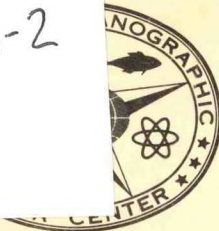


GC1  
.U423  
no. M-2



# NATIONAL OCEANOGRAPHIC DATA CENTER

MANUAL SERIES

## PROCESSING PHYSICAL AND CHEMICAL DATA FROM OCEANOGRAPHIC STATIONS

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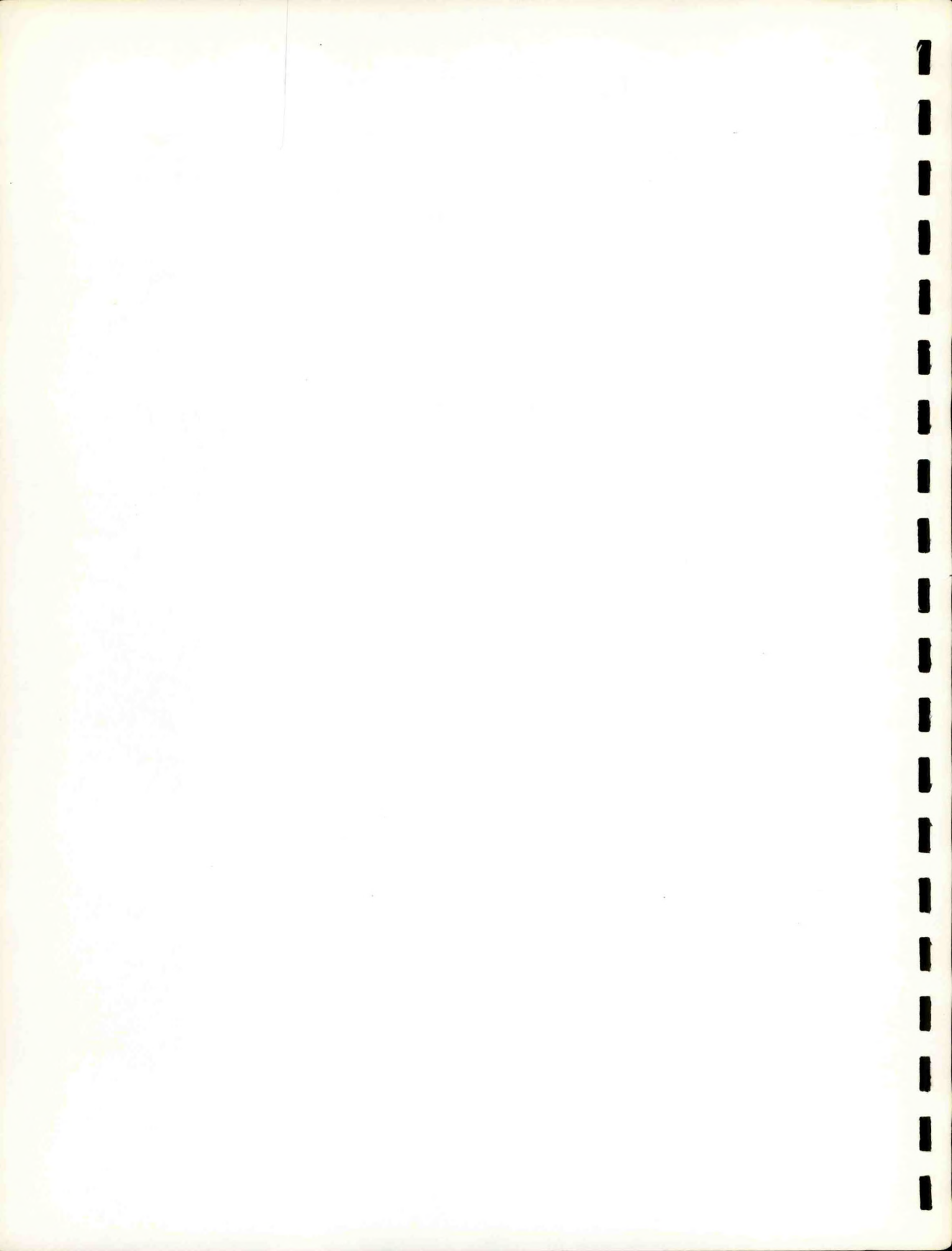
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FOREWORD

This publication describes the methods used at the National Oceanographic Data Center (NODC) for reducing processed physical and chemical oceanographic station data to a standard format. It is intended also for use by other agencies or contributors interested in furnishing oceanographic data to NODC or making their data systems compatible with those of NODC. An outline of the format of the Computed Card is included in order to acquaint the users of the NODC oceanographic station data holdings with the end product of the routinely performed computations.

*W C Jacobs*

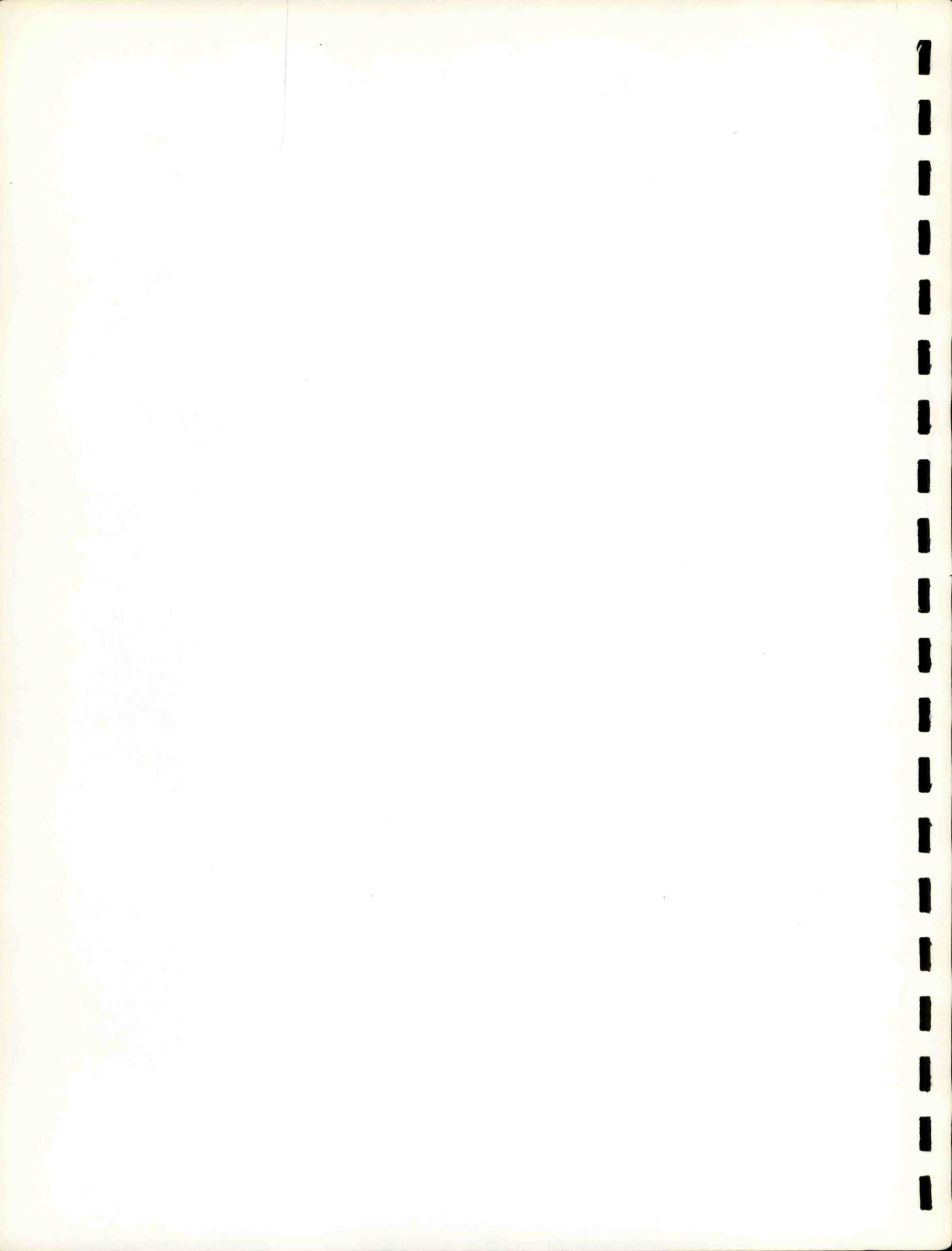
W. C. JACOBS

Director

National Oceanographic Data Center

AUG 24 1962

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## INTRODUCTION

This manual is intended to provide the necessary instructions and conversion tables for reducing processed marine physical and chemical environmental data collected at oceanographic stations to a standard format. Instructions for punching the National Oceanographic Data Center (NODC) Physical and Chemical Oceanographic Station Data Punch Card also are contained in this manual. This is the standard format used at the NODC; it is intended also for use by other agencies or contributors interested in furnishing oceanographic data to the Data Center or making their data systems compatible with those of NODC. The card format and codes described in this manual have resulted from comments and suggestions by the oceanographic community. Its main features are based on the report of the Eastern Pacific Oceanic Conference (EPOC) Committee on Machine Processing for Oceanographic Data, the International Council for the Exploration of the Sea (ICES) oceanographic station card format, the Canadian Oceanographic Data Center (CODC), and the card format formerly used at the U. S. Navy Hydrographic Office.

The card used by NODC is the 80-column Hollerith punch card. Each column contains ten numbers (0-9) and two additional places above the 0, designated as the X and Y overpunches. Only one number is used in each column; X and Y are used in combination with numbers to produce alphabetic codes or to denote various special numeric indicators.

## GENERAL

Three basic oceanographic station data cards are in use currently at NODC. These are the Master Card, the Observed Detail Card, and the Standard Detail Card. Actually, a single, multi-purpose card is used on which the three headings are printed; the identification of the card and the headings to be used are indicated by a control punch in Column 80. The function of each card is as follows: (1) a single Master Card is used to identify each oceanographic station and to record general surface environmental and meteorological information at the station; (2) a separate Observed Detail Card is punched for each depth at which chemical and physical data were taken; and (3) a Standard Detail Card may be punched for standard depths with interpolated physical and chemical data; usually this card is produced automatically by the IBM 7070/1401 Computer System for all standard depths.

The standard multi-purpose card also is used to record the results of the various computations programmed by NODC on the IBM 7070; when cards bear computed values they are referred to as Computed Cards; before computation they are called Data Cards. Additional types of cards are currently under development for recording biological, geological, and additional chemical information observed at the station.

Each oceanographic cruise or source of oceanographic station data processed by NODC is assigned a "reference identity number." NODC Publication C-1, "Reference Sources for Oceanographic Station Data," gives the bibliographic and other pertinent information for each cruise

by reference identity number. A cruise master card bearing information common to the cruise as a whole, as well as codes indicating observational techniques and accuracy, eventually will be provided for each cruise. The format of this card is now being developed by NODC on the basis of comments and suggestions received from the oceanographic community.

To facilitate card punching, all data are coded or transcribed onto the NODC "Physical and Chemical Data Form for Oceanographic Stations," NODC form NHO-NODC-3167/1 (9-61), which contains space for coding the station Master Card information and for coding physical and chemical information at 25 observed depths. The entries on this form are arranged in the same order as they appear on the punch card (decimal places are marked by dots). The shaded portion of the form is for information to be filled in by NODC only. Some columns are left out on the portion of the form which corresponds to the detail card; these data are always machine reproduced or computed and do not need to be filled in by the observer or coder.

#### CODING THE MASTER CARD INFORMATION

General instructions for entries on the data form:

1. Use standard rounding procedures whenever rounding is necessary.

Example: > 5 add one (1) to preceding column  
< 5 drop  
5 round to nearest even number

2. When necessary, 0's are prefixed to fill a field but do not need to be suffixed.

Example: A temperature of 6.3°C. should be recorded and punched in Columns 33-37 as 06.3 with Columns 36 and 37 left blank and unpunched.

#### ENTRIES FOR SURFACE ENVIRONMENTAL INFORMATION (MASTER CARD)

*(See Appendix I, page 105, for sample Physical and Chemical Data Form.)*

COLUMNS 1 and 2

COUNTRY CODE

Enter the IGY country code shown in Table 1. Regardless of the ship's registry, country code should reflect the nationality of the agency sponsoring or operating the vessel for the particular cruise being coded.

COLUMNS 3 and 4

SHIP CODE

Enter the first two letters of the ship's name (eg. AL = ALBATROSS, DI = DISCOVERY, HS = HUGH M. SMITH). Duplication of ship letters within any one country code must be avoided (e.g. U. S. ALBATROSS = AL, U. S. ALBACORA = AB). If ship is unknown, leave Columns 3 and 4 blank.

COLUMNS 5 - 9

LATITUDE

Enter latitude in degrees and minutes. Enter tenths of minute, when available, in Column 9. Table 2 converts seconds to tenths of a minute. Enter N or S in the space provided on the data form.

COLUMNS 10 - 15

LONGITUDE

Enter longitude in degrees and minutes. Enter tenths of minute, when available, in Column 15. Table 2 converts seconds to tenths of a minute. Enter E or W in the space provided on the data form.

## COLUMNS 16 - 18

## MARSDEN SQUARE

This number will be machine computed if not given. A Marsden Square Chart is provided as Table 3 for convenience in locating the station positions according to the Marsden Square system.

*Note on Columns 5-18: For station position use location as determined on arrival at oceanographic station whenever possible. Indicate appreciable drift during the time station was occupied by an entry in the Remarks space and a red dash in Column 16.*

## COLUMNS 19 - 20

## YEAR

Enter last two digits of year as determined by Greenwich Mean Time (GMT).

## COLUMNS 21 - 22

## MONTH

Enter month as determined by GMT, using Arabic numerals 01 through 12.

## COLUMNS 23 - 24

## DAY

Enter day of month as determined by GMT. Prefix 0 if less than 10.

## COLUMNS 25 - 27

## TIME

Enter hour and tenths of hour of time of station in GMT. Use either time of first cast or time at which applicable surface environmental data were obtained. Table 4 converts local time to GMT and Table 2 converts minutes to tenths of an hour.

## COLUMNS 28 - 30

## SHIP'S CRUISE NUMBER

Enter the number, alphabetic or alpha-numeric designator or its closest equivalent, assigned to the cruise by the originator. Leave blank if none.

Example: MRL 60 = 060

## COLUMNS 31 - 33

## SHIP'S STATION NUMBER

Enter ship's station number as assigned by the originator. When complex station numbering systems are employed (such as station numbers containing

positional codes) which require more than 3 columns to record, use the additional columns in the Special Observations field, Columns 68-72. In this case, put a red dash in Column 68.

COLUMNS 34 - 37

DEPTH TO BOTTOM

Enter corrected or uncorrected soundings (as determined at the location given in Columns 5-15) in meters. For corrected soundings, put a red dash in Column 37. Table 5 converts fathoms to meters; Table 6 converts feet to meters. Although Table 6 is given to tenths of a meter for added accuracy in recording observed depths in the detail card, depth to bottom, Columns 34-37, is rounded to the nearest whole meter.

COLUMNS 38 - 39

MAXIMUM SAMPLE DEPTH

Enter the depth of the deepest sample (temperature or salinity or both) to the nearest hundred-meter interval. Round as follows: 0-50 = 00, 51-150 = 01, 151-250 = 02, etc.

COLUMNS 40 - 41

ADDITIONAL OBSERVATIONS CODE

A two digit code to indicate various kinds of additional data collected at the station but not recorded on the Master or Detail Card is to be entered in this space. The code currently is under development; when completed it will be issued as Table 7.

COLUMNS 42 - 45

WATER COLOR AND TRANSPARENCY

Enter water color in Columns 42 and 43 according to the Forel-Ule scale. Table 8 shows the Forel-Ule scale and conversions from other color scales. Enter transparency values in whole meters in Columns 44 and 45 obtained by using a white, 30 cm. Secchi disc.



## COLUMNS 46 - 49

WAVE DIRECTION, HEIGHT AND PERIOD  
(OR SEA STATE)

Enter the direction from which the dominant waves come in Columns 46 and 47 according to WMO Code 0885 (23B)\* as shown in Table 9. (If wave height is 16 feet or greater, 50 must be added to code value of direction.)

Enter the height of the dominant waves in Column 48 according to WMO Code 1555 (42)\* shown in Table 11. (If Sea State is given, see note below.)

Enter the period of the dominant waves in Column 49 according to WMO Code 3155 (69)\* as shown in Table 12.

*To record Sea State instead of wave height and period, enter the state of sea (or amount) in Column 48 according to WMO Code 3700 (75)\* as shown in Table 13 and cross out H in Column 48; leave Column 49 blank.*

## COLUMNS 50 - 53

## WIND DIRECTION AND SPEED (OR FORCE)

Enter direction from which the wind blows in Columns 50 and 51 according to WMO Code 0877 (23)\* as shown in Table 9. Table 10 is for conversion from points, quarter points, or a scale of 32. There is a choice of either wind speed or force in this field:

1. Wind speed in knots. Conversions are given in:

Table 14 (meters/second to knots)

Table 15 (miles/hour to knots)

Table 16 (kilometers/hour to knots)

Table 17 (feet/second to knots)

2. Wind force according to the Beaufort scale as defined by Table 18. (Do not use WMO Code 1144 (30)\*.)

Important: the unit not used, i.e. speed or force, should be crossed off the data form.

\*Number in parentheses represents old WMO Code number.

## COLUMNS 54 - 56

## BAROMETER

Enter barometric pressure in millibars. Enter tens, units, and tenths only. (Example: 1012.62 = 12.6.) The recordable range is 945.0 to 1044.9 mbs. Enter pressure falling outside this range in the Remarks space of the data form. Table 19 converts inches to millibars. Table 20 converts millimeters to millibars.

## COLUMNS 57 - 62

AIR TEMPERATURE, DRY BULB  
AND WET BULB TEMPERATURES

Enter dry bulb temperature in Columns 57-59 and wet bulb temperature in Columns 60-62 in °C to tenths. Indicate negative temperature by a prominent red dash over the numeral(s) in Column(s) 57 and/or 60. Table 21 converts °F to °C.

## COLUMNS 63 - 64

## WEATHER

There is a choice of two types of entries for weather:

1. Enter an X in Column 63 and enter the weather in Column 64 according to the single digit WMO Code 4501 (90A)\* as shown in Table 22. This is the preferred weather code.
2. Enter present weather in Columns 63 and 64 according to the two digit WMO Code 4677 (92)\* as shown in Table 25. Because code figures 00 through 03 are not descriptive of present weather, Code 4501 is preferred instead of these code figures. Conversions from other weather codes are given in Tables 23 and 24.

\*Number in parentheses represents old WMO Code number.

## COLUMN 65

## CLOUD TYPE

Enter type (genus) of cloud according to WMO Code 0500 (10)\* as shown in Table 26.

## COLUMN 66

## CLOUD AMOUNT

Enter cloud amount (fraction of the sky covered by clouds) in eighths according to WMO Code 2700 (60)\* as shown in Table 27.

## COLUMN 67

## VISIBILITY

Enter visibility according to WMO Code 4300 (85A)\* as shown in Table 28.

## COLUMNS 68 - 72

## SPECIAL OBSERVATIONS

Enter special observations in this space. Specify nature of special observations, units, codes, and columns used in the Remarks space of the data form. As mentioned previously, these columns also may be used for ship's station numbers that exceed 3 digits (see page 5, Columns 31-33, SHIP'S STATION NUMBER). However, when used for this purpose, no other information may be placed in this field.

## COLUMNS 73 - 80

PROCESSING NUMBERS  
(TO BE COMPLETED BY NODC)

The reference identity number assigned by NODC is entered in Columns 73-75.

NODC assigns numbers to each station consecutively in the order in which they appear in the source. These "consec numbers" are entered in Columns 76-79. NODC enters one (1) in Column 80 to identify the station Master Card.

\*Number in parentheses represents old WMO Code number.

## CODING THE DETAIL CARD INFORMATION

General instructions for entries on the data form:

1. Columns 32, 37, and 42, marked i, may be used for the following purposes:

- a) For insertion of an additional decimal place, if needed, or
- b) For insertion of a "precision of measurement" indicator. An alphabetic code, applicable to depth, temperature, and salinity, will indicate the estimated limits of accuracy determined by the observer. This code, presently under development, will be distributed as Table 29. (Columns 32, 37, and 42 cannot be used simultaneously for any one cruise or station for both additional decimal places and precision of measurement indicator.)

2. To indicate doubtful depth, temperature, and salinity place a question mark (?) in the indicator columns (i.e., Columns 32, 37, and 42) or in the case of oxygen and optional chemistry after the last numeral of the value in the last column of the field. The last column of each field has been widened on the data form to allow for the possible entry of both a numeral and a question mark.

## ENTRIES FOR SUBSURFACE OBSERVATIONS (DETAIL CARD)

*(See Appendix I, page 105, for sample Physical and Chemical Data Form.)*

COLUMNS 1 - 24

IDENTIFICATION ENTRIES

These columns are identical to the Master Card and need not be filled in. The information is automatically reproduced in the Observed Detail Card from the Master Card.

COLUMNS 25 - 27

MESSENGER TIME

Enter hour and tenths of hour in GMT at time of release of messenger applicable to the observational level. Table 2 converts minutes to tenths of an hour. The time entry also serves to distinguish multiple casts at one station. If a single cast constitutes the station, the messenger time need be entered only at the shallowest (0-meter) level.

COLUMNS 28 - 32

DEPTH OF SAMPLE

Enter depth of a sample in meters in Columns 28 - 31. Column 32 may be used to enter tenths of a meter, if desired, or the alphabetic precision indicator (see general instructions). To indicate thermometrically determined depths place a cross (†) in Column 32. The entries in the depth field should be corrected depths only. Standard depths are normally interpolated by the computer and need not be entered on the data form.

*If interpolated standard depths are entered, leave messenger time blank and insert a 7 in Column 80.*

COLUMNS 33 - 37

TEMPERATURE

Enter temperature in °C to hundredths in Columns 33-36; Column 37 is for an additional decimal or precision indicator coded according to Table 29. To indicate a negative temperature, place a prominent minus sign in red before the numeral entry in Column 33. (Column 33 has extra width for this purpose.)

## COLUMNS 38 - 42

## SALINITY

Enter salinity in parts per thousand to hundredths in Columns 38-41; Column 42 is for an additional (thousandths) decimal. Table 30 converts chlorinity to salinity.

*Columns 43-50 do not appear on the data form. On the punch card these columns are reserved for computed sigma-t and sound velocity. Sound velocities measured by a velocimeter (or temperatures or salinities based on these measurements) should be forwarded or coded separately.*

## COLUMNS 51 - 53

## OXYGEN

Enter oxygen in milliliters per liter (ml/l) to hundredths in Columns 51-53. (If determined to tenths only leave Column 53 blank.) Table 31 converts milligrams per liter (mg/l) and Table 32 converts milligram-atoms per liter (mg-at/l) to ml/l.

*To record oxygen values greater than 9.99 ml/l enter two numerals (tens and units) in Column 51.*

## COLUMNS 54 - 71

## OPTIONAL CHEMISTRY

Columns 54-71 are intended for entry of the additional chemistry described below; this is the only chemistry that will be punched routinely. A special punch card to record chemistry other than that shown below is being developed at NODC. However, any chemistry may be substituted in these columns by special request provided that:

1. It can be reported in a 3 digit field.
2. The nature and units of the substituted chemistry and the columns used are fully described in the Remarks space of the data form.

## COLUMNS 54 - 56

## PHOSPHATE

Enter inorganic phosphate in microgram-atoms per liter ( $\mu\text{g-at/l}$ ) to hundredths. Conversions from other units are shown in Tables 33-35.

## COLUMNS 57 - 59

## TOTAL PHOSPHORUS

Enter total **P** in microgram-atoms per liter ( $\mu\text{g-at/l}$ ) to hundredths.

## COLUMNS 60 - 62

## NITRITE-NITROGEN

Enter nitrite-nitrogen ( $\text{NO}_2\text{-N}$ ) in microgram-atoms per liter ( $\mu\text{g-at/l}$ ) to hundredths. Conversions from micrograms per liter of  $\text{NO}_2$  to microgram-atoms per liter of  $\text{NO}_2\text{-N}$  are shown in Table 36.

## COLUMNS 63 - 65

## NITRATE-NITROGEN

Enter nitrate-nitrogen ( $\text{NO}_3\text{-N}$ ) in microgram-atoms per liter ( $\mu\text{g-at/l}$ ) to tenths. Conversions from micrograms per liter of  $\text{NO}_3$  to microgram-atoms per liter of  $\text{NO}_3\text{-N}$  are shown in Table 37.

## COLUMNS 66 - 68

## SILICATE-SILICON

Enter silicate-silicon in microgram-atoms per liter ( $\mu\text{g-at/l}$ ). Conversions from other units are shown in Tables 38-40.

## COLUMNS 69 - 71

 $\text{p}^{\text{H}}$ 

Enter  $\text{p}^{\text{H}}$  in Columns 69-71.

## COLUMN 72

This column (reserved for NODC) is to be left blank.

Columns 73-79 are omitted from the data form; on the punch card these will be reproduced automatically from the Master Card to provide each Detail Card with reference identity and consecutive numbers.

## COLUMN 80

## CARD TYPE

For observed sample depths enter 3 in Column 80 to indicate an Observed Detail Card. If interpolations are made by non-machine methods for standard depths enter a 7 in Column 80. (Computed elements such as sigma-t, sound velocity, dynamic depth anomaly, etc. will be computed for this type of card, but computations will be based on the temperature and salinity as interpolated by the originator.)

*In a few instances only interpolated data may be available for certain stations. In that case the numeral 4 is entered in Column 80. Such a card will be treated by the computer as though it were an observed level. Stations based on such interpolated data will be appropriately marked "LIT" on listings.*



INSTRUCTIONS FOR PUNCHING NODC OCEANOGRAPHIC STATION CARDS  
FROM THE PHYSICAL AND CHEMICAL DATA CODING FORM

(See Appendix I, page 105, for sample Oceanographic Station Card.)

In general the physical and chemical data form for oceanographic station data is arranged in such a manner that most of the numeric and alphabetic entries can be punched directly into the corresponding columns of the punch card. The alphabetic punch code used at NODC is the standard IBM code. The correct entry columns for certain overpunches, however, cannot readily be determined from the data form. The correct entry for these overpunches is given in the punching instructions below.

MASTER CARD

| ENTRY ON DATA FORM   | <u>ENTRY IN PUNCH CARD (OVERPUNCHES<br/>UNLESS STATED OTHERWISE)</u> |
|--|--|
| Entry <u>S</u> between Columns 9 and 10.   | x in Column 8  |
| Entry <u>E</u> between Columns 15 and 16.  | x in Column 14   |
| Red dash in Column 16  | x in Column 15   |
| Red dash in Column 37  | x in Column 37   |
| Letter <u>H</u> crossed out in Column 48 ( <u>A</u> not crossed out) and no entry in Column 49 | x in Column 47   |
| Entry X in Column 48   | Punch alphabetic X in Column 48                                      |
| Entry X in Column 49   | Punch alphabetic X in Column 49                                      |
| Word SPEED crossed out over Columns 52 and 53 (word FORCE <u>not</u> crossed out)              | x in Column 52   |

Red dash in Column 57  
Red dash in Column 60  
Letter in Column 63  
Entry X in Column 65  
Red dash in Column 68  
Card Type

x in Column 59  
x in Column 62  
Punch alphabetic X in Column 63  
Punch alphabetic X in Column 65  
x in Column 68  
Enter 1 in Column 80

DETAIL CARD

CODING FORM

Columns 1 - 24  
Question mark (?) in  
Column 32  
Cross (†) in Column 32  
Red dash in Column 33  
Question mark (?) in  
Column 37  
Question mark (?) in  
Column 42  
Two (2) numerals in  
Column 51  
Question mark (?) in  
Column 53  
Columns 73 - 79

PUNCH CARD

Reproduced from Master Card  
Q in Column 32  
x in Column 28  
x in Column 36  
Q in Column 37  
Q in Column 42  
x in Column 51  
x in Column 53  
Reproduced from Master Card

## THE COMPUTED DATA CARD

An outline of the format of the Computed Card is included in this manual in order to acquaint the users of the NODC oceanographic station data holdings with the end product of the routinely performed computations. (A detailed description of formulas and techniques used for interpolations and computation of various parameters will be described in a future NODC publication in the General Series.)

The manually punched cards described in the previous section are used as data cards for the NODC computer. The end product of the computation process is a new set of cards referred to as the Computed Cards. There are two types of Computed Cards. One type contains computed parameters as well as the original observed information. The other type contains computed values only and is generated for all standard depths; this card carries the interpolated values of temperature, salinity, and oxygen as well as certain additional parameters which are computed for standard depths only.

The routinely computed parameters which appear on each type of Computed Card are as follows:

| <u>NAME OF CARD TYPE</u> | <u>COMPUTED PARAMETER</u>    |
|--------------------------|------------------------------|
| Computed Master Card*    | Marsden square number        |
| Computed Observed Card*  | 1. Sigma-t ( $\sigma_t$ )    |
|                          | 2. Sound velocity (ft./sec.) |

\*Code indicators for each card type are given in table on Page 21.

Computed Standard Depth Card\*

1. Interpolated values of temperature, salinity, and oxygen
2. Sigma-t ( $\sigma_t$ )
3. Sound velocity (as above)
4. Specific volume anomaly
5. Dynamic depth anomaly

Additionally, a number of overpunches are included in these cards, some of which are generated during the computation process. A complete list of overpunches which may be used in the basic NODC physical and chemical oceanographic station data Computed Card follows.

\*Code indicators for each card type are given in table on Page 21.

COMPUTED MASTER CARD (CODE 1 IN COLUMN 80)

|                 |   |
|-----------------|---|
| Columns 1 - 4   | Alphabetic code (possible)  |
| Column 8        | x = South (no x = North)  |
| Column 14       | x = East (no x = West)  |
| Column 15       | x = "extensive" drift while<br>on station   |
| Columns 28 - 33 | Alphabetic code (possible)  |
| Column 37       | Corrected sounding  |
| Columns 40 - 41 | Reserve x and y code overpunch<br>for Additional Observations Code                    |
| Column 47       | x = State of the sea (or sea<br>amount) given rather than<br>wave height and period   |
| Column 48       | Alphabetic code (X) to indicate<br>height of waves not determined                     |
| Column 49       | Alphabetic code (X) to indicate<br>calm, or period not determined                     |
| Column 52       | x = Wind force given rather than<br>speed   |
| Column 59       | x = Negative air temperature (DRY)  |
| Column 62       | x = Negative air temperature (WET)  |
| Column 63       | Alphabetic code (X) to indicate<br>use of WMO 4501 (90A)*                             |
| Column 65       | Alphabetic code (X) to indicate<br>clouds not visible owing to<br>darkness, fog, etc. |

\*Number in parentheses represents old WMO Code number.

|  |  |
|--|--|
| Column 68  | x = Entry in Columns 68-72 is continuation of Ship's Station Number field. |
| Column 78*   | x = Geographical sorted deck indicator                                     |
| Column 79*   | x = Computed deck indicator  |
| <u>COMPUTED OBSERVED CARD (CODE 3 OR 4 IN COLUMN 80)</u> |  |
| Columns 1 - 24   | Reproduced from Master Card  |
| Column 28  | x = Thermometric depth   |
| Column 32  | Alphabetic code for precision indicator. Q indicates doubtful depth.       |
| Column 36  | x = Negative temperatures  |
| Column 37  | Alphabetic code for precision indicator. Q indicates doubtful temperature. |
| Column 42  | Alphabetic code for precision indicator. Q indicates doubtful salinity.    |
| Column 46*   | x = Negative sigma-t ( $\sigma_t$ )  |
| Column 47*   | x = Add 5000 to value in Columns 47-50                                     |
|  | No x = Add 4000 to value in Columns 47-50                                  |
| Column 51  | x = Add 10 to O <sub>2</sub> value   |
| Column 53  | x = Doubtful   |

\*Overpunch generated during the computation process.

COMPUTED STANDARD DEPTH CARD (CODE 6 OR 7 IN COLUMN 80)

|                |                                      |
|----------------|--------------------------------------|
| Columns 1 - 53 | Same as Observed Detail Card         |
| Column 59*     | x = Negative specific volume anomaly |
| Column 63*     | x = Negative dynamic depth anomaly   |

CARD TYPE IDENTIFICATION CODE

| <u>CARD TYPE</u>               | <u>CODE IN COLUMN 80</u> |
|--------------------------------|--------------------------|
| Master                         | 1                        |
| Observed                       | 3 or 4**                 |
| NODC Computed Standard         | 6                        |
| Originator's Computed Standard | 7                        |

\*Overpunch generated during the computation process

\*\*When only originator's computed standard values are available, a 4 is placed in Column 80. This card will act as an Observed Card in the NODC computer; i.e., it may carry optional chemistry. In addition, NODC Computed Standard Cards (type 6) will be computed.

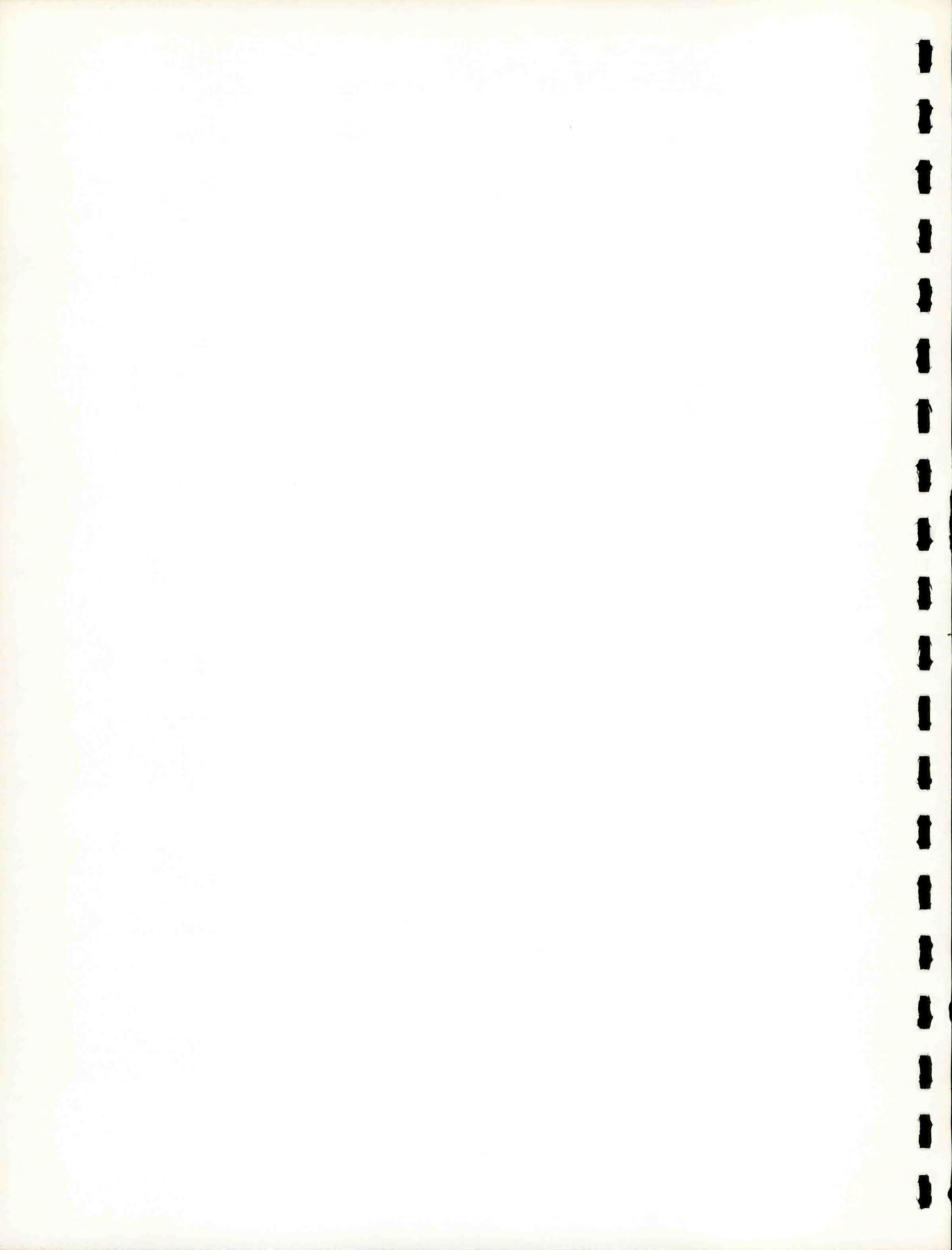




TABLE 1

## 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<br>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<br>and Northern Ireland |
| 31          | United States of America                                |
| 92          | Uruguay   |
| 93          | <sup>of S.M.P.</sup> Venezuela                          |
| 94          | Viet-Nam  |
| 95          | Yugoslavia  |

NOTE: 69 and 71 have not been assigned.

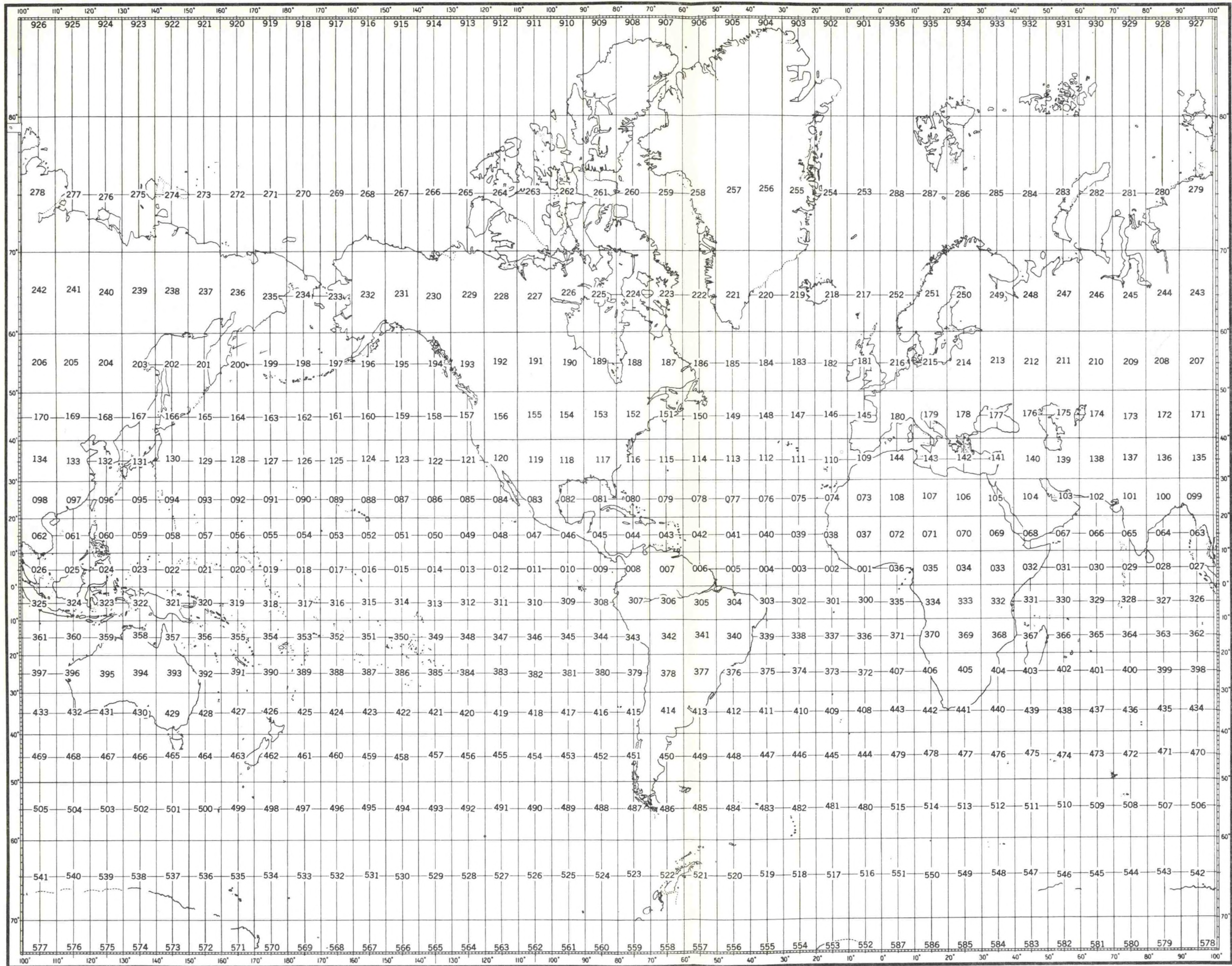
TABLE 2

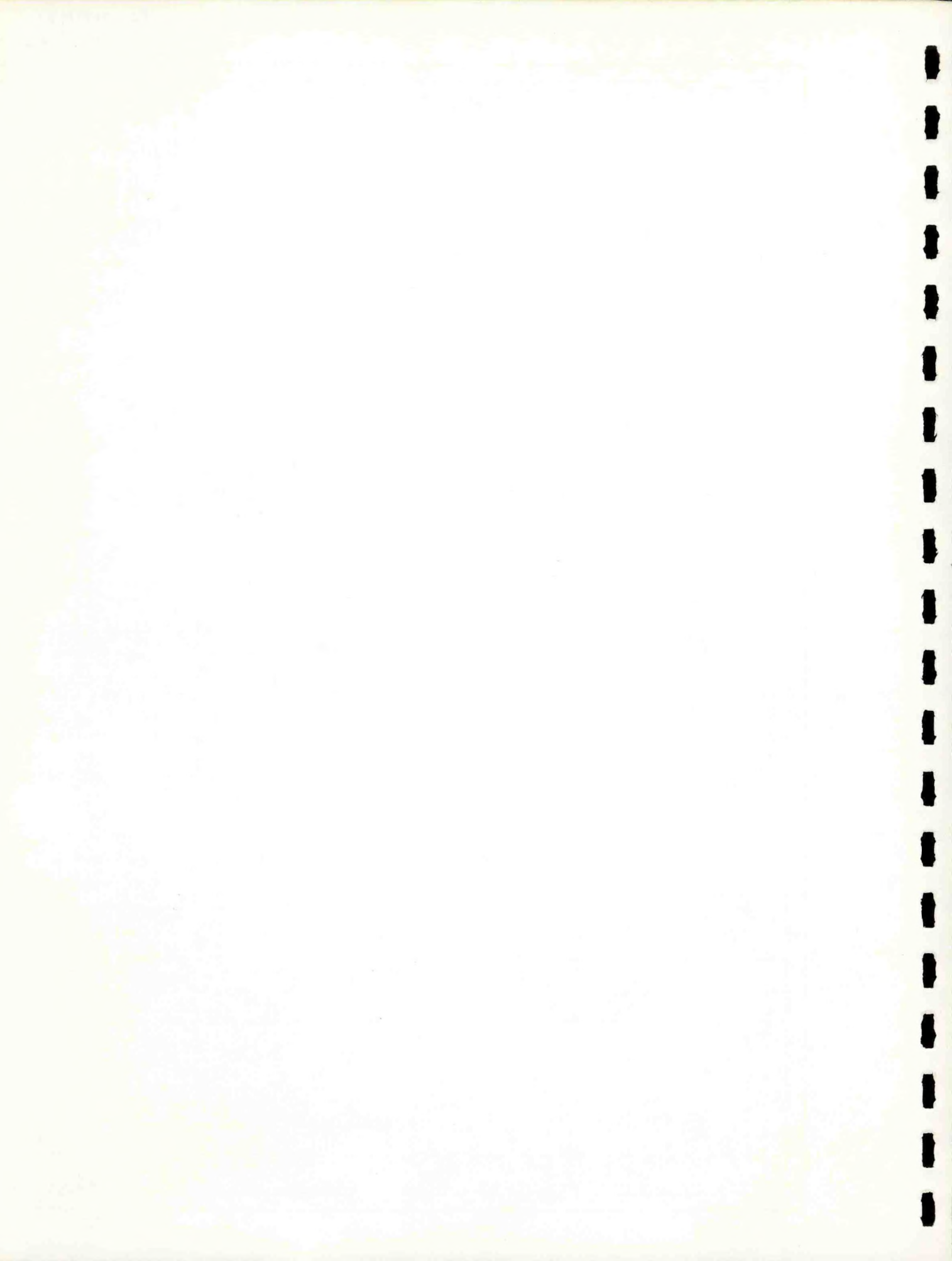
## Tenths Conversion

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

| Range of<br>Secs. or Mins. | Tenths of<br>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)

TABLE 4  
FOLLOWING DAY

| WEST LONGITUDE             |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  | EAST LONGITUDE             |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |
|----------------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|----------------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| TIME-ZONE CONVERSION TABLE |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  | TIME-ZONE CONVERSION TABLE |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |
| +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                |
| 24 <sup>00</sup>           | 01               | 02               | 03               | 04               | 05               | 06               | 07               | 08               | 09               | 10               | 11               | 12                         | 13               | 14               | 15               | 16               | 17               | 18               | 19               | 20               | 21               | 22               | 23               | 24 <sup>00</sup> |
| 01                         | 02               | 03               | 04               | 05               | 06               | 07               | 08               | 09               | 10               | 11               | 12               | 13                         | 14               | 15               | 16               | 17               | 18               | 19               | 20               | 21               | 22               | 23               | 24 <sup>00</sup> | 01               |
| 02                         | 03               | 04               | 05               | 06               | 07               | 08               | 09               | 10               | 11               | 12               | 13               | 14                         | 15               | 16               | 17               | 18               | 19               | 20               | 21               | 22               | 23               | 24 <sup>00</sup> | 01               | 02               |
| 03                         | 04               | 05               | 06               | 07               | 08               | 09               | 10               | 11               | 12               | 13               | 14               | 15                         | 16               | 17               | 18               | 19               | 20               | 21               | 22               | 23               | 24 <sup>00</sup> | 01               | 02               | 03               |
| 04                         | 05               | 06               | 07               | 08               | 09               | 10               | 11               | 12               | 13               | 14               | 15               | 16                         | 17               | 18               | 19               | 20               | 21               | 22               | 23               | 24 <sup>00</sup> | 01               | 02               | 03               | 04               |
| 05                         | 06               | 07               | 08               | 09               | 10               | 11               | 12               | 13               | 14               | 15               | 16               | 17                         | 18               | 19               | 20               | 21               | 22               | 23               | 24 <sup>00</sup> | 01               | 02               | 03               | 04               | 05               |
| 06                         | 07               | 08               | 09               | 10               | 11               | 12               | 13               | 14               | 15               | 16               | 17               | 18                         | 19               | 20               | 21               | 22               | 23               | 24 <sup>00</sup> | 01               | 02               | 03               | 04               | 05               | 06               |
| 07                         | 08               | 09               | 10               | 11               | 12               | 13               | 14               | 15               | 16               | 17               | 18               | 19                         | 20               | 21               | 22               | 23               | 24 <sup>00</sup> | 01               | 02               | 03               | 04               | 05               | 06               | 07               |
| 08                         | 09               | 10               | 11               | 12               | 13               | 14               | 15               | 16               | 17               | 18               | 19               | 20                         | 21               | 22               | 23               | 24 <sup>00</sup> | 01               | 02               | 03               | 04               | 05               | 06               | 07               | 08               |
| 09                         | 10               | 11               | 12               | 13               | 14               | 15               | 16               | 17               | 18               | 19               | 20               | 21                         | 22               | 23               | 24 <sup>00</sup> | 01               | 02               | 03               | 04               | 05               | 06               | 07               | 08               | 09               |
| 10                         | 11               | 12               | 13               | 14               | 15               | 16               | 17               | 18               | 19               | 20               | 21               | 22                         | 23               | 24 <sup>00</sup> | 01               | 02               | 03               | 04               | 05               | 06               | 07               | 08               | 09               | 10               |
| 11                         | 12               | 13               | 14               | 15               | 16               | 17               | 18               | 19               | 20               | 21               | 22               | 23                         | 24 <sup>00</sup> | 01               | 02               | 03               | 04               | 05               | 06               | 07               | 08               | 09               | 10               | 11               |
| 12                         | 13               | 14               | 15               | 16               | 17               | 18               | 19               | 20               | 21               | 22               | 23               | 24 <sup>00</sup>           | 01               | 02               | 03               | 04               | 05               | 06               | 07               | 08               | 09               | 10               | 11               | 12               |
| 13                         | 14               | 15               | 16               | 17               | 18               | 19               | 20               | 21               | 22               | 23               | 24 <sup>00</sup> | 01                         | 02               | 03               | 04               | 05               | 06               | 07               | 08               | 09               | 10               | 11               | 12               | 13               |
| 14                         | 15               | 16               | 17               | 18               | 19               | 20               | 21               | 22               | 23               | 24 <sup>00</sup> | 01               | 02                         | 03               | 04               | 05               | 06               | 07               | 08               | 09               | 10               | 11               | 12               | 13               | 14               |
| 15                         | 16               | 17               | 18               | 19               | 20               | 21               | 22               | 23               | 24 <sup>00</sup> | 01               | 02               | 03                         | 04               | 05               | 06               | 07               | 08               | 09               | 10               | 11               | 12               | 13               | 14               | 15               |
| 16                         | 17               | 18               | 19               | 20               | 21               | 22               | 23               | 24 <sup>00</sup> | 01               | 02               | 03               | 04                         | 05               | 06               | 07               | 08               | 09               | 10               | 11               | 12               | 13               | 14               | 15               | 16               |
| 17                         | 18               | 19               | 20               | 21               | 22               | 23               | 24 <sup>00</sup> | 01               | 02               | 03               | 04               | 05                         | 06               | 07               | 08               | 09               | 10               | 11               | 12               | 13               | 14               | 15               | 16               | 17               |
| 18                         | 19               | 20               | 21               | 22               | 23               | 24 <sup>00</sup> | 01               | 02               | 03               | 04               | 05               | 06                         | 07               | 08               | 09               | 10               | 11               | 12               | 13               | 14               | 15               | 16               | 17               | 18               |
| 19                         | 20               | 21               | 22               | 23               | 24 <sup>00</sup> | 01               | 02               | 03               | 04               | 05               | 06               | 07                         | 08               | 09               | 10               | 11               | 12               | 13               | 14               | 15               | 16               | 17               | 18               | 19               |
| 20                         | 21               | 22               | 23               | 24 <sup>00</sup> | 01               | 02               | 03               | 04               | 05               | 06               | 07               | 08                         | 09               | 10               | 11               | 12               | 13               | 14               | 15               | 16               | 17               | 18               | 19               | 20               |
| 21                         | 22               | 23               | 24 <sup>00</sup> | 01               | 02               | 03               | 04               | 05               | 06               | 07               | 08               | 09                         | 10               | 11               | 12               | 13               | 14               | 15               | 16               | 17               | 18               | 19               | 20               | 21               |
| 22                         | 23               | 24 <sup>00</sup> | 01               | 02               | 03               | 04               | 05               | 06               | 07               | 08               | 09               | 10                         | 11               | 12               | 13               | 14               | 15               | 16               | 17               | 18               | 19               | 20               | 21               | 22               |
| 23                         | 24 <sup>00</sup> | 01               | 02               | 03               | 04               | 05               | 06               | 07               | 08               | 09               | 10               | 11                         | 12               | 13               | 14               | 15               | 16               | 17               | 18               | 19               | 20               | 21               | 22               | 23               |

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   | <div style="display: flex; align-items: center;"> <div style="font-size: 3em; margin-right: 5px;">{</div> <div style="margin-right: 10px;"> <p>Waves confused, direction indeterminate (waves greater than <math>4\frac{3}{4}</math> metres) <i>great - imp.</i></p> <p><i>er</i></p> <p>Winds variable, or all directions or unknown <i>direc - imp.</i></p> <p><i>tions</i></p> </div> </div> |

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<br>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 | 43.9 | 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 | -26.0 | -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 | -28.0 | -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<br>Code<br>4501<br>(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.,<br>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                              | 7 |
| 25 | Rain shower (s).                                    | 7 |
| 26 | Snow shower (s).                                    | 8 |
| 27 | Hail or rain and hail shower (s).                   | 7 |
| 28 | Slight thunderstorm.                                | 9 |
| 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          |

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 |

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 |

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<br>Code<br>4501<br>(modified) |
|----|--|---|--|-----------------------------------|
|    |  | THUNDERSTORM  |  |                                   |
| 90 | Thunderstorm   |   |  | 9                                 |
| 91 | Rain at time   | } thunderstorm during last hour, but not at<br>time of observation. |  | 9                                 |
| 92 | Snow, or sleet at time   |   |  | 9                                 |
| 93 | Thunderstorm, slight without hail or soft hail,<br>but with rain (or snow) |   |  | 9                                 |
| 94 | Thunderstorm slight with soft hail   | } at time of<br>observation.  |  | 9                                 |
| 95 | Thunderstorm moderate without hail, but with<br>rain (or snow)             |   |  | 9                                 |
| 96 | Thunderstorm moderate with soft hail                                       |   |  | 9                                 |
| 97 | Thunderstorm heavy without hail, but with<br>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<br>except<br>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   |
|                                      |   |             | } characteristic change of the state of sky during the past hour   |
| 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 dust-storm 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          | { Patches of } shallow fog or ice fog at the station, whether on land or   |
|                                      |   | 12          |  |
|                                      |   |             |  |
|                                      |   | 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          | { Squalls } at or within sight of the station during the preceding   |
|                                      |   | 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              |
| 31 |  |   | - no appreciable change during the preceding hour      |
| 32 |  |   | - has begun or has increased during the preceding hour |
| 33 | } Severe duststorm or sandstorm              | } | - has decreased during the preceding hour              |
| 34 |  |   | - no appreciable change during the preceding hour      |
| 35 |  |   | - has begun or has increased during the preceding hour |
| 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                  | } no appreciable change during the preceding hour           |
| 45  | Fog or ice fog, sky invisible                |   |
| 46  | Fog or ice fog, sky visible                  | } has begun or has become thicker during the preceding hour |
| 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          | } slight at time of observation                             |
| 51  | Drizzle, not freezing, continuous            |   |
| 52  | Drizzle, not freezing, intermittent          | } moderate at time of observation                           |
| 53  | Drizzle, not freezing, continuous            |   |
| 54  | Drizzle, not freezing, intermittent          | } heavy (dense) at time of observation                      |
| 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             | } slight at time of observation                             |
| 61  | Rain, not freezing, continuous               |   |
| 62  | Rain, not freezing, intermittent             | } moderate at time of observation                           |
| 63  | Rain, not freezing, continuous               |   |
| 64  | Rain, not freezing, intermittent             | } heavy at time of observation                              |
| 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             | } slight at time of observation                             |
| 71  | Continuous fall of snow flakes               |   |
| 72  | Intermittent fall of snow flakes             | } moderate at time of observation                           |
| 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 (‰)

| C1   | S    | C1   | S    | C1   | S    | C1   | 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 (‰)

| Cl    | S     | Cl    | S     | Cl    | S     | Cl    | 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 (‰)

| C1    | S     | C1    | S     | C1    | S     | C1    | 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 (‰)

| Cl    | S     | Cl    | S     | Cl    | S     | Cl    | 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 (‰)

| C1    | S     | C1    | 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<br>per<br>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.

$$\begin{array}{r}
 5.00 \text{ milligrams/liter} = 3.50 \\
 0.65 \text{ milligrams/liter} = 0.45 \\
 \hline
 3.95 \text{ milliliters/liter (ans.)}
 \end{array}$$

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<br>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  $O_2$  = 11.196 milliliters per liter of  $O_2$ )

| Milligram-atoms/liter of $O_2$ | .000 | .001 | .002 | .003 | .004 | .005 | .006 | .007 | .008 | .009 |
|--------------------------------|------|------|------|------|------|------|------|------|------|------|
| 0.31                           | 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-<br>atoms/liter<br>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<sub>2</sub> = 11.196 milliliters per liter of O<sub>2</sub>)

| Milligram-<br>atoms/liter<br>of O <sub>2</sub> | .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<br>per<br>Liter of<br>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<br>Liter of in-<br>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<br>per Liter<br>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<br>per Liter<br>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<br>per Liter<br>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  $\mu\text{g}$  of  $P_2O_5$  = 0.014090  $\mu\text{g}$ -atom of P)

| Micrograms<br>per Liter<br>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<br>per Liter<br>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<br>per Liter<br>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<br>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<br>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<br>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<br>per<br>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<br>per<br>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<br>per<br>Liter of<br>$\text{SiO}_2$ | 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<br>per<br>Liter of<br>$\text{SiO}_2$ | 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 |

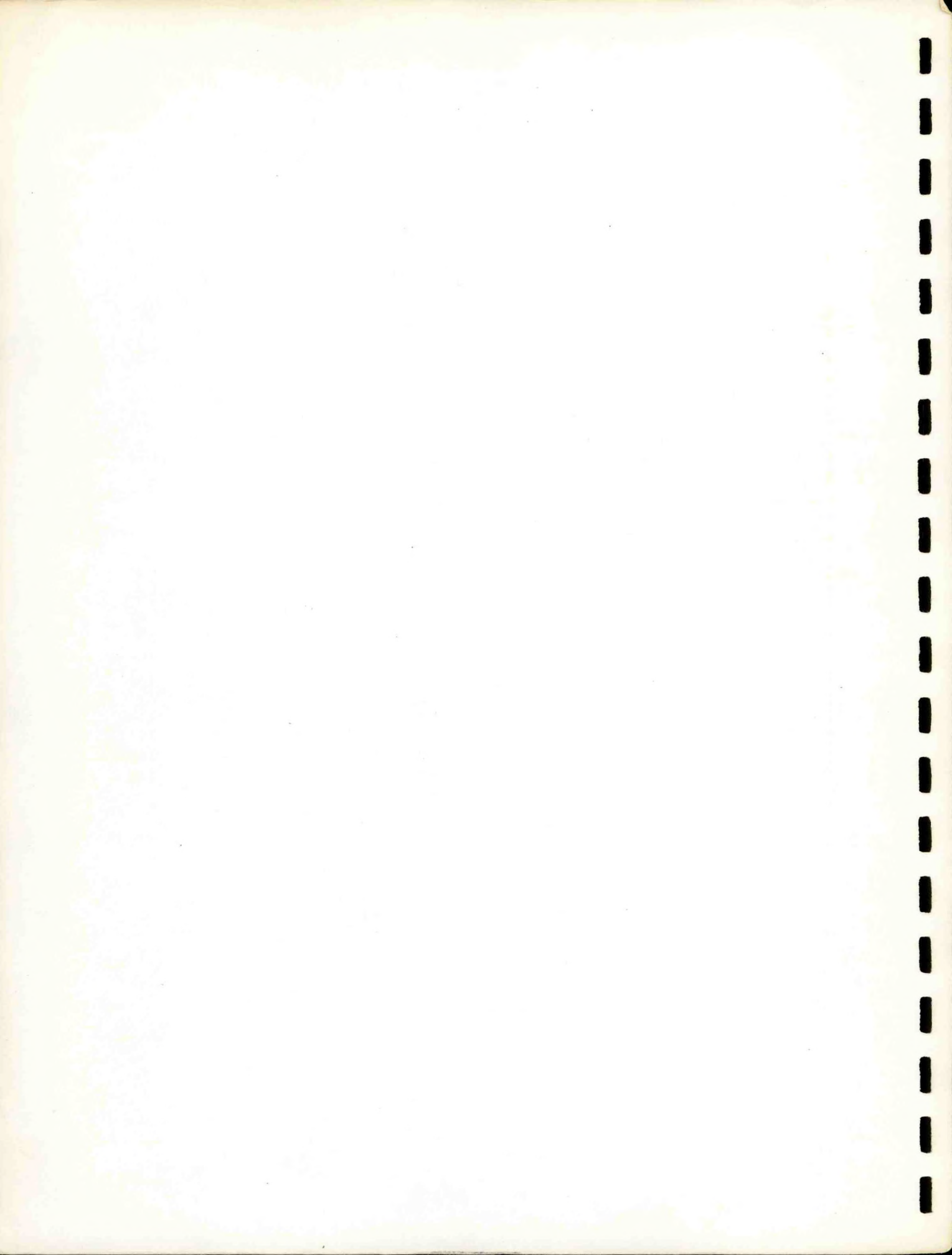


TABLE 40

## 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<br>per Liter<br>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 |





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COUNTRY CODE OF COUNTRIES PARTICIPATING IN THE IGY METEOROLOGY  
PROGRAM AS GIVEN IN "INTERNATIONAL GEOPHYSICAL YEAR 1957-1958"  
METEOROLOGICAL PROGRAMME, OMM/WMO-NO. 58 AGL-IGY-2 1957