
1000	036	039	043	046	050	053	057	061	064	068
2000	071	075	078	082	085	089	093	096	100	103
3000	107	110	114	117	121	125	128	132	135	139
4000	142	146	150	153	157	160	164	1.67	171	174
5000	178	182	185	189	192	196	199	203	207	210
6000	214	217	221	224	228	231	235	239	242	246
7000	249	253	256	260	263	267	271	274	278	281
8000	285	288	292	296	299	303	306	310	313	317

EXAMPLE I:

Assume an initial value of 4200. Since this value lies within the range 1000 - 8900, use lower portion of above table. Enter left hand column at 4000, proceed horizontally to the right to column headed 200, and read 150.

EXAMPLE II:

Assume an initial value of 4180. Since this value is not recorded explicitly in the table, the conversion can be made by one of two methods:



TABLE 38 (Cont'd)

Silicon

- (1) Interpolation between 4100 and 4200 to nearest whole number, 149:
- or (2) Since  $4180 = 4100 + 80$ , find 146 corresponding to 4100 and 003 corresponding to 80.  
Add 146 and 003 to get 149.

TABLE 39

## Silicon Dioxide

Conversion from micrograms per liter of  $\text{SiO}_2$  to microgram-atoms per liter of  $\text{SiO}_2\text{-Si}$   
 (1  $\mu\text{g}$  of  $\text{SiO}_2$  = 0.016643  $\mu\text{g}$ -atom of Si)

Micrograms per Liter of $\text{SiO}_2$	00	10	20	30	40	50	60	70	80	90
000	000	000	000	000	001	001	001	001	001	001
100	002	002	002	002	002	002	003	003	003	003
200	003	003	004	004	004	004	004	004	005	005
300	005	005	005	005	006	006	006	006	006	006
400	007	007	007	007	007	007	008	008	008	008
500	008	008	009	009	009	009	009	009	010	010
600	010	010	010	010	011	011	011	011	011	011
700	012	012	012	012	012	012	013	013	013	013
800	013	013	014	014	014	014	014	014	015	015
900	015	015	015	015	016	016	016	016	016	016

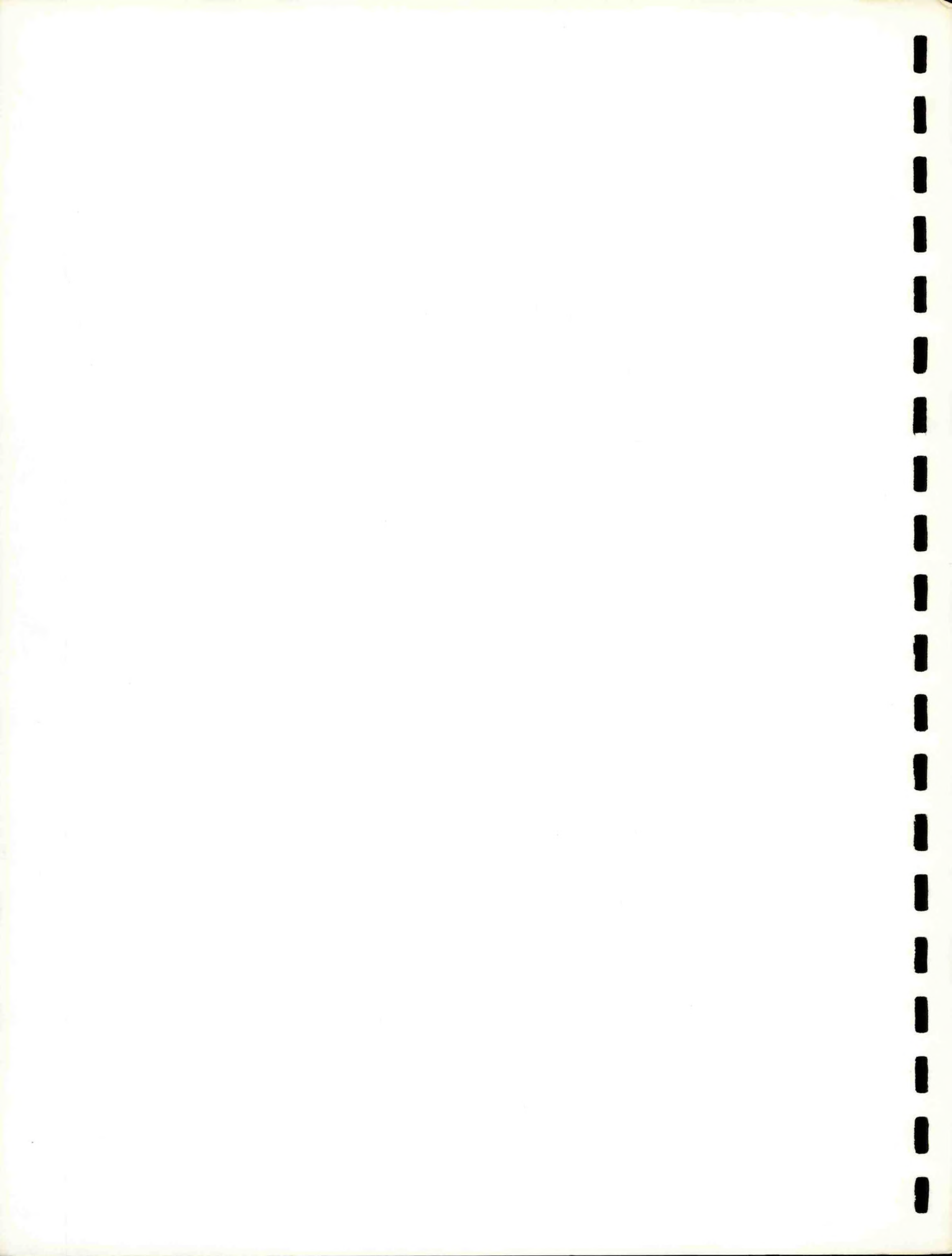
Micrograms per Liter of $\text{SiO}_2$	000	100	200	300	400	500	600	700	800	900
1000	017	018	020	022	023	025	027	028	030	032
2000	033	035	037	038	040	042	043	045	047	048
3000	050	052	053	055	057	058	060	062	063	065
4000	067	068	070	072	073	075	077	078	080	082
5000	083	085	087	088	090	092	093	095	097	098
6000	100	102	103	105	107	108	110	112	113	115
7000	117	118	120	121	123	125	126	128	130	131
8000	133	135	136	138	140	141	143	145	146	148
9000	150	151	153	155	156	158	160	161	163	165
10000	166	168	170	171	173	175	176	178	180	181
11000	183	185	186	188	190	191	193	195	196	198
12000	200	201	203	205	206	208	210	211	213	215

TABLE 40

## Silicate

Conversion from milligrams per liter of  $\text{SiO}_3$  to microgram-atoms per liter of  $\text{SiO}_3\text{-Si}$  (1 milligram of  $\text{SiO}_3$  = 13.1433 microgram-atoms of  $\text{SiO}_3\text{-Si}$ )

Milligrams per Liter of $\text{SiO}_3$	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
00	000	001	003	004	005	007	008	009	011	012
01	013	014	016	017	018	020	021	022	024	025
02	026	028	029	030	032	033	034	035	037	038
03	039	041	042	043	045	046	047	049	050	051
04	053	054	055	057	058	059	060	062	063	064
05	066	067	068	070	071	072	074	075	076	078
06	079	080	081	083	084	085	087	088	089	091
07	092	093	095	096	097	099	100	101	103	104
08	105	106	108	109	110	112	113	114	116	117
09	118	120	121	122	124	125	126	127	129	130
10	131	133	134	135	137	138	139	141	142	143
11	145	146	147	149	150	151	152	154	155	156
12	158	159	160	162	163	164	166	167	168	170
13	171	172	173	175	176	177	179	180	181	183
14	184	185	187	188	189	191	192	193	195	196
15	197	198	200	201	202	204	205	206	208	209
16	210	212	213	214	216	217	218	219	221	222
17	223	225	226	227	229	230	231	233	234	235
18	237	238	239	241	242	243	244	246	247	248
19	250	251	252	254	255	256	258	259	260	262
20	263	264	265	267	268	269	271	272	273	275



# APPENDIX 1

## PHYSICAL AND CHEMICAL DATA FORM FOR OCEANOGRAPHIC STATIONS

ESPECIALLY PREPARED FOR THE  
**INTERNATIONAL INDIAN OCEAN EXPEDITION**  
BY THE NATIONAL OCEANOGRAPHIC DATA CENTER  
WASHINGTON 25, D. C.

SURFACE ENVIRONMENTAL INFORMATION (MASTER CARD)																																												
COUNTRY		SHIP				LATITUDE									LONGITUDE									MARSDEN SQUARE			DATE				TIME GMT			SHIP'S CRUISE NO.			SHIP'S STATION NO.			DEPTH TO BOTTOM (M)			MAX. SAMPLE	
1 2 3 4 5 6 7 8 9 N S 10 11 12 13 14 15 E W 16 17 18 19 20 21 22 23 24 25 26 27		S=X8				E=X14									YEAR MONTH DAY			HR. 1/10			28 29 30			31 32 33			34 35 36 37			38 39														
COL.																																												
ADD. OBS. CODE		WATER				WAVE				WIND				BAR. (MBS)			AIR TEMPERATURE °C				WEATHER		CLOUD		VIS.			SPECIAL OBS.				PROCESSING NOS.				C								
40 41		COLOR TRANS. DIR. H A P				DIR. SPEED FORCE				54 55 56			DRY B WET B				W W W W		T A					REF. ID. NO. CONSEC. NO.				T																
COL.																																												

COUNTRY
INSTITUTE
VESSEL
CRUISE OR PROJECT NO.

SUBSURFACE OBSERVATIONS—(DETAIL CARDS)																															
MESSENGER TIME		DEPTH (M)				TEMP. °C				SAL. ‰				O <sub>2</sub>				PO <sub>4</sub> -P	TOTAL-P		NO <sub>2</sub> -N		NO <sub>3</sub> -N		SiO <sub>2</sub> -Si		pH			C T	
HR. 1/10		28 29 30 31 32				33 34 35 36 37				38 39 40 41 42				51	52 53		54 55 56		57 58 59		60 61 62		63 64 65		66 67 68 69 70 71 72			73 74 75 76 77 78 79 80			
COL.																															
OPTIONAL CHEMISTRY																															

REMARKS
SPECIFY OPTIONAL ITEMS OR SPECIAL CODES

OCEANOGRAPHIC STATION CARD PHYSICAL AND CHEMICAL DATA																																																							
MASTER																																																							
COUNTRY	SHIP	LATITUDE									LONGITUDE									MARSDEN SQUARE	DATE			TIME	SHIP'S CRUISE NO.	SHIP'S STATION NO.	DEPTH BOTTOM	ADD. OBS. CODE	WATER				WAVE				WIND				BAR.		AIR TEMP		WEATHER		CLOUD		SPECIAL			MOQC PROCESSING NOS.			
0 0 0 0	0 0 0 0	0 0 0 0 0 0 0 0 0 0									0 0 0 0 0 0 0 0 0 0									0 0 0 0	0 0 0 0			0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0						
OBSERVED																																																							
TIME		DEPTH		TEMP.		SAL.		SIGMA-T		SOUND VEL.		O <sub>2</sub>		PO <sub>4</sub> -P		TOTAL-P		NO <sub>2</sub> -N		NO <sub>3</sub> -N		SiO <sub>2</sub> -Si		pH			3 3 3 3 3 3 3 3																												
HR. 1/10		M		°C		‰		I		FT/SEC.		ml/l		µg dl/l		µg dl/l		µg dl/l		µg dl/l		µg dl/l																																	
STANDARD																																																							
TIME		DEPTH		TEMP.		SAL.		SIGMA-T		SOUND VEL.		O <sub>2</sub>		SP. VOL. ANOMALY		DYN. DEPTH ANOMALY		7 7 7 7 7 7 7 7																																					
HR. 1/10		M		°C		‰		I		FT/SEC.		ml/l																																											

### OCEANOGRAPHIC STATION CARD PHYSICAL AND CHEMICAL DATA

GENERAL REMARKS