

U.S. DEPARTMENT OF COMMERCE
Luther H. Hodges, Secretary

U.S. DEPARTMENT OF THE AIR FORCE
Curtis E. LeMay, General, USAF
Chief of Staff

U.S. DEPARTMENT OF THE NAVY
David L. McDonald, Admiral, USN
Chief of Naval Operations

WEATHER BUREAU
F. W. Reichelderfer, Chief

AIR WEATHER SERVICE
R. W. Nelson, Jr.,
Brig. General, USAF

NAVAL WEATHER SERVICE
R. A. Chandler, Captain, USN

MANUAL OF BAROMETRY

(WBAN)

Volume I
First Edition



WASHINGTON, D. C.
(1963)

ERRATA
MANUAL OF BAROMETRY
(WBAN)
VOLUME I
FIRST EDITION
(1963)

Index page 7, first column, 17 lines from bottom: Delete 2-67,.

Index page 7, first column, 8 lines from bottom: Read A2-1, A2-7+ instead of
A2-1+.

Index page 9, first column, 29 lines from top: Read Beeckman instead of
Beekman.

Index page 10, second column, 10 lines from bottom: Delete 8-26 at extreme
right.

Index page 10, second column, 7 lines from bottom: Read 6-46, 6-59, 8-26
instead of 6-46, 6-59.

Index page 14, first column, 3 lines from bottom: Immediately below the word
"Theory" insert the word "Units" before the number 1-7.

Index page 14, first column, last line: Delete entire line - Units
12.App.1.3.1-5.

Index page 17, first column, 4 lines from bottom: Read Evaluation of $\underline{T_v}$ for
various levels 7-45,.

Index page 20, first column, 3 lines from top: Read 7-2, 7-18+ instead of
7-2, 7-184.

Index page 23, first column, 4 and 5 lines from top: Delete Station pressure
derived from altimeter setting (continued)

FOREWORD

The ideas which led to the development of the mercury barometer began historically with the curiosity of Galileo regarding the causes for the failure of a suction pump to raise water in a tube higher than about 27–33 feet with the best vacuum obtainable during his time (1564–1642). Although he reasoned that the tensile strength of the water determined the limiting height to which the column of liquid of given density could be sustained under a vacuum, he was not completely satisfied with the sufficiency of this explanation of the phenomenon; he was disinclined, also, to accept the speculation common to many philosophers of that era that nature's abhorrence of a vacuum supported the column. The speculations of Galileo on this subject, published in 1638, gave impetus to the performance of a crucial experiment about 1640–41 in Rome. Here, G. Berti and his collaborators constructed an ingenious design of what amounted to a water barometer. Shortly after Galileo's death, the quest was taken up by his pupil, Torricelli. The latter reasoned that we live submerged at the bottom of an ocean of air and that the known weight of the air causes the atmosphere to press down upon the free surface of the liquid, therefore impelling it up into the tube at the top of which there is a vacuum. He pointed out that since the vacuum at the top of the tube had no weight it could not press down on the surface of the liquid within the tube, and hence it could not resist the force due to the weight of the atmosphere, acting to raise the fluid. Torricelli came to the logical conclusion that the liquid must rise in the tube until its weight comes to equalize the weight of the air pressing down on the same area of the free surface of the liquid exposed to the atmosphere. A beautiful test of the deduction was obtained by Torricelli's famous experiment of 1643 in which he immersed the open end of a full tube of mercury into a dish of this metallic liquid and observed that it was supported to a height of about 30 inches, which is approximately 1/14th the height of a column of water raised under a vacuum pump at the same time. Since the density of mercury is about

13.595 times as great as that of water, the experiment proved that the weights of the columns of the two dissimilar liquids were the same, suggesting that they were sustained by a common pressure (namely, atmospheric). The Torricellian tube thus became the first barometer, creating a landmark in the history of science. See fig. 12.2.1.3.

Since 1643 there have been many developments in the field of barometry, covering such matters as the determination of heights in the atmosphere by means of barometric observations; the measurement of pressure changes associated with various systems such as HIGHS, LOWS, tornadoes, etc.; and the representation of the pressure field over extensive areas of the globe for purposes of synoptic weather analysis. Thus, barometry may be categorized under several headings, such as those listed above, and is concerned not only with the subject of the barometer as an instrument used for the measurement of atmospheric pressure but also with these other important aspects. Unfortunately, the broad scope of the field together with certain inherent complexities have led to the employment of diverse practices in regard to the various phases over a period of years, with a resultant lack of consistency.

On these grounds an imperative need has arisen for the establishment of standardized procedures to be used in connection with pressure observations, reduction of pressure, altimetry, and other aspects of the subject. In the light of that requirement, the preparation of this manual was undertaken. We are happy to express appreciation for the work of Louis P. Harrison, U.S. Weather Bureau, whose deep interest in the subject has led to significant advances, and who is the one primarily responsible for completion of the task of writing the Manual of Barometry.

August 1, 1963


Chief, U.S. Weather Bureau

PREFACE

It is the purpose of this manual to provide instructions to those concerned with various operational practices relating to *barometry*, and to present scientific and technical information pertinent to the subject regarded in a rather broad sense. As a matter of choice it is considered that *altimetry* may be properly regarded as falling within the province of this work. On these grounds the manual serves not only the meteorologist and the laboratory technician, but also those persons concerned with the various aviation and scientific aspects of the subject, together with the interested citizen.

Chapter 1, section 1.1, explains the scope of "barometry" as considered for the purposes of this publication. Briefly, the subject may be subdivided into parts for individual treatment as indicated by the following list:

(a) Measurement of atmospheric pressure by means of a barometric instrument, which involves the proper calibration, standardization, correction, reading, and maintenance of the device.

(b) Reduction of pressure from one level to another by means of the hypsometric equation (see Appendix 7.1) in order to obtain data of such comparable character as to permit their being studied on a synoptic basis. Note: The reduction of pressure to sea level with reference to stations on land is a case in point, involving suitable assumptions regarding the non-existent vertical distributions of temperature and humidity in the fictitious "air column" which hypothetically extends downward from the station to sea level.

(c) Hypsometry; that is, the computation of the difference in height between two levels pertaining to neighboring points of given atmospheric pressure, under the assumption that the height difference is related to the logarithm of the pressure ratio by virtue of the hypsometric equation, subject to the proviso that the vertical distributions of

temperature and humidity are either observed or assumed.

(d) Altimetry; that is, the determination of altitudes or heights, usually with respect to sea level, by means of an altimeter, particularly of the type employed in aviation; and the investigation of the accuracy of the altimetry system in its various aspects, together with a consideration of the problems that stem from uses of the system in air navigation for purposes of landing, vertical separation of aircraft, and terrain clearance.

(e) Representation and analysis of the pressure field over the earth's surface by means of special parameters involving systems based on functions, potential or otherwise, designed to enable one to ascertain the distribution of pressure and its horizontal gradient, or more precisely the horizontal gradient of the local isobaric surface nearest the ground, depending upon the topography and the pertinent observed meteorological quantities. (It may be noted that the latter gradient is related to the geostrophic wind in a mathematical sense.)

(f) Investigation of the effects of irregular terrain and nonstatic atmospheric conditions on the distribution of pressure and its variations with time over the surface; for example, the effects on the pressure of such phenomena as air drainage, wind, and accelerated atmospheric motions in mountainous regions.

Owing to the need for this manual it was decided to publish it in two volumes at different times. Volume I consists of Chapters 1–8, inclusive, together with Chapters 12, 13 and 14. Volume II which is to be issued later will consist of Chapters 9, 10 and 11, plus certain additions to the appendices which comprise Chapter 12; also the complete index for both volumes.

In order to facilitate the finding of material the work is organized in chapters and sections, numbered according to a decimal system of classification. The pagination of

each chapter is separate; such that a bold face number is used to indicate the chapter, while the page number within the chapter is given by the number which comes immediately after the dash that follows the bold face number. This system has the great added advantage that it permits adding new material to future editions without the need for disturbing the numbering in earlier pages or in other chapters which do not require revision or addition.

As a rule the introductory paragraphs of sections (usually numbered to end with .0) outline the scope of the succeeding related sections, and therefore they serve the useful purpose of providing a sort of directory to help the reader find the material in those sections relevant to the subject under consideration.

From a scrutiny of the table of contents, it may be seen that the manual is organized on the following basis:

(A) *Chapter 1* is introductory, and is concerned mostly with matters of definition, the running of levels to determine the elevation (height above sea level) of barometric instruments, and the computation of the geopotential of the station. A detailed explanation of geopotential is presented in Appendix 1.3.1 (see *Chapter 12*).

(B) *Chapter 2* is concerned with various kinds of barometers and related equipment, considered mostly from an instrumental point of view. It presents general discussions relating to the various errors to which these instruments are subject, and tells how to read and install a barometer. The Annex of *Chapter 2* contains a good deal of information of a special technical nature, such as cleaning of barometers, maintenance, packing and shipping of the instruments, etc.

(C) *Chapters 3, 4 and 5* deal with corrections of certain definite categories. Thus, one has *Chapter 3* on the gravity correction for mercury barometers; *Chapter 4* on the so-called "removal correction" for difference in height between instrument and station elevations, also on the so-called "residual correction" for any residual instrument error which is determined after a barometer is in use at a station; and *Chap-*

ter 5 on the temperature correction for mercury barometers.

(D) *Chapter 6* gives instructions relating to the calibration and standardization of barometric instruments, usually on the basis of comparative readings between the given instrument and a standard barometer or other device that serves as an intermediate standard.

(E) *Chapter 7* presents information mainly in regard to the special techniques of reduction of pressure to sea level as used in the United States, and provides instructions to permit one to compute pertinent reduction factors for field stations.

(F) *Chapter 8* deals with various problems relating to altimetry.

(G) *Chapters 9, 10, and 11* which are to appear in Volume II, will be categorized as follows: *Chapter 9* on "Reduction to Constant Pressure Surfaces, and Hypsometry"; *Chapter 10* on "Special Potential or Other Functions Representing the Earth's Pressure Field"; and *Chapter 11* on "Atmospheric Pressure as Affected by Accelerations, Non-static Conditions, and Terrain."

(H) *Chapter 12* is composed of a series of appendices which provide scientific and technical information relevant to the matters dealt with in the main body of the manual. By separating these items from the main body, interruption of the principal trend of thought in the text is obviated; however, in many cases, one may find it useful or necessary to refer to the special material contained in the appendices.

(I) *Chapter 13* consists of nothing but a collection of samples of all forms referred to in the text in connection with data entries pertinent to the various aspects of the subject.

(J) *Chapter 14* is a compilation of tables specifically useful for the purpose of obtaining certain corrections which must be applied to some barometric instruments, and other tables giving data specifically necessary for the objective of permitting one to compute different factors which may be involved in one or more phases of the subject, such as the reduction of pressure to sea level.

While all tables involving computational data are assembled in Chapter 14, the numbering of tables is designed to show the chapter and section numbers in which first use of the tables is made. For example, Tables 5.2.1 and 5.2.2 are two tables used in connection with instructions in section 5.2 (that is, the second full section of Chapter 5).

Similar systems of numbering of figures and appendices are employed. However, since all of the appendices are collected in Chapter 12, the numbering in the latter shows both the chapter and the appendix.

In some instances it has been found desirable to supplement the information embodied in a particular chapter with an annex. When these are given, they will always be found at the end of the chapter to which they relate.

The present manual supersedes the pamphlet, now out of print, by C. F. Marvin, entitled "Barometers and the Measurement of Atmospheric Pressure" (Weather Bureau Circular F), which went through seven editions, from its inception until its last printing in 1941. An inestimable debt is owed to that publication.

With reference to the technique of reduction of pressure to sea level used in the United States, it is worthy of special mention that the method of reduction developed

by F. H. Bigelow about the year 1900 forms the underlying basis of the reduction procedure covered by the instructions in Chapter 7, although some of the precise details of the technique have been modified since that time for the sake of simplicity or gain in efficiency of operations. A monument to Bigelow's work in the field of reduction technique still remains in the form of his book, long out of print and now virtually a rarity, entitled "Report on the Barometry of the United States, Canada, and the West Indies," Volume II—Report of the Chief of the Weather Bureau, 1900–1901, Washington, D. C.

An effort has been made to embody in this manual the most recent decisions and recommendations of the World Meteorological Organization (WMO) pertaining to various matters relevant to barometry. In this connection, the following items may be mentioned: (a) Appendix 1.4.1 which cites the complete text of the "International Barometer Conventions" as adopted by the WMO in 1953; (b) information in Chapter 3 relating to procedures recommended by the WMO for the calculation and determination of local gravity under various conditions; and (c) the Annex to Chapter 6 on "International Comparison of Barometers" adopted by the WMO in 1953.

TABLE OF CONTENTS¹

By Chapters

1	Introduction; Definitions; Elevations; Geopotential
2	Instruments for Determining Atmospheric Pressure; Their Installation and Characteristics
3	Gravity Correction for Mercury Barometers
4	"Removal Correction" and "Residual Correction"
5	Temperature Correction of Mercury Barometers
6	Standardization and Comparison of Barometers
7	Reduction of Pressure to Sea Level, and Other Levels
8	Altimetry
9	Reduction to Constant Pressure Surfaces; Hypsometry
10	Special Potential or Other Functions Representing the Earth's Pressure Field
11	Atmospheric Pressure as Affected by Accelerations, Non-Static Conditions and Terrain
12	Appendixes (Theory and Technical Information)
13	Forms
14	Tables
	Index

TABLE OF CONTENTS

By Sections

CHAPTER 1 INTRODUCTION; DEFINITIONS; ELEVATIONS; GEOPOTENTIAL

	Page
1.0 Introduction	1—1
1.1 Scope of Subject	1—1
1.2 Elevations, Heights, and Altitudes	1—2
1.2.0 General	1—2
1.2.1 Definitions, Symbols, and Terminology	1—4
1.2.2 Units of Height Employed in this Manual	1—7
1.2.3 Determination of Elevations for Barometry	1—8
1.2.3.0 General Instructions	1—8
1.2.3.1 Accuracy and Precision of Measurements	1—8
1.2.3.2 Heights on Vessels	1—8
1.2.3.3 Leveling Required When a Station is Moved	1—8
1.2.3.4 Choice of Reference Plane	1—8
1.2.3.5 Relocation of Barometer Through Short Distances	1—8
1.2.3.6 Comparative Barometer Readings Incident to Moving Barometers	1—9
1.2.3.7 Rendition of Data	1—9
1.3 Geopotential	1—13
1.3.1 Introduction	1—13
1.3.2 Some Characteristics of Geopotential	1—13
1.3.3 International Units of Geopotential	1—14
1.3.4 Formulas Expressing Geopotential	1—14
1.3.5 Formula for Geopotential of Station	1—14
1.3.6 Instructions for Calculating Geopotential of Station	1—14
1.4 International Barometer Conventions and Units of Pressure	1—17

CHAPTER 2 INSTRUMENTS FOR DETERMINING ATMOSPHERIC PRESSURE; THEIR INSTALLATION AND CHARACTERISTICS

2.0 Scope of This Chapter	2—1
2.1 General Information Regarding Pressure Measurements	2—2

¹ Each chapter or annex has a separate system of page numbers. In Chapters 1 through 8 and associated annexes the boldface number denotes the chapter or annex number while the number following the dash indicates the page within the chapter or annex. The letter A associated with a chapter number signifies the annex of that chapter.

CHAPTER 2 INSTRUMENTS FOR DETERMINING ATMOSPHERIC PRESSURE; THEIR INSTALLATION AND CHARACTERISTICS (Cont'd.)

	Page
2.2 Instructions for Installation, Unpacking and Moving of Barometers	2-3
2.2.0 Introduction	2-3
2.2.1 Instructions for Picking a Barometer Site	2-3
2.2.2 Instructions for Establishing Height of Barometer Above Floor	2-4
2.2.3 Unpacking and Checking Barometers	2-5
2.2.3.0 Introduction	2-5
2.2.3.1 Unpacking	2-5
2.2.3.2 Checking	2-5
2.2.4 Instructions for Installation of Barometers	2-5
2.2.4.0 Introduction	2-5
2.2.4.1 Mounting the Barometer Case and Hanging the Barometer	2-6
2.2.4.2 Procedure Used so Barometer Will Hang Vertically	2-8
2.2.4.3 White Surfaces Back of Barometer Tube and Cistern	2-12
2.2.4.4 Light Sources to Permit Reading of Barometer	2-12
2.2.5 Installation of Static-Pressure Head for Fixed-Cistern Barometers	2-12
2.2.6 Obtainment of Elevation Data and Running of Levels	2-12
2.2.7 Moving a Barometer	2-13
2.2.7.0 Introduction	2-13
2.2.7.1 Method of Carrying a Barometer by Hand; Precautions Necessary	2-14
2.2.7.2 Moving Mercury Barometers in an Upright Position	2-14
2.2.7.3 Procedures for Inverting a Fortin-Type Barometer and Bringing it Upright	2-15
2.2.7.4 Procedure for Inverting a Fixed-Cistern Barometer of Kew Pattern	2-16
2.2.7.5 Procedure for Inverting a Fixed-Cistern Barometer of Navy Type	2-16
2.3 Introduction to Aneroid Barometers	2-17
2.4 General Principle of the Mercury Barometer and Procedure for Reading Instrument	2-19
2.4.0 Introduction	2-19
2.4.1 General Principle of the Mercury Barometer	2-19
2.4.2 Procedure for Reading Instrument	2-21
2.4.2.0 Preparations	2-21
2.4.2.1 Thermometer Reading	2-23
2.4.2.2 Cistern Setting	2-23
2.4.2.3 Vernier Adjustment	2-24
2.4.2.4 Reading Barometer Scale and Vernier	2-24
2.4.2.5 Applying Corrections to Observed Reading of Mercury Barometer to Obtain Station Pressure	2-32
2.4.2.6 Supplementary Information Regarding Barometer Corrections	2-34
2.5 Fortin-Type Mercury Barometer	2-35
2.6 Fixed-Cistern Type Barometer	2-37
2.7 Factors Influencing the Absolute Accuracy of Mercury Barometers	2-40
2.7.0 Introduction	2-40
2.7.1 Capillarity, Cleanness of Mercury, and Friction	2-41
2.7.2 Verticality	2-57
2.7.3 Imperfect Vacuum	2-59
2.7.4 Temperature of Mercury Column and Barometer Scale	2-61
2.7.5 Gravity	2-62
2.7.6 Pumping and Swinging of Barometer	2-63
2.7.7 Parallax	2-67
2.8 Information Regarding Operation and Temperature Compensation of Aneroid Barometers	2-67
2.8.0 General	2-67
2.8.1 Method of Operation	2-68
2.8.2 Temperature Effects and Compensation	2-69
2.9 Special Types of Aneroid Instruments	2-71
2.9.0 Introduction	2-71
2.9.1 Microbarographs	2-73
2.9.2 Altimeter-Setting Indicators	2-78
2.9.3 Altimeters	2-79
2.9.3.0 General Information Regarding Altimeters	2-79

CHAPTER 2 INSTRUMENTS FOR DETERMINING ATMOSPHERIC PRESSURE; THEIR INSTALLATION AND CHARACTERISTICS (Cont'd.)

	Page
2.9.3.1 Aircraft Altimeters	2—80
2.9.3.2 Surveying Altimeters	2—81
2.9.3.2.1 Function of Surveying Altimeters	2—81
2.9.3.2.2 Graduation of Scale	2—82
2.9.3.2.3 Corrections for Air Temperature and Humidity	2—88
2.9.3.2.4 Geopotential Used for Scale Graduation	2—88
2.9.3.2.5 Calibration	2—88
2.9.3.2.6 Temperature Effect on Instrument	2—91
2.9.3.2.7 Conditions of Field Operations	2—92
2.9.3.2.8 Recording Surveying Altimeters	2—93
2.9.3.2.9 Errors Relating to Surveying Altimeters	2—98
2.9.3.2.10 Use of Capillary Tube in Surveying Altimeters	2—101
2.9.3.2.11 Developments to Improve Surveying Altimeters	2—102
2.10 Factors Influencing the Absolute Accuracy of Aneroid Barometers	2—103
2.10.0 General	2—103
2.10.1 Effect of Imperfect Temperature Compensation	2—103
2.10.2 Scale Error (Effect of Variations in Scale)	2—104
2.10.3 Drift (Creep) Owing to Deformation of Metal	2—104
2.10.4 Hysteresis and After-Effect	2—104
2.10.5 Examples of Hysteresis and Drift	2—108
2.10.6 Effect of Leaks in Evacuated Aneroid Cell	2—109
2.10.7 Effects of Friction, and Backlash	2—109
2.10.8 Effect of Imperfect Balance or Position	2—110
2.10.9 Effect of Parallax	2—110
2.10.10 Summary; Long-Period Drift and Superimposed Random Variations	2—111
2.11 Factors Influencing Absolute Accuracy of All Atmospheric Pressure Measurements	2—111
2.11.0 General	2—111
2.11.1 Wind Effects	2—111
2.11.2 Pressure Effects Dependent on Heating and Air-Conditioning	2—114

ANNEX TO CHAPTER 2: MISCELLANEOUS INFORMATION; TYPES OF BAROMETERS; HANDLING OF MERCURY AND BAROMETERS; TRANSPORTATION OF INSTRUMENTS

A-2.0 Introduction	A2—1
A-2.1 Types of Barometers	A2—1
A-2.2 Fortin-Type Mercurial Barometer	A2—1
A-2.3 Movable Scale Barometer	A2—2
A-2.4 Fixed-Cistern Barometer	A2—2
A-2.5 Siphon Barometer, Non-Adjustable Level; Primary Standard Barometers	A2—7
A-2.5.0 Siphon Barometer—General	A2—7
A-2.5.1 Primary Standard Barometer—General	A2—8
A-2.5.2 Density and Thermal Expansion of Mercury	A2—9
A-2.5.3 Primary Standard Barometer, Teddington, England	A2—10
A-2.5.4 Extended Range Standard Barometer at Teddington	A2—11
A-2.5.5 United States Primary Standard Barometer	A2—13
A-2.5.6 Finnish Primary Standard Barometer	A2—14
A-2.5.7 United States Weather Bureau Standard Barometer	A2—15
A-2.5.8 Japanese Absolute Standard Barometer	A2—15
A-2.6 Cistern-Siphon Barometers, Adjustable Level	A2—18
A-2.7 Siphon Barometers, Float and Wheel Mechanism	A2—27
A-2.8 Two-Liquid, Expanded-Scale Barometer	A2—30
A-2.9 Weight Barometers	A2—31
A-2.10 Aneroid Barometers	A2—31
A-2.11 Sympiesometer	A2—33
A-2.12 Hypsometer	A2—34
A-2.13 Miscellaneous Types of Barometers	A2—36
A-2.14 Effects of Impure Mercury, and Procedures for Cleaning It	A2—43
A-2.14.0 Introduction	A2—43

CHAPTER 2 INSTRUMENTS FOR DETERMINING ATMOSPHERIC PRESSURE; THEIR INSTALLATION AND CHARACTERISTICS (Cont'd.)

	Page
A-2.14.1 Effects of Impurities in Mercury.....	A2-43
A-2.14.2 Filtering Method of Cleaning Mercury.....	A2-45
A-2.14.3 Laboratory Operations for Purifying Mercury.....	A2-46
A-2.15 Filling of Mercury Barometers.....	A2-51
A-2.16 General Rules for Handling and Maintenance of Barometers.....	A2-53
A-2.16.0 Introduction.....	A2-53
A-2.16.1 Handling and Maintenance of Mercury Barometers.....	A2-54
A-2.16.1.0 Introduction.....	A2-54
A-2.16.1.1 Choice of Installation Site, from Standpoint of Thermal Factors.....	A2-55
A-2.16.1.2 Choice of Installation Site, with a View to Avoiding Pollution Sources.....	A2-55
A-2.16.1.3 Precautions Necessary When Moving, Tilting, or Inverting Barometers.....	A2-56
A-2.16.1.4 Protection of Barometers Against Rough Handling and Shocks.....	A2-56
A-2.16.1.5 Limitations on Turning the Adjusting Screw or Jackscrew of a Barometer.....	A2-57
A-2.16.1.6 Need for Applying Special Instructions in Packing and Shipping Barometers.....	A2-57
A-2.16.1.7 Need for Regular Inspection and Comparative Readings of Barometers.....	A2-57
A-2.16.1.8 Special Comparisons Required When Barometer is Moved, Jarred, etc.	A2-58
A-2.16.2 Installation, Handling, and Maintenance of Aneroid Indicating Instruments.....	A2-58
A-2.16.2.0 Introduction.....	A2-58
A-2.16.2.1 Installation of Aneroid Indicating Instruments.....	A2-59
A-2.16.2.2 Position of Aneroid Instruments.....	A2-59
A-2.16.2.3 Venting of Aneroid Indicating Instruments.....	A2-60
A-2.16.2.4 Laboratory Adjustments and Calibration of Aneroid Indicating Instruments.....	A2-60
A-2.16.2.5 Field Standardization of Aneroid Indicating Instruments.....	A2-60
A-2.16.2.6 Field Adjustment of Aneroid Indicating Instruments.....	A2-62
A-2.16.2.7 Quality Control of Aneroid Indicating Instruments.....	A2-63
A-2.16.2.8 Posted Correction for Aneroid Indicating Instruments.....	A2-64
A-2.16.2.9 Temperature Corrections for Aneroid Indicating Instruments.....	A2-64
A-2.16.2.10 Care and Maintenance of Aneroid Indicating Instruments.....	A2-64
A-2.16.2.11 Moving of Aneroid Indicating Instruments.....	A2-64
A-2.16.2.12 Packing and Shipping of Aneroid Indicating Instruments.....	A2-65
A-2.16.3 Installation, Maintenance, and Operation of Barographs at Land Stations.....	A2-65
A-2.16.3.0 Introduction.....	A2-65
A-2.16.3.1 Protection Against Mechanical Damage and Extreme Temperature Variations.....	A2-65
A-2.16.3.2 Cleanness and Dryness of Barograph.....	A2-65
A-2.16.3.3 Cleaning Pen.....	A2-66
A-2.16.3.4 Care of Clock and Chart Cylinder Drive.....	A2-66
A-2.16.3.5 Lubrication.....	A2-72
A-2.16.3.6 Dashpots and Damper.....	A2-72
A-2.16.3.7 Protection Against Moisture and Fungi.....	A2-73
A-2.16.3.8 Laboratory Adjustment and Recalibration of Barographs.....	A2-73
A-2.16.3.9 Selection of Barograph Charts.....	A2-73
A-2.16.3.10 Disposition of Barograms.....	A2-74
A-2.16.3.11 Application of Barograph Correction.....	A2-74
A-2.16.4 Installation, Maintenance, and Operation of Marine Barographs.....	A2-75
A-2.16.4.0 General Information Regarding Marine Barographs.....	A2-75
A-2.16.4.1 Removing and Replacing Case of Marine Barograph.....	A2-75
A-2.16.4.2 Exposure and Installation of Marine Barograph.....	A2-76
A-2.16.4.3 Winding of Clock of Marine Barograph.....	A2-76
A-2.16.4.4 Inking of Pen on Marine Barograph.....	A2-77

CHAPTER 2 INSTRUMENTS FOR DETERMINING ATMOSPHERIC PRESSURE; THEIR INSTALLATION AND CHARACTERISTICS (Cont'd.)

	Page
A-2.16.4.5 Setting for Correct Pressure and Time on Marine Barograph.....	A2-77
A-2.16.4.6 Changing Chart on Marine Barograph.....	A2-77
A-2.16.4.7 Data Entries on Charts of Marine Barograph.....	A2-78
A-2.16.4.8 Disposition of Charts of Marine Barograph.....	A2-78
A-2.16.4.9 Regulation of Clock of Marine Barograph.....	A2-79
A-2.16.4.10 Regulation of Damper of Marine Barograph.....	A2-79
A-2.16.4.11 Maintenance and Port Control of Marine Barographs.....	A2-80
A-2.17 Cleaning of Fortin Barometers, Air in Barometer Tubes, and the "Metallic Click".....	A2-81
A-2.17.0 Introduction.....	A2-81
A-2.17.1 Cleaning of Fortin Barometers.....	A2-82
A-2.17.2 Air in Barometer Tubes.....	A2-90
A-2.17.3 The "Metallic Click".....	A2-92
A-2.18 Hazards of Mercury; and Control of its Vapor Concentration.....	A2-93
A-2.19 Flat Meniscus of Mercury Under Certain Conditions.....	A2-95
A-2.20 Packing, Transporting and Shipping Mercury Barometers.....	A2-99
A-2.20.0 Introduction.....	A2-99
A-2.20.1 Packing and Shipping Mercury Barometers.....	A2-99
A-2.20.1.0 General Information on Packing Procedures.....	A2-99
A-2.20.1.1 Instructions for Packing Barometers in an Inclined Position (Weather Bureau).....	A2-103
A-2.20.1.2 Packing Small-Bore Fortin Barometers in an Inclined Position (Military).....	A2-104
A-2.20.1.3 Packing Large-Bore Fortin Barometers in an Inclined Position (Military).....	A2-106
A-2.20.1.4 Improvising Packing Box and Packing Material.....	A2-106
A-2.20.1.5 Shipment of Special Barometers in Erect Position.....	A2-109
A-2.20.1.6 Shipment of U. S. Navy Type Marine Barometers in Inverted Position.....	A2-109
A-2.20.1.7 Shipment of Barometers of Unusual Type or of Kew Pattern.....	A2-112
A-2.20.1.8 Reporting of Defective Barometers.....	A2-113
A-2.20.1.9 Shipment of Defective Barometers, Emptied of Mercury.....	A2-113
A-2.20.2 Transporting Mercury Barometers in Carrying Cases.....	A2-114
A-2.21 Packing and Transportation of Aneroid Barometers, Altimeter-Setting Indicators, and Barographs.....	A2-115
A-2.21.0 Introduction.....	A2-115
A-2.21.1 Hand Carrying of Aneroid Barometers.....	A2-121
A-2.21.2 Shipment of Aneroid Instruments Unattended, by Surface Vehicle.....	A2-121
A-2.21.2.0 General Information.....	A2-121
A-2.21.2.1 Packing of Aneroid Barometers and Altimeter-Setting Indicators for Unattended Shipment by Surface Vehicle.....	A2-123
A-2.21.2.2 Packing of Barographs and Microbarographs.....	A2-126
A-2.21.3 Shipment of Aneroid Instruments by Air.....	A2-132

CHAPTER 3 GRAVITY CORRECTION FOR MERCURY BAROMETERS

3.0 Introduction.....	3-1
3.1 Gravity Correction for Mercury Barometers on Board Ship.....	3-3
3.2 Determination of Local Gravity at Land Stations.....	3-7
3.2.0 Introduction.....	3-7
3.2.1 Use of the Gravimeter.....	3-8
3.2.2 Use of Bouguer or Free-Air Anomalies.....	3-8
3.2.3 Use of Theoretical Formula Giving Local Gravity for Inland Stations.....	3-9
3.2.4 Use of Theoretical Formula Giving Local Gravity for Coastal and Island Stations.....	3-11
3.3 Calculation of the Correction for Gravity Applicable to Mercury Barometer Readings at Land Stations.....	3-12

ANNEX TO CHAPTER 3: AUXILIARY GRAVITY INFORMATION

A-3.1 Calculation of Local Acceleration of Gravity at any Point Over the Ocean.....	A3-1
A-3.2 Use of Bouguer Anomalies.....	A3-1

CHAPTER 4 "REMOVAL CORRECTION" AND "RESIDUAL CORRECTION"

	Page
4.0 Introduction	4-1
4.1 General Information Regarding "Removal Correction"	4-1
4.2 Instructions for Calculating the "Removal Correction"	4-1
4.3 Examples of Determining "Removal Correction"	4-3
4.4 "Residual Correction"	4-4

CHAPTER 5 TEMPERATURE CORRECTION OF MERCURY BAROMETERS

5.0 Introduction	5-1
5.1 Technical Information Regarding Temperature Correction of Fortin Barometer	5-3
5.2 Instructions for Correcting Fortin-Type Barometers for Temperature	5-8
5.2.0 Introduction	5-8
5.2.1 Option Regarding Method of Determining Correction	5-9
5.2.2 Selection of Proper Temperature Correction Table	5-9
5.2.3 Correction of Attached Thermometer Readings	5-10
5.2.4 Algebraic Sign of Corrections of the Barometer for Temperature	5-11
5.2.5 Use of Temperature Correction Tables, No. 5.2.1, 5.2.2, 5.2.3, etc.	5-13
5.3 Correction of Fixed-Cistern Barometers for Temperature	5-16
5.4 "Total Correction" Table for Fortin-Type Barometers	5-25

CHAPTER 6 STANDARDIZATION AND COMPARISON OF BAROMETERS

6.0 Introduction	6-1
6.1 Symbols and Terminology Regarding Different Classes of Barometer	6-2
6.2 Absolute Standard (Primary) Barometer for the United States ("A")	6-3
6.3 Standardization of Working Standard Barometers ("B")	6-3
6.4 Standardization of Sub-Standard Barometers ("C")	6-3
6.5 Comparison of Station Barometers ("S," "N," and "V") with Regional Office or Headquarters Sub-Standard Barometer ("C")	6-4
6.5.0 General Features of Comparison Program	6-4
6.5.1 Limit Regarding Variation of Inspection Barometer	6-4
6.5.2 Basic Procedures for Comparisons at Stations	6-4
6.5.3 Forms for "Comparative Barometer Readings"	6-5
6.5.4 Criteria for Deciding upon Need for Barometer Comparisons	6-6
6.5.5 Tapping of the Barometer	6-9
6.5.6 Preparation and Disposition of Form WBAN 54-6.3	6-10
6.5.7 Action Dependent Upon Variation in Inspection Barometer	6-10
6.5.8 Tolerance Regarding Departure of "S" from "A,"	6-10
6.5.9 Action when Tolerance Is Exceeded	6-11
6.5.10 Detailed Rules for Completion of Forms	6-11
6.5.10.1 General	6-11
6.5.10.2 Aneroid Barometers	6-12
6.5.10.3 Altimeter-Setting Indicators	6-13
6.5.11 Barometer Comparisons Involving Airport Station and City Office	6-13
6.5.12 Comparisons at Headquarters Station	6-14
6.5.13 Rendition of Forms	6-14
6.5.14 Determination of "Residual Corrections"	6-15
6.6 Comparison of Station Barometers	6-15
6.6.0 General Instructions	6-15
6.6.1 Dates, Times, and Conditions for Regular Comparisons	6-15
6.6.2 Correction for Difference in Barometer Elevations	6-15
6.6.3 Detailed Instructions for the Comparisons	6-17
6.7 Standardization of Precision Aneroid Barometers	6-18
6.7.0 General Information Concerning Aneroid Barometers	6-18
6.7.1 Definitions of Correction, C_a , of Aneroid Barometer	6-19
6.7.1.0 General Information	6-19
6.7.1.1 Definition of C_a in Case Where Removal Correction Is Constant	6-19
6.7.1.2 Definition of C_a in Case Where Removal Correction Is Variable	6-19
6.7.1.3 Significance of C_a for Aneroid Barometers	6-20
6.7.2 Basic Procedures for Standardizing Aneroid Barometers	6-20
6.7.2.0 General Information	6-20

CHAPTER 6 STANDARDIZATION AND COMPARISON OF BAROMETERS (Cont'd.)

	Page
6.7.2.1 Comparative Observations to Determine C_a and General Plan	6-20
6.7.2.2 Quality-Control Chart	6-27
6.7.2.3 Calculations to Check Drift	6-27
6.7.2.4 Drift Shown by "Curve of Best Fit" on Quality-Control Chart	6-27
6.7.2.5 "Tail-End Drift"	6-37
6.7.2.6 Variability	6-37
6.7.2.7 Calculation of Mean Corrections (C_{am})	6-37
6.7.2.8 Posted Correction Card and Application of the "Posted Correction"	6-40
6.7.2.9 Additional Details	6-41
6.7.2.9.1 Records of Data	6-41
6.7.2.9.2 Numbering of Observations	6-41
6.7.2.9.3 Plotting of Quality-Control Chart	6-41
6.7.2.9.4 Constructing Curve of Best Fit	6-42
6.7.2.9.5 Drift Shown by Curve of Best Fit	6-42
6.7.2.9.6 Precautions Regarding "Tail-End Drift"	6-43
6.7.2.9.7 Study of Variability	6-43
6.7.2.9.8 Mean Correction (C_{am}) over a Period of Time	6-46
6.7.3 Instructions Regarding Preparation of Form WBAN 54-6.6: Comparison of Aneroid Barometer	6-47
6.8 Standardization of Altimeter-Setting Indicators	6-50
6.8.0 General Information Concerning Altimeter-Setting Indicators	6-50
6.8.1 Definitions of Corrections, C_a , of Altimeter-Setting Indicator	6-55
6.8.1.0 General Information	6-55
6.8.1.1 Definition of C_a in Case Where Removal Correction Is Constant	6-56
6.8.1.2 Definition of C_a in Case Where Removal Correction Is Variable	6-57
6.8.1.3 Significance of C_a	6-57
6.8.2 Basic Procedures for Standardizing Altimeter-Setting Indicators	6-58
6.8.2.0 General Information	6-58
6.8.2.1 Résumé of General Plan for Standardizing Altimeter-Setting Indicators	6-59
(1) Comparative Observations	6-59
(2) Quality-Control Chart	6-59
(3) Drift Calculations	6-59
(4) Drift Determined from Curve	6-59
(5) "Tail-End Drift" Checked	6-59
(6) Variability Checked	6-59
(7) Mean Correction (C_{am}) Calculated	6-59
(8) "Posted Correction Card" Prepared	6-59
6.8.2.2 Instructions Regarding Preparation of Form WBAN 54-6.6: Comparison of Altimeter-Setting Indicator	6-60
6.9 Comparison of Marine Aneroid Barometers	6-61
6.9.0 Introduction	6-61
6.9.0.1 Conditions Affecting Comparison of Barometers	6-62
6.9.0.2 Comparison Standard Barometers	6-63
6.9.0.3 Inspection Aneroid Barometer	6-63
6.9.1 Comparison of Barometers on Board U.S. Coast Guard and Naval Ships	6-66
6.9.1.0 General Information Regarding Comparisons Involving U.S. Ships	6-66
6.9.1.1 Ship's Aneroid Compared with Inspection Aneroid Barometer	6-67
6.9.1.2 Ship's Aneroid Compared with Comparison Standard Barometer	6-71
6.9.1.3 Posting of Corrections for Ship's Aneroid Barometer	6-74
6.9.1.4 Aneroid Barometer Adjustments	6-74
6.9.2 Comparison of Barometers on Board Commercial Ships	6-76
6.9.2.0 General Information	6-76
6.9.2.1 Ship's Aneroid Barometer Compared with Inspection Aneroid	6-77
6.9.2.2 Calibarometer Tests	6-79
6.10 Standardization of Barographs	6-84
6.10.0 General Information	6-84
6.10.1 Standardization of Barographs at Land Stations	6-89
6.10.1.0 General Information	6-89
6.10.1.1 Definition of Barograph Correction	6-90

CHAPTER 6 STANDARDIZATION AND COMPARISON OF BAROMETERS (Cont'd.)

	Page
6.10.1.2 Times and Conditions for Determining Barograph Corrections.....	6-90
6.10.1.3 Posting of Barograph Correction.....	6-90
6.10.1.4 Conditions for Resetting Barograph Pressure Indication.....	6-90
6.10.1.5 Conditions for Adjusting Barograph Time Indication.....	6-91
6.10.1.6 Data and Forms Used in Computing Barograph Corrections.....	6-91
6.10.1.7 Station Pressure for Computing Barograph Correction.....	6-91
6.10.1.8 Barograph Readings and Time-Clock Lines.....	6-91
6.10.1.9 Barograph Correction Calculated.....	6-92
6.10.1.10 Instructions for Resetting Barograph to Zero Correction.....	6-92
6.10.1.11 Adjusting Time Indication of Barograph.....	6-92
6.10.1.12 Preparation of Chart Before Placing It on Barograph.....	6-93
6.10.1.13 Instructions For Replacing a Barogram.....	6-93
6.10.1.14 Data Entries on Completed Barograms.....	6-95
6.10.2 Standardization of Marine Barographs.....	6-96
6.10.2.0 General Information.....	6-96
6.10.2.1 Correct Setting of Marine Barographs.....	6-96
6.10.2.2 Entries of Data on Marine Barograph Charts.....	6-96

ANNEX TO CHAPTER 6: SPECIAL PROCEDURE FOR BAROMETER COMPARISONS

A-6.1 International Comparison of Barometers.....	A6-1
Annex—Recommended Practices Regarding First-Order International Comparison of Barometers.....	A6-2
I. Nomenclature and symbols.....	A6-2
II. General procedure recommended for comparison of barometers in different locations.....	A6-2
III. System of interregional comparisons.....	A6-4
IV. System of international comparisons within a Region.....	A6-4
V. Specifications regarding portable mercurial barometer "P".....	A6-4

CHAPTER 7. REDUCTION OF PRESSURE TO SEA LEVEL, AND OTHER LEVELS

7.0 General Information on the Hypsometric Equation and its Terms, as applied to Reduction of Pressure.....	7-1
7.0.0 Introduction.....	7-1
7.0.1 Temperature Scale.....	7-1
7.0.2 Hypsometric Equation.....	7-2
7.0.3 Virtual Temperature.....	7-2
7.0.4 Mean Virtual Temperature of the Air Column (T_{mv}).....	7-3
7.0.5 Terms Included in T_{mv} (°R.).....	7-5
7.0.5.0 List of Terms Involved in T_{mv}	7-5
7.0.5.1 "Station Temperature Argument," t_s	7-5
7.0.5.2 "Standard Lapse-Rate Correction," $aH_{ps}/2$	7-5
7.0.5.3 "Humidity Correction," $e_s C_h$	7-6
7.0.5.4 "Correction for Plateau Effect and Local Lapse-Rate Anomaly," F	7-6
7.1 Instructions for reduction at low stations.....	7-7
7.1.0 General Information.....	7-7
7.1.1 Determination of C_h , Humidity Correction Factor.....	7-8
7.1.2 Determination of Absolute Extremes and Annual Normal of Temperature for the Station.....	7-8
7.1.3 Determination of Vapor Pressures (e_s) Corresponding to the Temperatures.....	7-8
7.1.4 Determination of Humidity Correction ($e_s C_h$) and Virtual Temperature (t_v).....	7-9
7.1.5 Determination of Additive Reduction Constant.....	7-9
7.1.6 Criterion in Regard to Permissibility of Using Fixed Reduction Constant.....	7-9
7.1.7 Use of Reduction Constant When Permissible.....	7-10
7.2 Instructions Regarding Preparation of Factors and Tables for Reduction of Pressure to Sea Level.....	7-10
7.2.0 Introduction.....	7-10
7.2.0.1 Forms Required.....	7-10
7.2.0.2 Significant Figures.....	7-10
7.2.1 Preparation of Form WBAN 54-7.1.....	7-11

CHAPTER 7 REDUCTION OF PRESSURE TO SEA LEVEL, AND OTHER LEVELS (Cont'd.)

	Page
7.2.1.0 General Information and Temperature Range.....	7-11
7.2.1.0.0 Purpose of Form.....	7-11
7.2.1.0.1 Parts of Form.....	7-11
7.2.1.0.2 Instructions Depending on Value of H_{pg} and Location.....	7-11
7.2.1.0.3 Intervals and Range of t_s	7-11
7.2.1.1 Annual Normal Temperature of Station (t_n).....	7-11
7.2.1.2 Part (A), Form WBAN 54-7.1: Vapor Pressure (e_s).....	7-13
7.2.1.2.0 "Humidity Point-of-Departure Stations".....	7-13
7.2.1.2.1 Selection of Stations for Humidity Data.....	7-13
7.2.1.2.2 Evaluation of e_s Data.....	7-14
7.2.1.3 Part (B), Form WBAN 54-7.1: $F(t_s)$, the Correction for Plateau Effect and Local Lapse-Rate Anomaly.....	7-14
7.2.1.3.0 "Point-of-Departure Stations" for $F(t_s)$	7-14
7.2.1.3.1 General Rules Regarding $F(t_s)$	7-14
7.2.1.3.2 Instructions for Determination of $F(t_s)$	7-14
7.2.1.4 Part (C), Form WBAN 54-7.1: Computation of T_{mv} = Mean Vir- tual Temperature ($^{\circ}\text{R.}$).....	7-17
7.2.1.4.0 General Information.....	7-17
7.2.1.4.1 Line (b), Part (C): ($aH_{pg}/2 + e_s C_h$).....	7-17
7.2.1.4.2 Line (c), Part (C): Algebraic Sum of (a) and (b).....	7-17
7.2.1.4.3 Line (d), Part (C): $F(t_s)$	7-17
7.2.1.4.4 Line (e), Part (C): T_{mv} = Algebraic Sum of (c) and (d).....	7-18
7.2.2 Preparation of Form WBAN 54-7.2.....	7-18
7.2.2.0 General Information.....	7-18
7.2.2.1 Instructions for Preparation of Form WBAN 54-7.2.....	7-18
7.2.2.1.0 List of Data To Be Entered.....	7-18
7.2.2.1.1 Column T_{mv}	7-18
7.2.2.1.2 Column r	7-18
7.2.2.1.3 Entry P'	7-18
7.2.2.1.4 Column $P' \cdot r$	7-18
7.2.2.1.5 Entry (ΔP).....	7-22
7.2.2.1.6 Column ($\Delta P \cdot r$).....	7-22
7.2.3 Preparation of Form WBAN 54-7.3.....	7-22
7.2.3.0 General Information.....	7-22
7.2.3.1 Instructions for Preparation of Form WBAN 54-7.3.....	7-22
7.2.4 Preparation of Form WBAN 54-7.4.....	7-22
7.2.4.0 General Information.....	7-22
7.2.4.1 Instructions for Preparation of Form WBAN 54-7.4.....	7-25
7.2.4.1.0 Items To Be Entered.....	7-25
7.2.4.1.1 Heading Data.....	7-28
7.2.4.1.2 Station Pressure Data.....	7-28
7.2.4.1.3 Column Headed: "Calculation of Sea-Level Pressure".....	7-28
7.2.5 Preparation of Pressure Reduction Table in Extenso.....	7-29
7.2.6 Interpolation or Extrapolation in Tables in Extenso.....	7-29
7.2.7 Use of Pressure-Reduction Computer.....	7-39
7.3 Reduction of Pressure Downward or Upward to any Level in General.....	7-42
7.3.0 General Information.....	7-42
7.3.1 Determination of H_{pg}	7-43
7.3.2 Determination of T_{mv}	7-44
7.3.2.0 General Information for Guidance.....	7-44
7.3.2.0.0 Directions Regarding Instructions Covering Various Cases or Factors.....	7-44
7.3.2.0.1 Case of Small H_{pg} , and T_v Available for Base and Top.....	7-44
7.3.2.0.2 Case of Large H_{pg} and T_v Available for a Number of Levels.....	7-44
7.3.2.0.3 Case Where T_v is Observed at Only One Level.....	7-44
7.3.2.0.4 Evaluation of T_v	7-45
7.3.2.1 Determination of T_{mv} for a Shallow Air Column.....	7-45
7.3.2.2 Determination of T_{mv} for a Deep Air Column.....	7-46
7.3.2.2.0 Introduction.....	7-46
7.3.2.2.1 Determination of T_{mv} by Method (I).....	7-46

CHAPTER 7 REDUCTION OF PRESSURE TO SEA LEVEL, AND OTHER LEVELS (Cont'd.)

	Page
7.3.2.2.2 Determination of T_{mv} by Method (II).....	7—47
7.3.2.2.2.0 Introduction.....	7—47
7.3.2.2.2.1 Estimation of P for Various Levels.....	7—47
7.3.2.2.2.2 Evaluation of T_v for the Various Levels.....	7—48
7.3.2.2.2.3 Determination of T_{mv} by Method (II), Final Steps.....	7—48
7.3.2.3 Estimation and Tabulation of T_{mv} in Case Meteorological Data are Observed at Only One Level.....	7—48
7.3.2.3.0 Introduction.....	7—48
7.3.2.3.1 Estimation of Temperature t_1	7—50
7.3.2.3.2 Estimation of Barometric Pressure P_1	7—51
7.3.2.3.3 Estimation of Vapor Pressure, e_1	7—51
7.3.2.3.4 Evaluation of T_v for Various Levels.....	7—52
7.3.2.3.5 Determination of T_{mv}	7—52
7.3.2.3.6 Tabulation of T_{mv} as a Function of Surface Temperature and Dew Point (or Vapor Pressure).....	7—52
7.3.3 Compilation of Ratio r as a Function of T_{mv} for Given H_p	7—53
7.3.4 Reduction of Pressure: Final Stage.....	7—53
7.3.4.0 Recapitulation and Introduction.....	7—53
7.3.4.1 Case (a): Downward Reduction.....	7—57
7.3.4.2 Case (b): Upward Reduction.....	7—59

CHAPTER 8 ALTIMETRY

8.0 General Information.....	8—1
8.0.0 Introduction.....	8—1
8.0.1 Functions of Altimeters.....	8—1
8.0.2 Standard Atmosphere and Pressure Altitude.....	8—1
8.0.2.0 General Information.....	8—1
8.0.2.1 Definition of "Pressure Altitude".....	8—5
8.0.2.2 Definition of "Density Altitude".....	8—6
8.0.3 Fundamental Basis of Altimeter Operation.....	8—6
8.0.3.0 Introduction.....	8—6
8.0.3.1 Models Illustrating Basis of Altimeter.....	8—6
8.0.3.2 Definition of "Indicated Altitude".....	8—10
8.0.3.3 Fundamental Principle of Operation of Altimeter.....	8—10
8.0.4 Performance of Altimeters for Various Conditions and Operations.....	8—13
8.0.4.0 Introduction: Deductions from Equation (1).....	8—13
8.0.4.1 Deduction (a) from Equation (1).....	8—13
8.0.4.2 Deduction (b) from Equation (1).....	8—13
8.0.4.3 Deduction (c) from Equation (1).....	8—13
8.0.4.4 Deduction (d) from Equation (1).....	8—16
8.0.4.4.1 Rules (A) and (B) Derived Mathematically and Illustrated.....	8—16
8.0.5 Deduction of Method for Computing Altimeter Setting.....	8—17
8.0.6 Definitions of Altimeter Setting.....	8—18
8.0.6.0 Introduction.....	8—18
8.0.6.1 Theoretical Definition of Altimeter Setting.....	8—18
8.0.6.2 Operational Definition of Altimeter Setting.....	8—18
8.0.7 Altimeter Setting as Affected by Change of Elevation.....	8—19
8.0.7.1 Example of Discrepancy in Altimeter Settings Based on Different Elevations.....	8—20
8.1 Computation and Use of Altimeter Settings.....	8—20
8.1.1 Computation of Altimeter-Setting Tables.....	8—20
8.1.1.0 Introduction.....	8—20
8.1.1.1 Instructions Regarding Individual Entries in Tables.....	8—21
8.1.1.2 Instructions for Mass Production of Altimeter-Setting Tables.....	8—21
8.1.1.3 Instructions for Preparation of Tables Yielding Station Pressure as a Function of Altimeter Setting.....	8—21
8.1.1.3.0 Introduction.....	8—21
8.1.1.3.1 Instructions for Preparing Table to Give P , Corresponding to A.S.	8—22
8.1.2 Computation of Altimeter Setting by Means of "Altimeter-Setting Computer".....	8—23