TM 11-2421

WAR DEPARTMENT TECHNICAL MANUAL

BAROMETERS ML-331/TM, ML-332/TM, ML-333/TM, AND MERCURIAL BAROMETERS ML-330/FM AND FM-330A/FM

WAR DEPARTMENT 27 NOVEMBER 1945

Change in force: C 4

CHANGE
No. 4

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON; D.C., *14 April 1969*

BAROMETERS ML-331/TM, ML-332/TM, ML-333/TM, AND MERCURIAL BAROMETERS ML-330/FM AND ML-330A/FM

TM 11-2421, 27 November 1945, is changed as follows:

> ***Note.*** **The parenthetical reference to a previous change (for example: "as changed by C 3, 14 June 1957") indicates that pertinent material was published in that change.**

Change the title of the manual to read as shown above.
Page 1, paragraph 1a, add the following note:

> ***Note.*** **Mercurial Barometer ML-4330A/FM, Order No. 905-Phila-57, serial numbers 1011 through 1047, is similar to Barometer ML-330/FM. Information pertaining to ML-330/FM applies to ML-330A/FM unless otherwise specified Official nomenclature followed by (*) indicates all models of barometers covered in this manual.**

Delete "Barometer ML-2-( ) " and substitute "Barometer ML-512-(*) " in the following places:
Page 35, paragraph 22*b* (2), note, line 6.
Page 37, paragraph 23*a*, line 6.
Page 44, paragraph 26*b*, line 7.
Page 53, paragraph 29*b*. line 4.
Page 62, paragraph 33*b* (4), line 3; NOTE, line 5.
Page 63, paragraph 33*b* (10), NOTE, line 4.
Page 87, paragraph 53*d* (4), line 1.
Delete "ML-330/FM" and substitute "M1-330(*) /FM" in the following places:
Page 4, paragraph 4, heading.
Page 7, paragraph 4*c*(1), line 1 and d(1), line 1.
Page 8, figure 4, caption.
Page 9, paragraph 4*e*(1),line 1.
Page 11, paragraph 5, heading and line 1.
Paragraph 6, heading and line 1.
Page 14, paragraph 7, heading and line 1
Paragraph 9, heading and line 1.
Page 23, paragraph 13, heading and line 1.
Page 25, paragraph 15, heading.
Page 28, paragraph 15*g* line 2.
Paragraph 16, heading.

*This change supersedes change 3, 14 June 1957.

TAGO 1094B-April 340-486°-69

Page 37, paragraph 23a, lines 5 and 7.
Page 40, figure 21, caption.
Page 43, paragraph 26*a*, line 1.
Page 44, paragraph 26*b*, line 4, (1), line 1, (2), line 8, and (3), line 1.
Page 45, paragraph 26*b*(4), line 4, (5), line 8, and *c*(1), line 14.
Page 53, paragraph 29*a*, line 2 and 6, line 2.
Page 55, paragraph 30*b*, line 6, *c*(1), line 2, (2), line 1, (6), line 2, and (7), line 1.
Page 56, paragraph 30*d*(1), line 2 and *g* (1); line 2.
Page 58, paragraph 30*h* (1), line 3 and (2), line 3.
Page 59, paragraph 31*b* (2), line 3.
Page 66, paragraph 35, heading and paragraph 36*a*, line 2.
Page 68, paragraph 36*c*, line 2.
Page 69, paragraph 40, line 2.
Page 83, paragraph 52, heading and *a*, lines 2 and 10.
Page 84, paragraph 52*b*, lines 2 and 4; *c*(1), line 3; CAUTION, line 7.
Page 1, paragraph 1*b*, line 3. Delete "Army Air Forces"
Add the following after subparagraph d.

1.1. Indexes of Equipment Publications

a. DA Pam 310-4. Refer to the latest issue of DA Pam 3104 to determine whether there are new additions, changes, or additional publications pertaining to this equipment.

b. DA Pam 310-7. Refer to DA Pam 310-7 to determine whether there are modification work orders pertaining to the equipment.

1.2. Forms and Records

a. Reports of Maintenance and Unsatisfactory Equipment. Use equipment forms and records in accordance with instructions in TM 38-750.

b. Report of Packaging and Handling Deficiencies. Fill out DD Form 6 (Report of Packaging and Handling Deficiencies) as prescribed in AR 700-58 (Army), NAVSUP Publication 378 (Navy), AFR 71-4 (Air Force), and MCO P4610-S (Marine Corp).

c. Discrepancy in Shipment Report (DISREP) (SF361). Fill out and forward Discrepancy in Shipment Report (DISREP) (SF361) as prescribed in AR 55-38 (Army), NAYSUP Pub 459 (Navy), AFR 75-34 (Air Force), and MCO P4610.19 (Marine Corps).

d. Report of Equipment Publication Improvements. The reporting of errors, omissions, and recommendations for improving this manual, by the individual user, is encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to Publications) and forwarded direct to Commanding General, U.S. Army Electronics Command, ATTN: AMSEL-ME-NMP-AD, Fort Monmouth, N.J. 07703.

Paragraph 2, line 3, delete "United States Army Air Force".

Page 2. Delete figure 2 and substitute:

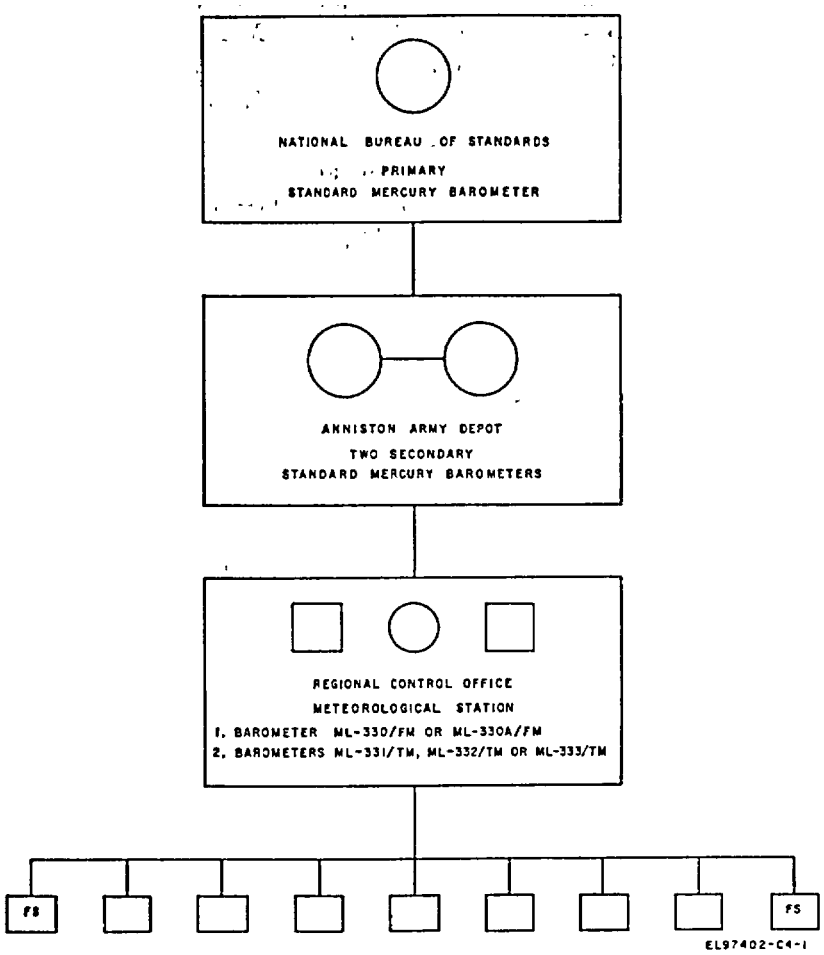

Figure 2. Diagram showing meteorological system application for barometer checks.

Page 3, paragraph 2. Delete subparagraph a and substitute:

a. Permanently installed at Anniston Army Depot, Anniston, Alabama are two Army secondary-standard barometers which have been calibrated and certified by the National Bureau of Standards. A mercurial barometer and two aneroid barometers have been calibrated against these secondary standards for use in the regional control offices of the meteorological services.

Page 4, paragraph 4. Delete subparagraph a and substitute:

a. General. Barometer ML-330(*) /FM is a mercurial barometer which has been calibrated to laboratory precision against the U.S.

Army secondary-standard barometers at Anniston Army Depot, Anniston, Alabama. The instrument is larger in size and has greater accuracy than Barometer ML-512(*) used in fixed meteorological stations. The construction of Barometer ML-30(*)/FAP and Barometer ML-512(*), however, is almost identical.

Page 21, paragraph 10. Delete subparagraph d and substitute:

d. Scale Calibration Chart (Fig. 9). A scale calibration correction chart, mounted in the lid of the wooden barometer case, represents the deviation of the instrument from the secondary-standard calibration equipment located at Anniston Army Depot at the time the instrument leaves the depot. This correction is determined for each individual instrument over the entire range and must be applied to each reading of the aneroid barometer.

Page 22, paragraph 10. Delete subparagraph e and substitute:

e. Carrying Case (Fig. 8). Barometers ML-331/TM, ML-332/TM, and M-333/TT are transported in lightweight carrying cases made of water-repellent canvas padded with shock insulation material and lined with a rubberized fabric. A flap, fastened with six snap fasteners, insures a rainproof seal. When the barometer leaves Anniston Army Depot, the aluminum temperature correction and pressure correction chart and copies of the required forms are placed in the pocket of the case lid. A webbing handle is provided for carrying the case.

Page 27, paragraph 15. Delete subparagraph f and substitute:

f. Mercurial Barometer Correction Form. The mercurial barometer correction form accompanies Barometer ML-330 (*) /FM when it leaves Anniston Army Depot. This form gives the instrumental correction, since this may be a variable quantity throughout the scale. The total gravity correction should be applied to each reading of the barometer. Install the mercurial barometer correction form beside the barometer. This correction form is applicable as long as the barometer is used at the original location. If the instrument is moved to another location, it will be necessary to compute gravity corrections in accordance with the instructions given in paragraphs 26c(2) and 56.

Page 28, paragraph 15. Delete subparagraph g and substitute:

g. Thermometer Correction. A correction for the attached thermometer on each mercurial barometer is determined before the barometer leaves Anniston Army Depot. If the correction is large enough to introduce an error in the barometer reading, then the correction is typed on a sheet titled "Results of Thermometer Test" and placed in the carrying case of one of the precision aneroid barometers, in the set. If this sheet is furnished, it should be removed and installed near the mercurial barometer, and the corrections applied to thermometer readings as described in paragraph 21. If the correction sheet is lost, request a duplicate from Anniston Army Depot, Anniston, Alabama,

by giving the serial number of the mercurial barometer and thermometer. The serial number for the thermometer is etched on the backplate; therefore, the thermometer must be removed from the casing.

Page 29. Delete paragraph 17 and substitute:

17. Transporting Barometers

a. The accuracy of the mercurial and precision aneroid barometers will be affected by improper handling in shipment. Barometers should be transported by hand as long as they are in actual service.

b. When it becomes necessary to return a barometer for repair or calibration to Anniston Army Depot, notify NICP, Philadelphia, Pennsylvania, who is responsible for requisitions and funding requirements as prescribed in SB 11492 before returning the equipment to Anniston, Alabama.

c. Special handling instructions are required for shipment of mercurial and precision aneroid barometers (para 32).

> ***Note.*** **Air shipment of aneroid barometers requires low-level flights and special precautions as described in paragraph 32; otherwise, permanent damage will result.**

Page 45, paragraph 26. Delete subparagraph c (as changed by C 3, 14 Jun 57) and substitute:

c. Gravity Corrections.

(1) When a barometer is placed at sea level, at approximately 45° latitude, the gravity has, by definition, a standard value and gravity and corrections are not applied to the barometer readings. At all other locations, corrections for variations in the local value of the gravity from the standard must be applied. The correction for gravity consists of a correction for latitude and altitude. These corrections can be determined, assuming theoretical gravity prevails, from table I (altitude) and table II (latitude) in this manual. There is generally a small difference (seldom alters the correction by more than a few thousandths of an inch) (para 44) between the true value of the local measured gravity and the calculated value. The gravity correction for the regional control station to which Barometer MIL-330 (*) /FSM is shipped has been determined by Anniston Army Depot and is inscribed on the mercurial barometer correction form which accompanies each barometer. This correction must be applied to each reading of the barometer and is based on actual gravity measurements or on the values interpolated from actual measurements. The magnitude of the correction may differ from the value obtained from the tables; therefore, for some stations, it has been necessary to use theoretical values of gravity.

(2) If the location of the regional control station is changed enough to alter the gravity correction by as much as .001 inch, a new

gravity correction must be determined for the new location. Theoretically, a change of approximately 300 feet in elevation at sea level, or a change of approximately 20 minutes in latitude at 30-inch pressure and 45° latitude, is required to cause a change of .001 inch in gravity correction. Therefore, when the location of Barometer ML-330(*) /FM is changed by less than 10 miles, or by less than 150 feet in elevation, from the location for which a gravity correction was furnished by Anniston Army Depot, retain the last gravity correction. When a change in location and elevation is involved, a new correction should be requested if the change in the elevation exceeds 75 feet and the change in location exceeds 5 miles. As an emergency measure, until a more precise value can be obtained, a new gravity correction, if required, can be computed in accordance with directions in paragraph 56. Application should be made through channels for a new gravity correction. The latitude, longitude, and the elevation of the new location should be given in the application. Upon receipt of this request a-new correction, including gravity anomaly, will be determined by Anniston Army Depot.

Page 46, paragraph 26 (as changed by C 2, 14 Jun 57). Make the following changes:

Delete subparagraph d(2) (a) and substitute:

(*a*) The standard temperature for the inch scale of Barometer ML-330/FM is 62° F; the standard temperature for the inch scale of Barometer ML-330A/FM is 32° F.

Subparagraph *d*(2) (*d*). Add the following at the end of sentence:

On Barometer TML-330A/FM, the combined correction is zero at 32° F.

Subparagraph *d*(3). Add the following after the first sentence:

When stations observations are made on the inch or millibar scale of the ML-330A/FMAI, at temperatures other than 32° F. or 0° C., apply the appropriate corrections for temperature as indicated on the temperature correction sheet furnished with the barometer.

Page 52, paragraph 28. Make the following changes:

Subparagraph *d*(2). Delete the text following "indication" and substitute: Between the time the aneroid barometers are calibrated at Anniston Army Depot and the time they are received at the regional stations, a slight shift may occur due to transportation or aging of cells. This change should be small and within tolerance.

Subparagraph *f*, line 3. Delete "Evans Signal Laboratory" and substitute: Anniston Army Depot.

Page 57, paragraph 30*g* (3) and (4). Delete "Evans Signal Laboratory" and substitute: Anniston Army Depot.

Page 60, paragraph 32*b*, line 9. Delete "Evans Signal Laboratory" and substitute: Anniston Army Depot.

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Page 65, paragraph 33*f*, NOTE: Delete and substitute:

> **Note: The mean values of Aneroid Barometer ML-331/TM, ML-332/TM, or ML-333/TM should always agree within .3 millibar. If either barometer exceeds the value when compared with Mercurial Barometer ML/330(*)/FM, replace the barometer. Replacement of barometers may be requisitioned through NICP, Phila, Pa., to Anniston Army Depot, Anniston, Alabama. The defective barometer should be returned for calibration or repair when a replacement is received from the depot. The procedure to be followed when new barometers are requisitioned or returned for repair and calibration is given in paragraph 58.**

Page 66, paragraph 34. Add the following after the last sentence:

A maintenance calibration check will be made by the using organization at least once every 6 months and, returned to Anniston Army Depot for depot maintenance and recalibration every 5 years.

Page 68, paragraph 36*b*. Delete the last sentence and substitute. If this size is reached, it is advisable to requisition another barometer as prescribed in paragraph 58 before returning the defective barometer to Anniston Army Depot.

Page 69, paragraph 37*b*, WARNING, line 4. Delete "Evans Signal Laboratory, Belmar, New Jersey" and substitute: Anniston Army Depot.

Page 70, PART, FIVE. Delete NOTE and substitute:

> **Note. Secondary standard barometers are required to be calibrated to extreme accuracy, using special calibration and pressure measuring equipments These barometers cannot be adjusted or repaired by maintenance personnel. All unserviceable equipment must be returned to Anniston Army Depot, as described in SB 11-492, with a work order and the log forms for each individual instrument.**

Page 77, paragraph 46c(5). Delete and substitute:

(5) Occasionally a barometer will show a persistent drift. To detect this condition, note the difference for the ambient pressure of the meteorological station between the last scale calibration curve and the one supplied with the instrument. If periodic checks indicate that this difference exceeds 3 millibars, requisition a new barometer in accordance with instructions furnished by the using agencies and SB 11492. Return the instrument to Anniston Army Depot for repair.

Paragraph 47*a*(2). Delete WARNING and substitute:

> **Warning: This adjustment is never made at the meteorological stations; the instrument must be returned to Anniston Army Depot, Anniston, Alabama, for adjustment and calibration.**

Page 80, paragraph 50. Delete and substitute:

50. Unsatisfactory Equipment Report

Equipment being returned to Anniston Army Depot, Anniston, Alabama, for repairs or calibration will require an unsatisfactory report per instructions described in TMI 88-750 and forwarded in accordance with instructions in SB 11492.

Page 81. Delete figure 24.

Page 83, paragraph 52*a*. Delete "Evans Signal-Laboratory: and substitute: Anniston Army Depot, Anniston, Alabama. Lines 6 and 7. Delete "Evans Signal Laboratory, Belmar, New Jersey" and substitute: Anniston Army Depot, Anniston, Alabama.

Page 84, paragraph 52*b*, line 6. Delete "Evans Signal Laboratory" and substitute: Anniston Army Depot, Anniston, Alabama.

Page 85, paragraph 53*a*, line 7. Delete "Evans Signal Laboratory" and substitute: Anniston Army Depot, Anniston, Alabama.

Page 101, paragraph 58. Delete and substitute:

58. Requisitioning of Equipment

The process by which new instruments are requested, and unserviceable instruments are returned to Anniston Army Depot for calibration and repair, is covered in SB 11492. Interagency request for additional equipments or repair of existing equipments and procedures for transporting standard barometers will be coordinated with the National Inventory Control Point in Philadelphia, Pa. The accuracy required of these barometers requires special handling and should be transported by hand as long as they are in actual service.

Page 102, paragraph 60, line 2. Delete "Evans Signal Laboratory, Belmar, New Jersey" and substitute: "Anniston Army Depot".

By Order of the Secretary of the Army:

W. C. WESTMORELAND,
General, United States Army,
Chief of Staff.

Official:

KENNETH G. WICKHAM,
Major General, United States Army,
The Adjutant General

Distribution:

Active Army:

USASA (2)
CNGB (1)
ACSC-E (2)
Dir of Trans (1)
TOPOCOM (2)
TSG (1)
CofSptS (1)
USAARENBD (2)
USACDCEC (10)
USACDC Agcy (1)
USAMC (5)
USAMICOM (4)
USATECOM (2)
USASTRATCOM (4)
USCONARC (5)
ARADCOM (5)
ARADCOM Rgn (2)
OS Maj Comd (4)
USARJ (5)
LOGCOMD (2)
USAESC (70)
MDW (1)
Armies (2)
Corps (2)
Instl (2) except
  Fort Gordon (10)
  Fort Huachuca (10)
  Fort Carson (25)
  Fort Knox (12)
  WSMR (5)
  USAECFB (5)
USMA (5)
Svc Colleges (2)
USASCS (5)
USAQMS (5)
USASESS (3)
USAADS (2)
USA FA Sch (2)
USAARMS (2)
USAIS (2)
USAES (2)
USATC Armor (2)
USATC Inf (2)
USASTC (2)
Gen Dep (2)
Sig See, Gen Dep (5)
Sig Dep (12)
Army Dep (2) except
  LBAD (14)
  SAAD (30)
  TOAD (14)
  LEAD (7)
  SHAD (3)
  NAAD (5)
  SVAD (5)
  CHAD (3)
  ATAD (10)
  FTWIAD (5)
  PUAD (5)
MAAG (2)
USARMIS (2)
USAERDAA (2)
USAERDAW (13)
USACRREL (2)
USABIOLABS (5)
WRAMC (1)
Army Pie Cen (2)
Sig FLDMS (2)
Units organized under following TOE's (2 copies each) :

6-200	11-127
6-201	11-155
6-526	11-157
6-565	11-158
6-575	11-500(AA-AC)
6-576	11-587
6-700	11-592
6-701	11-597
11-57	29-56
11-97	57
11-98	67
11-117	

ARNG: State AG (3); units-same as Active Army except allowance is one (1) copy each.

USAR: None.

For explanation of abbreviations used, see AR 320-50.

U.S. GOVERNMENT PRINTING OFFICE: 1969

WAR DEPARTMENT TECHNICAL MANUAL

TM 11-2421

BAROMETERS

ML-330/FM

ML-331/TM

ML-332/TM

ML-333/TM

WAR DEPARTMENT **27 NOVEMBER 1945**

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LIST OF ILLUSTRATIONS

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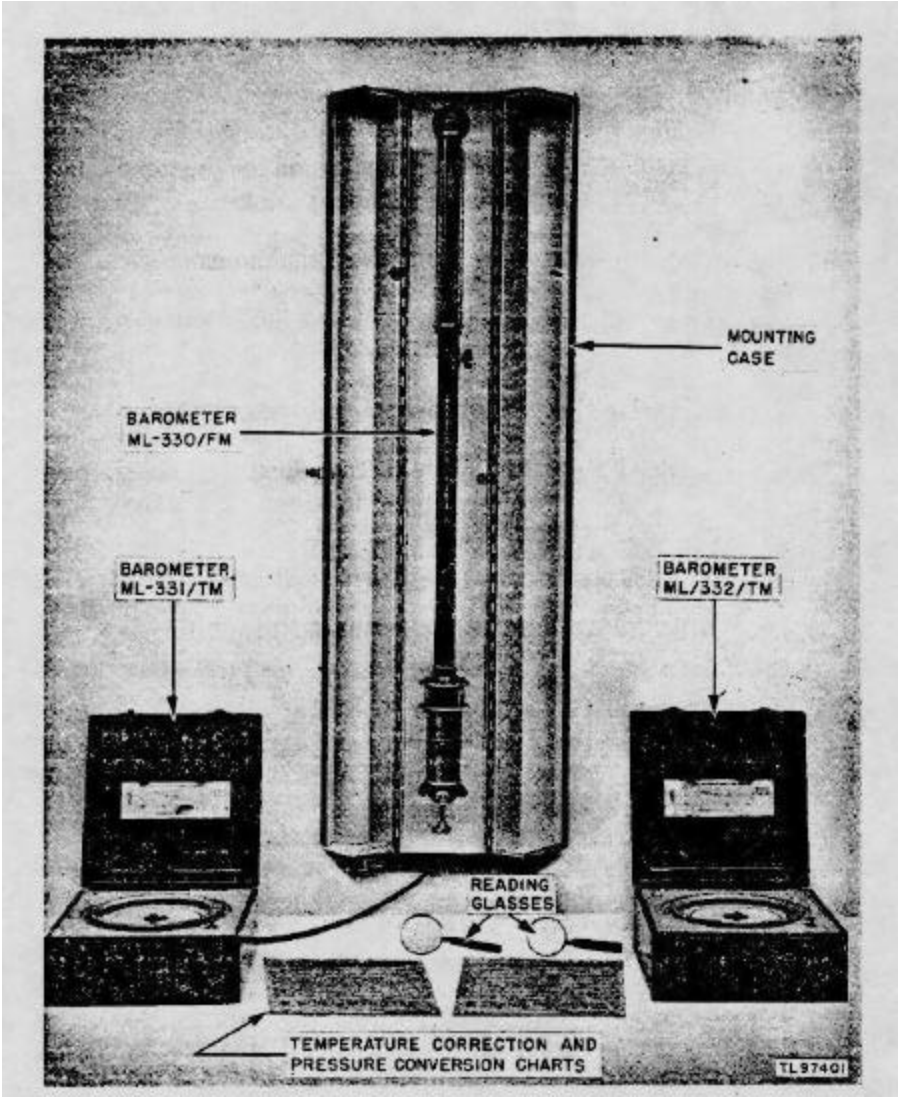


Figure 1. Set of secondary-standard barometers in use at Army Air Force weather region control office.

X

DESTRUCTION NOTICE

WHY - To prevent the enemy from using or salvaging this equipment for his benefit.

WHEN - When ordered by your commander.

HOW - 1. Smash - Use sledges, axes, handaxes, pickaxes, hammers, crowbars, heavy tools.

2. Cut - Use axes, handaxes, machetes.

3. Burn - Use gasoline, kerosene, oil, flame throwers, incendiary grenades.

4. Explosives - Use firearms, grenades, TNT.

5. Disposal - Bury in slit trenches, fox holes, other holes. Throw in streams. Scatter.

USE ANYTHING IMMEDIATELY AVAILABLE FOR

DESTRUCTION OF THIS EQUIPMENT.

WHAT - 1. Smash - Glass tube, metal casing, cistern, and mounting case of mercury barometer; glass window, dial, and mechanism of precision aneroid barometers.

2. Cut - Connection cord to mounting case; canvas carrying cases.

3. Burn - Wooden cases; canvas carrying cases; technical manuals; all charts, forms, and records.

4. Bend - Brass tube of mercury barometer.

5. Bury or scatter - Any or all of the above pieces after destroying their usefulness.

DESTROY EVERYTHING

PART ONE

INTRODUCTION

SECTION I. DESCRIPTION

1. GENERAL.

a. The instruments covered by this technical manual include one mercury barometer, Barometer ML-330/FM, and three precision aneroid barometers, Barometers ML-331/TM, ML-332/TM, and ML-333/TM.

Note. **Mercurial Barometer ML-4330A/FM, Order No. 905-Phila-57, serial numbers 1011 through 1047, is similar to Barometer ML-330/FM. Information pertaining to ML-330/FM applies to ML-330A/FM unless otherwise specified Official nomenclature followed by (*) indicates all models of barometers covered in this manual.**

b. The mercurial barometer and the two precision aneroid barometers are used together as a set of reference standard barometers for weather region control offices of the. All barometric instruments in the region are to be compared with aneroid reference standards for the purpose of bringing field station instruments into agreement with the standard.

c. Throughout this manual, references to the set apply to one Barometer ML.-330/FM and two precision aneroid barometers, one of the pair being Barometer ML-331/TM, and the other being another Barometer ML-331/TM, ML-332/TM, or ML-333/TM, the combination used depending upon the maximum weather-station elevation above sea level within the region. References to the aneroid apply to any one or all models (Barometers ML-331/TM, ML-332/TM, or ML-333/TM).

d. in the nomenclature for the barometers, FM following the number (ML-330/FM) refers to fixed meteorological equipment; TM (ML-331/TM) refers to transportable meteorological equipment.

1.1. Indexes of Equipment Publications

a. DA Pam 310-4. Refer to the latest issue of DA Pam 3104 to determine whether there are new additions, changes, or additional publications pertaining to this equipment.

b. DA Pam 310-7. Refer to DA Pam 310-7 to determine whether there are modification work orders pertaining to the equipment.

1.2. Forms and Records

a. Reports of Maintenance and Unsatisfactory Equipment. Use equipment forms and records in accordance with instructions in TM 38-750.

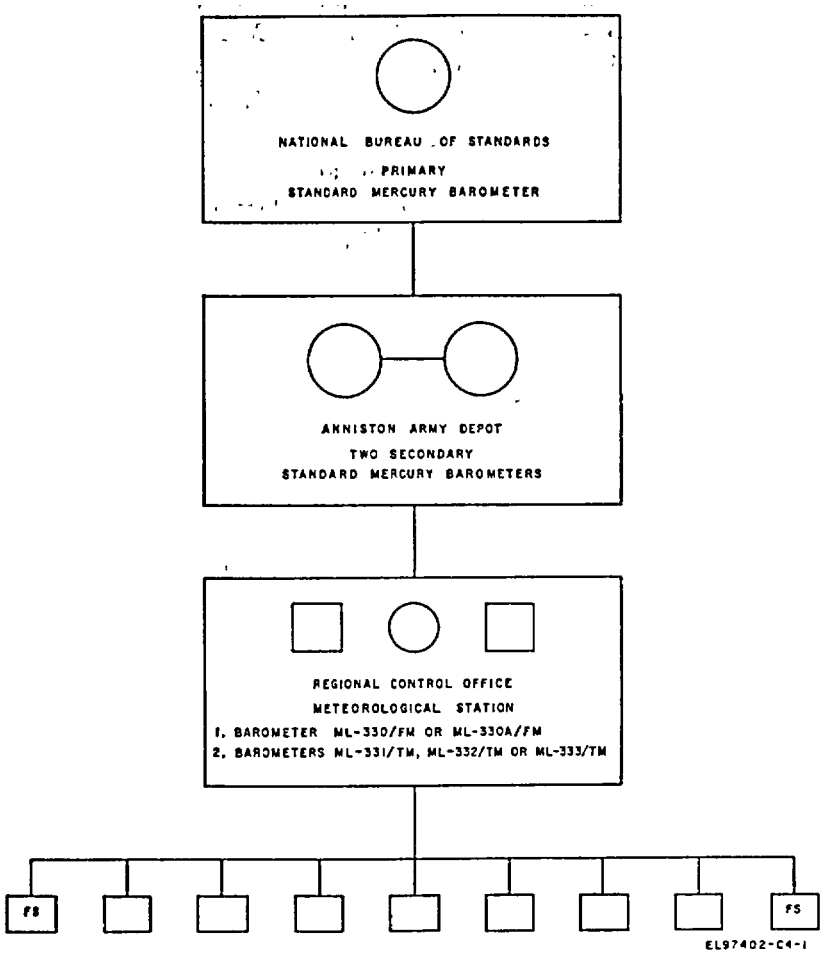
b. Report of Packaging and Handling Deficiencies. Fill out DD Form 6 (Report of Packaging and Handling Deficiencies) as prescribed in AR 700-58 (Army), NAVSUP Publication 378 (Navy), AFR 71-4 (Air Force), and MCO P4610-S (Marine Corp).

c. Discrepancy in Shipment Report (DISREP) (SF361). Fill out and forward Discrepancy in Shipment Report (DISREP) (SF361) as prescribed in AR 55-38 (Army), NAYSUP Pub 459 (Navy), AFR 75-34 (Air Force), and MCO P4610.19 (Marine Corps).

d. Report of Equipment Publication Improvements. The reporting of errors, omissions, and recommendations for improving this manual, by the individual user, is encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to Publications) and forwarded direct to Commanding General, U.S. Army Electronics Command, ATTN: AMSEL-ME-NMP-AD, Fort Monmouth, N.J. 07703.

2. APPLICATION.

The use of one mercury barometer and two aneroid barometers as a set initiates a new system of checking barometers in weather stations throughout the world. Figure 2 shows diagrammatically how the system operates.



* FIELD STATIONS
(SEVERAL FIELD STATIONS IN EACH REGION)

○ - MERCURY BAROMETER
□ - PRECISION ANEROID BAROMETER TL 97402

Figure 2. Diagram showing meteorological system for barometerschecks.

a. Permanently installed at Anniston Army Depot, Anniston, Alabama are two Army secondary-standard barometers which have been calibrated and certified by the National Bureau of Standards. A mercurial barometer and two aneroid barometers have been calibrated against these secondary standards for use in the regional control offices of the meteorological services.

b. The mercury barometer (Barometer ML-330/FM) remains in the regional control office as the standard for the region.

c. The two precision aneroid barometers (Barometers ML-331/TM, ML-332/TM, or ML-333/TM) are used in the field for checking station barometers, both mercury and aneroid. (The aneroids are always used as a pair, never separately, if the pressure to be measured is within the range of both instruments.) The aneroids are checked against each other constantly and against the mercury standard in the regional office at specified intervals.

3. TABLE OF MAJOR COMPONENTS.

a. Barometer ML-330/FM.

Quan	Component	Dimensions (in.)			Volume	Weight
		Length	Width	Depth	(cu ft)	(lb)
1	Mercurial barometer					
1	Mounting case	48½	5½	7½	1.2	26
4	Fluorescent lights (2 in use; 2 spares)					
1	Carrying case	51	8	8	1.9	40*
2	Reading glasses, low power	6¼	2½			

**Packed for hand transportation; includes barometer.*

b. Barometers ML-331/TM, ML-332/TM, or ML-333/TM.

Quan	Component	Dimensions (in.)			Volume	Weight
		Length	Width	Depth	(cu ft)	(lb)
1	Aneroid barometer					
1	Hardwood shock-mounting case	11	11	5	0.35	3
1	Padded canvas carrying case	12½	12½	6	0.6	14*
1	Temperature correction and pressure conversion chart					

**Packed for hand transportation; includes barometer.*

c. Forms.

Quan	Component
1	SC Form No. 79
2	Form SC-80
1 pad	Signal Corps Form SC 436
1 pad	Signal Corps Form SC 437
1 pad	Signal Corps Form SC 438

4. BAROMETER ML-330(*)/FM.

a. General. Barometer ML-330(*)/FM is a mercurial barometer which has been calibrated to laboratory precision against the U.S. Army secondary-standard barometers at Anniston Army Depot, Anniston, Alabama. The instrument is larger in size and has greater accuracy than Barometer ML-512(*) used in fixed meteorological stations. The construction of Barometer ML-330(*)/FAP and Barometer ML-512(*), however, is almost identical.

(*1*) The barometer consists of a glass tube 35-1/2 inches long and of .6-inch internal bore. The tube is closed at the top, while the bottom is open and is immersed in a quantity of pure mercury which is contained in the *cistern* (subpar. e below). The glass tube is constricted a few inches above the bottom, and the lower end, which dips into the mercury, is about 1/4 inch in diameter.

(*2*) The mercury fills the tube except for an evacuated space at the top. Both the glass tube and the cistern are supported vertically within a tubular brass casing which has a swivel hanger at the top for suspending the barometer in the mounting case. Cork supports are placed between the glass tube and the brass casing at the top and at intervals along the entire length of the tube. The brass casing is slotted front and back to expose the upper portion of the glass tube and afford a view of the mercury inside.

(*3*) The height of the mercury column is read on *scales* (subpar. b below) attached to each side of the front slot.

(*4*) A cylindrical cover glass, extending from the top of the barometer tube to the bottom of the scales, fits over the brass casing and is held in place by a metal flange at the top and at the bottom. The cover glass affords protection to the scales. On most of the barometers, the cover glass is 11½ inches deep. On a few barometers, with extended scales for use at stations of high elevation, the cover glass is 14 inches deep. (See paragraph 5 for actual differences in scale.)

(*5*) The slots in the brass casing provide a track for the movable *vernier* (subpar. c below) and the rack and pinion mechanism by which the vernier is adjusted.

(*6*) Attached to the brass casing in front is a *thermometer* (subpar. d below) which indicates the temperature of the instrument.

b. Scales. Graduated scales for measuring the height of the mercury column are provided on each side of the front slot in the brass casing. The scales are engraved on separate strips of silver-plated brass and are attached to the casing by small screws. The height of the mercury may be measured in inches or in millibars.

(*1*) *Inch Scale*. The inch scale is on the left side when the observer is facing the barometer and is graduated in twentieths of an inch. Each integral inch is numbered with figures engraved on the scale.

(*2*) *Millibar Scale*. The millibar scale is on the right side and is graduated in whole millibars. Only 100-millibar graduations are given a complete numerical designation, for example: 800, 900, etc. The intervening 10-millibar intervals are numbered in units of 10 only, hence the numerals 10, 20, 30, etc., appearing on the scale in sequence above the 900-millibar mark actually designate 910, 920, 930 millibars.

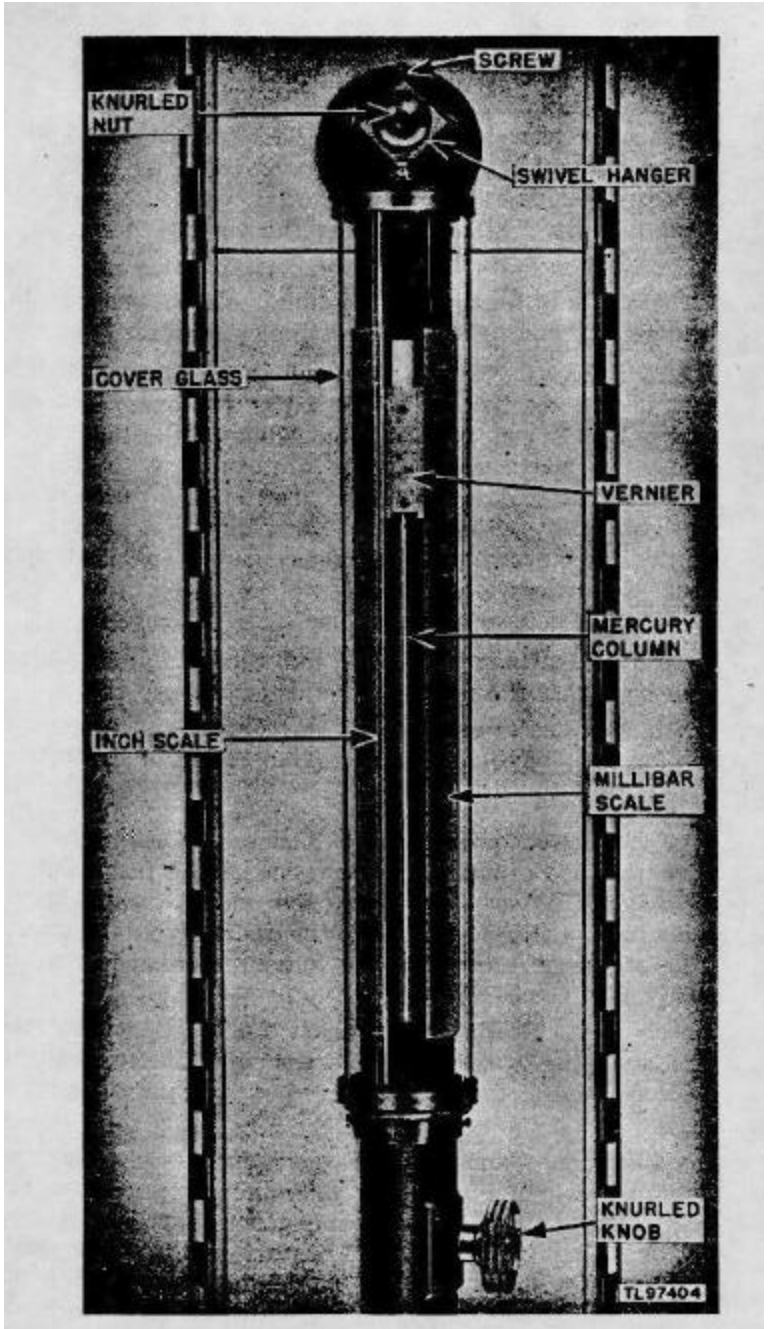


Figure 3. Vernier, inch scale, and millibar scale, of Barometer ML-330/FM.

c. Vernier. A vernier is an auxiliary scale which is placed alongside the main scale to enable subdivisions of the main scale divisions to be read accurately.

(*1*) Barometer **ML-330(*)/FM** is provided with a vernier which measures fractions of the adjacent inch and millibar scales. The vernier is a metal plate 1/2, inch wide and 1/4 inches long which is positioned between the inch and millibar scales so that it covers a portion of the front slot in the brass casing. An indentation about 5/16 inch wide has been machined in the center of the lower edge of the vernier plate to form the sighting edge. The vernier scales are engraved on the vertical edges of the vernier plate.

(*2*) The vernier is screwed to a short piece of tubing fitted closely inside the casing. The top of a long fine-toothed rack is attached to the short tube. A pinion gear engages the rack inside the casing; its shaft extends outside the casing and is provided with a knurled knob by which the vernier is moved vertically between the scales.

(*3*) The vernier edge adjacent to the inch scale is engraved with 25 equal divisions which correspond in over-all length to 24 divisions of the inch scale. The fifth, tenth, fifteenth, twentieth, and twenty-fifth graduations are marked with the numerals 1, 2, 3, 4, and 5, respectively. The inch vernier permits measurements to 1/500, (.002) inch, and by interpolation to .001 inch.

(*4*) The vernier edge adjacent to the millibar scale is engraved with 20 equal divisions which correspond in over-all length to 19 divisions of the millibar scale. The tenth and twentieth divisions are marked with the numerals 5 and 10, respectively. The millibar vernier permits measurements to 1/20 (.05) millibar.

d. Thermometer.

(*1*) The thermometer of Barometer **ML-330(*)/FM** consists of a glass thermometer tube mounted in a metal frame which is screwed to the brass casing of the barometer. The metal frame completely surrounds the thermometer bulb except at the back where an opening is cut through both the frame and the casing. Thus the bulb is shielded from temperature variations in the surrounding air and more nearly represents the temperature of the mercury and the brass casing.

(*2*) The thermometer is provided with both a Fahrenheit and a centigrade scale. The Fahrenheit scale is on the left side of the thermometer when the observer is facing the barometer, and the centigrade scale is on the right.

(*3*) The range of the Fahrenheit scale is from 30° F to 130° F, graduated in ½° F intervals.

(*4*) The range of the centigrade scale is from 0° C to 55° C, graduated in .2° C intervals.

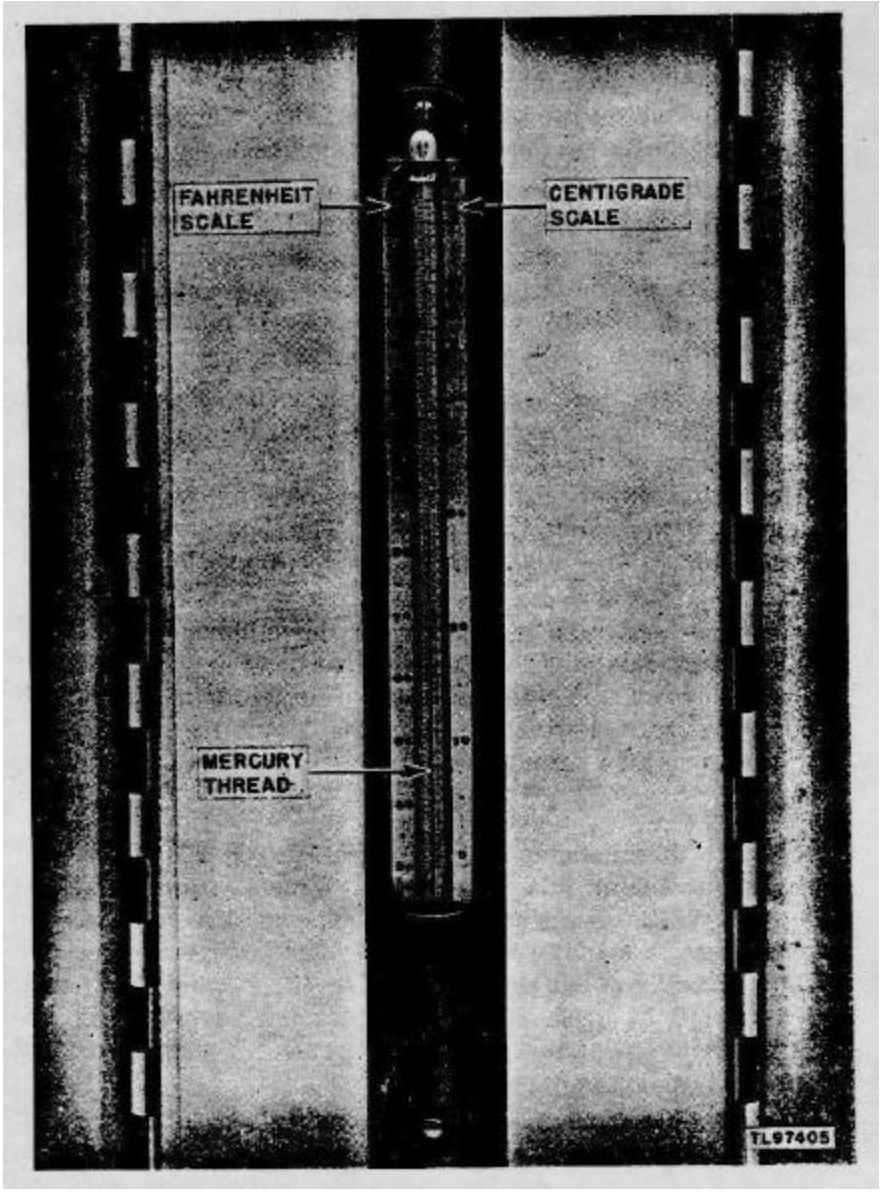


Figure 4. Attached thermometer, Barometer ***ML-330(*)/FM****.*

e. Cistern (fig. 5).

(*1*) The cistern of Barometer **ML-330(*)/FM** consists of a flanged steel cylinder (5), a short glass cylinder (8), two curved cylinders (13) and (16) made of boxwood, and a kid leather bag (18). These parts are assembled with gaskets (6), (11), and (15), and splitring clamps (14), and are inclosed in a metal cylindrical housing (19) that is closed at the bottom by a screw cap (20) which carries adjusting screw (21). Metal cylinder (19) is screwed to flange (12) which is fastened to top flange (4) by screws (10).

(*2*) The center of leather bag (18) is tied to wooden piece (17) against which the tip of adjusting screw (21) bears. The top of leather bag (18) is tied to the lower end of curved cylinder (16), which is joined to curved cylinder (13) with gasket (15) between them, by a system of split-ring clamps (14).

(*3*) The top of curved cylinder (13) rests on a ledge of lower flange (12) and bears the lower end of glass cylinder (8) with gasket (11) between them.

(*4*) Glass tube (1) has a piece of soft kid leather (3), which is folded in a special manner, tied securely around the constricted portion, and then brought over and tied to the top of cylinder (5). The flanged lower portion of cylinder (5) rests on top of glass cylinder (8) with gasket (6) between them. The bottom surface of cylinder (5) carries ivory point (7) which is the zero end of the scale from which all measurements of the height of the mercury column are made.

NOTE: The flexible joint provided by leather pieces (3) and (18) is porous to air but impervious to mercury. This, and the air vent screw (22) permits the air pressure inside the cistern to be identical with that outside, yet prevents mercury from leaking from the cistern at these points.

(*5*) Top flange (4) is fastened by screws to the bottom of casing (2). Flange (12) bears the lower cistern assembly. The lower cistern assembly (13), (14), (15), (16), and (18) and the upper cistern assembly (5) and (8) are held tightly together by screws (10) and flanges (4) and (12). Gaskets (6) and (11) make the joints leakproof.

(*6*) Glass tube (1) and the cistern contain mercury (9). Glass cylinder (8) is transparent and affords view of the cistern mercury level and the ivory point.

(*7*) Adjusting screw (21), bearing against wooden bearing (17), controls the capacity of leather bag (18), making it possible to raise or lower the level of the mercury to meet the tip of ivory point (7).

(*8*) An air vent screw (22) admits air directly to the cistern of the barometer. The air vent consists of a hole about 1/16 inch in diameter which is

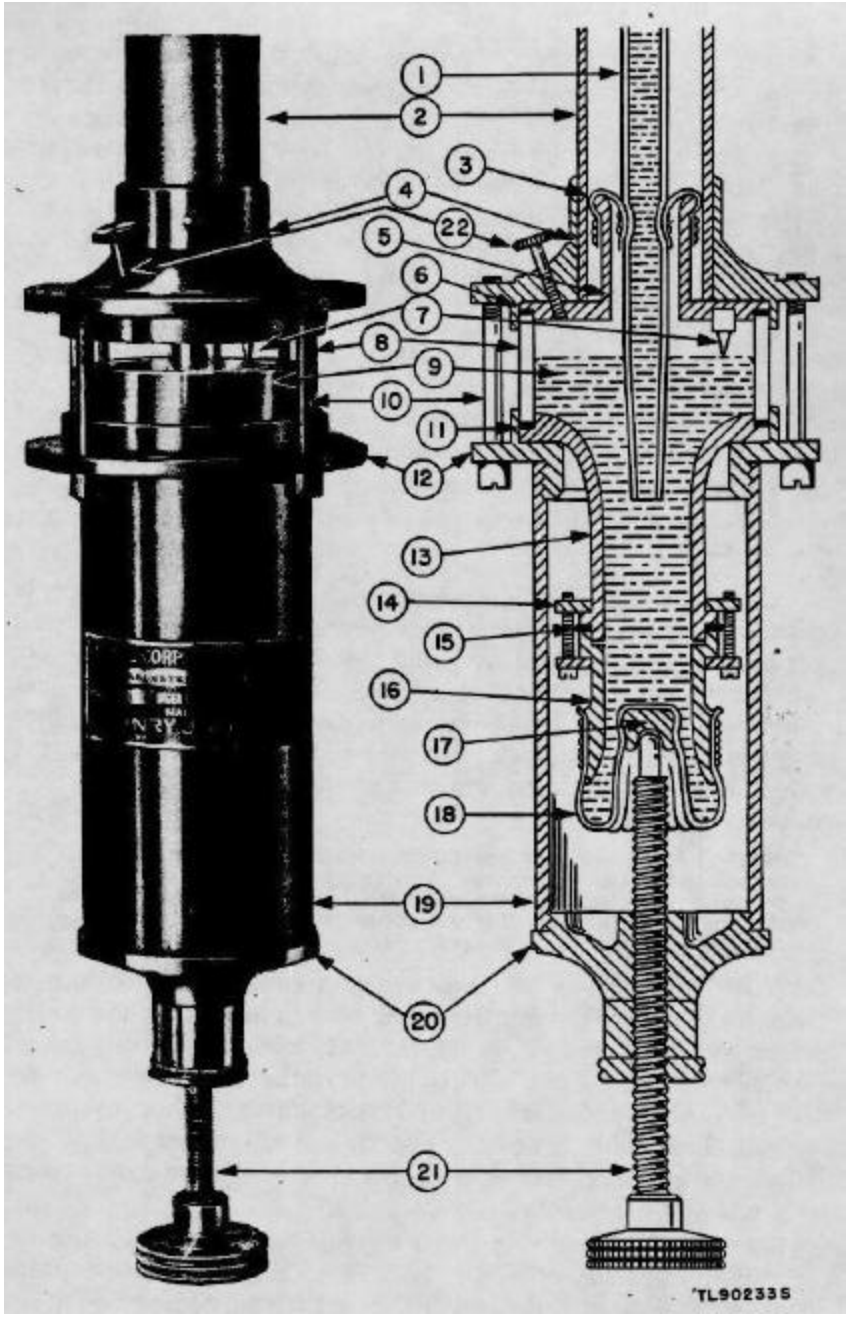


Figure 5. Cistern of Barometer ML-330/FM, showing internal construction.

drilled through the top flange and the flanged cylinder. The hole has a threaded sleeve and is plugged with a knurled-head screw 5/8 inch long-which controls the amount of air admitted to the cistern.

Legend for Figure 5		
(1) Glass tube	(9) Mercury	(16) Lower curved cylinder
(2) Brass casing	(10) Long screws	(17) Wooden bearing
(3) Leather joint	(11) Leather gaskets	(18) Leather bag
(4) Top flange	(12) Lower flange	(19) Cistern housing
(5) Flanged cylinder	(13) Upper curved cylinder	(20) Screw cap
(6) Leather gasket	(14) Split-ring clamp	(21) Adjusting screw
(7) Ivory point	(15) Leather gasket	(22) Air vent screw
(8) Glass cylinder		

5. RANGE OF SCALES ON BAROMETER ML-330(*)/FM.

Barometers ML-330/FM are issued in two scale ranges (see table below). Because of the length of the brass strip on which the vernier is engraved, the effective range of the inch and millibar scales is less than the actual markings in inches and millibars. A comparison of the actual scale markings and the effective range of the scales, in both inches and millibars, is as follows:

Actual scale range	Effective scale range
23.5 to 32.8 in. **(9.3 in.)** 800 to 1110 mb **(310 mb)**	23.7 to 31.3 in. **(7.6 in.)** 805 to 1060 mb **(255 mb)**
21.2 to 32.8 in. **(11.6 in.)** 717 to 1110 mb **(393 mb)**	21.5 to 31.3 in. **(9.8 in.)** 725 to 1060 mb **(335 mb)**

The greater number of the barometers issued have the shorter scale.

6. MOUNTING CASE FOR BAROMETER ML-330(*)/FM (fig. 6).

a. The mounting case for Barometer ML-330(*)/FM is a rectangular metal case, painted olive drab outside and white inside. The two front edges of the case are beveled. The front of the case opens longitudinally, and the two sides are hinged to the back so that when the case is open, the barometer is

completely exposed. The case is fastened with a small trunk latch; the case may be secured with a small padlock.

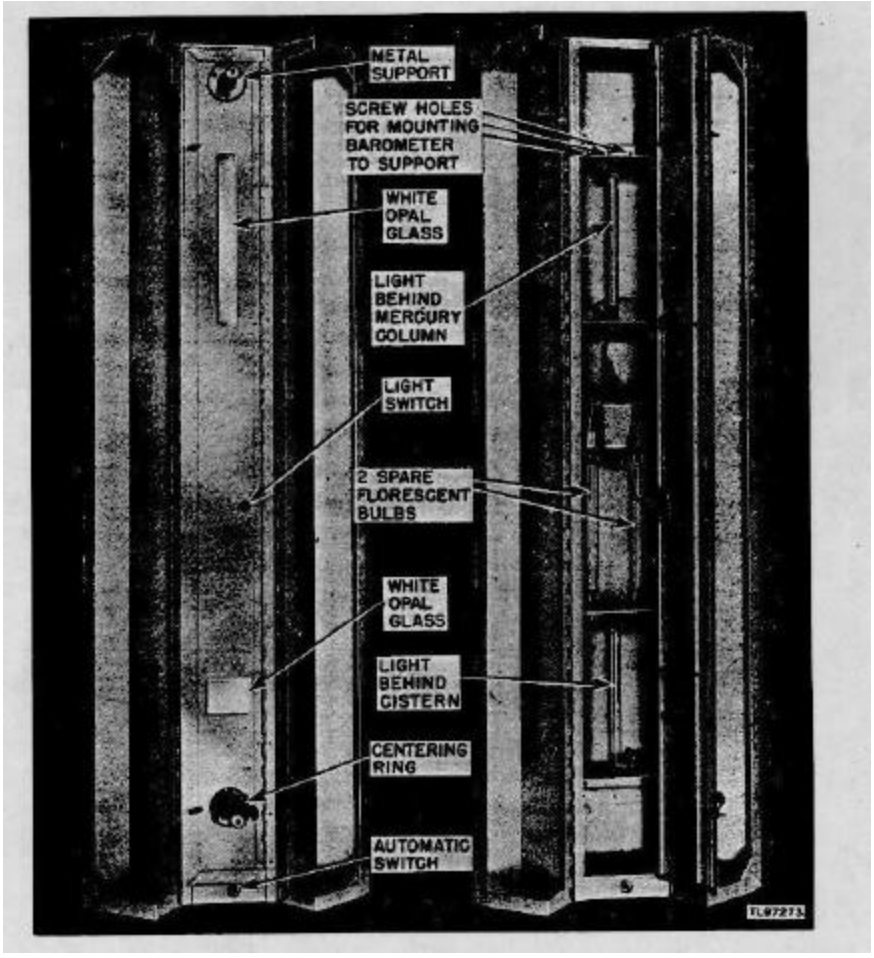


Figure 6. Mounting case for Barometer ML-330/FM, showing mounting panel and wiring behind mounting panel.

b. The barometer mounting panel which is hinged inside the case has a metal support near the top which is fitted with a knurled nut for hanging the barometer. Near the bottom, a brass centering ring with three screws provides means for maintaining the barometer in a vertical position.

c. Set within the mounting panel are two sections of white opal glass so positioned that one extends the full length of the slots in the casing while the other is behind the cistern of the barometer when it is mounted in the case.

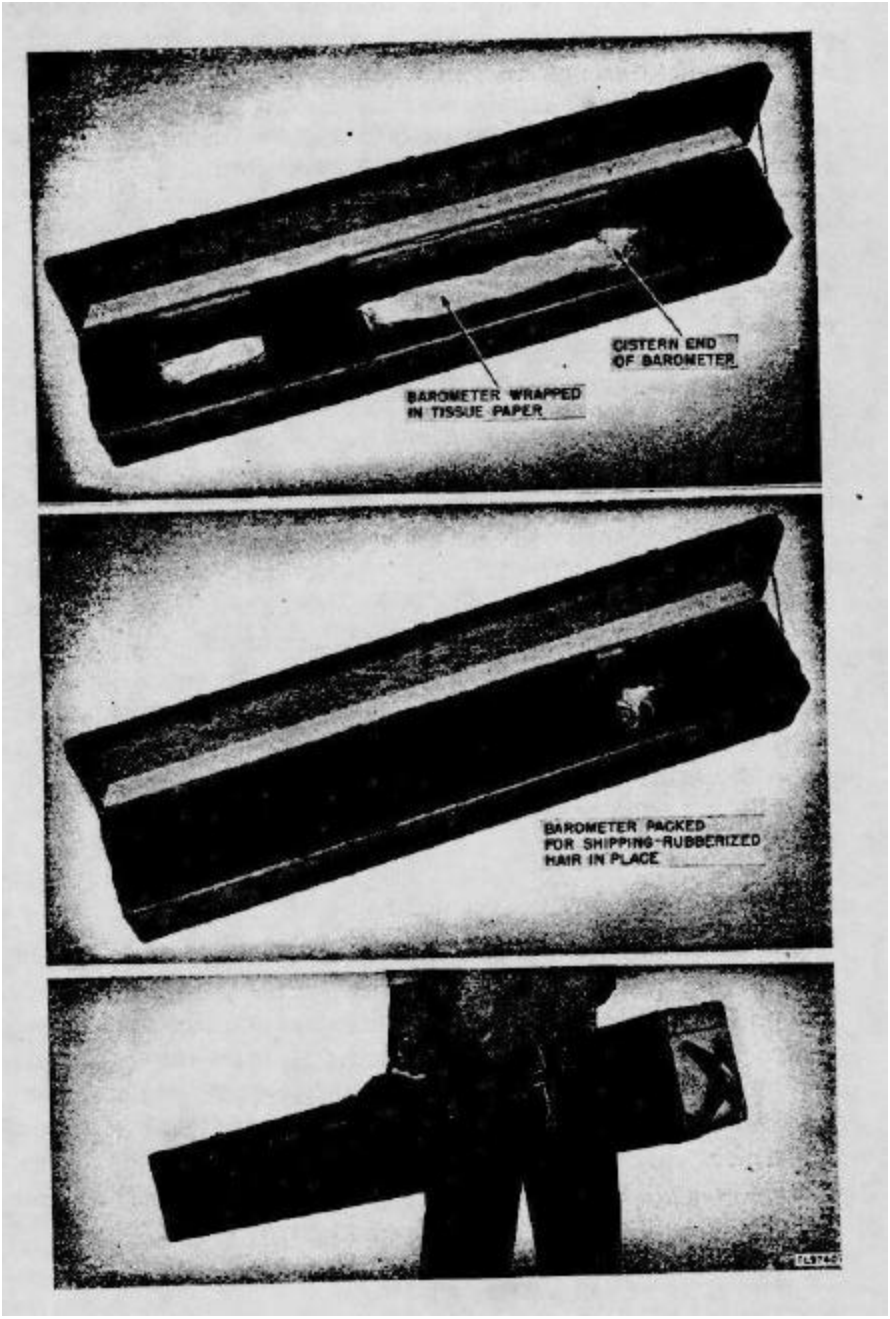


Figure 7. Proper method of packing and transporting Barometer ML-330/FM in carrying case.

in the space between the mounting panel and the actual back of the case are two fluorescent lights which, shining through the two pieces of opal glass, illuminate the upper part of the glass tube and the cistern of the barometer. Two spare bulbs are also mounted inside. The mounting case is wired and is provided with a 5-foot rubber cord and a plug for connecting to an electrical outlet. A switch in the center of the mounting panel provides for operation of the lights in the case, and a second switch at the bottom of the case provides for cutting off the lights automatically when the doors of the mounting case are closed.

7. CARRYING CASE FOR BAROMETER ML-330(*)/FM.

The carrying case for Barometer ML-330(*)/FM is a sturdy plywood box, rectangular in shape, painted olive drab outside and varnished inside. The case opens longitudinally and is 51 inches long by 8 inches square. It has metal corners and is fastened with three trunk catches. The lid is 1½ inches deep and is attached by two piano hinges. A handle is provided for transporting the case by hand. Rounded pieces of wood are attached to one end of the carrying case in such a manner that the case cannot be stood on this end. (When the barometer is packed in the carrying case the cistern is placed toward the end to which these rounded pieces are attached (Fig. 7).) This is done so that during transit the cistern of the barometer will be higher than the barometer tube.

8. READING GLASS.

Two low-power reading glasses with metal frames and wooden handles are furnished as component parts of the set. Experiments have proved that more accurate readings are obtained if the glass is used in reading the thermometer (par. 21), in setting the cistern (par. 22), and in reading the scales (pars. 24 and 25) of Barometer ML-330/FM. The glass should not be used, however, in adjusting the vernier (par. 23) to the top of the mercury column. More accurate readings are obtained when the glass is also used to read the indications of the precision aneroid barometers.

9. DIFFERENCES IN BAROMETERS ML-330(*)/FM.

All Barometers ML-330(*)/FM are identical except for a difference in the length of the scales. A comparison of the scale markings, together with the actual and

effective range of the scales, in both inches and millibars, is given in paragraph 5.

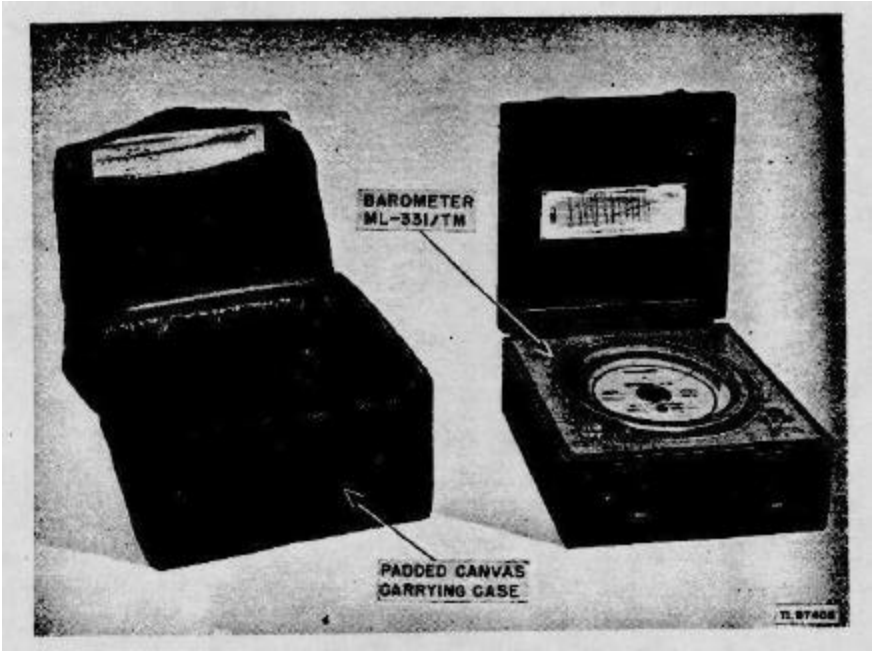


Figure 8. Precision aneroid barometer and carrying case.

10. BAROMETERS ML-331/TM, ML-332/TM, AND ML-333/TM.

a. Accuracy. Aneroid barometers have the advantage of being portable and rugged and are often used where the use of a mercury barometer would be inconvenient or impractical. Heretofore, aneroid barometers have been considered less dependable than mercury barometers, partly because of their design, and partly because of the conditions to which they are exposed. Barometers ML-331/TM, ML-332/TM, and ML-333/TM, however, are of sufficient accuracy that they may be used as inspection barometers to correct 1/4-inch bore mercury barometers.

b. General. Barometer ML-331/TM (or ML-332/TM or ML-333/TM) consists of a *metal case* which contains the *aneroid mechanism*, a *dial*, and a *pointer* which indicates the pressure on the dial. The metal case is shock-mounted in a *hardwood shockmounting case* which has a hinged lid. A padded canvas *carrying case* is provided for hand transportation of the barometers.

(*1*) *Metal Case.* The case containing the aneroid mechanism is kettle-shaped (8 inches in diameter by 4 inches deep) and is made of aluminum alloy.

The plate glass cover which protects the dial is sealed to a beveled aluminum bezel 3/4 inch wide and 1/8 inch thick. This bezel is attached to the rim of the base by means of

Figure 9. Barometer ML-331/TM in hardwood shock-mounting case, scale calibration correction chart in lid.

eight screws spaced equidistantly around the periphery of the case. A synthetic rubber gasket which fits into a circular groove on the rim of the base helps to make the juncture between the bezel and the base airtight. An opening in the cover glass permits adjustment of the pointer without opening the case. This

opening is plugged by means of a threaded metal sleeve with a flanged top which is cemented into the glass. The sleeve accommodates a flathead screw and a plastic washer. A connection on the side of the case (Fig. 10) provides for attaching two rubber tubes, one terminating at a valve that can be opened and closed, and the other terminating at an air pump.

(*2*) *Aneroid Mechanism*. A description of the aneroid mechanism is given in paragraph 47.

(*3*) *Dial*. The dial of the instrument is 7 inches in diameter and is white With black numerals and graduation lines. The scale is hand calibrated in half-millibars. A slotted screw in the dial permits adjustment of the pointer. A mirror ring approximately 3/16 inch in width, concentric with the scale and immediately inside, reflects an image of the pointer and provides a means of eliminating parallax error in reading the scale.

(*4*) *Pointer*. The pointer is made of three sections of fine aluminum tubing and is flattened vertically at the indicating end. It is damped to the pointer shaft by a small setscrew.

(*5*) *Hardwood Shock-mounting Case*. The metal case of Barometers ML-331/TM, ML-332/TM, and ML-333/TM is shockmounted in a hardwood case 11 inches square by 5 inches deep. The case is painted olive drab, has a hinged cover, and is fastened by two metal trunk catches. The metal case fits down into the wooden case, the rim of the metal case resting against a 3/4-inchwide adjustable aluminum ring that is seated upon four wooden supports well padded with sponge rubber. The four supports are positioned in the center of each of the four sides of the wooden case; they hold the metal case firmly in place and reduce the effect on the aneroid mechanism of shocks occurring to the wooden case. The bottom of the metal case is seated upon four rubber cushions in the bottom of the hardwood case. A 10-inch square aluminum plate with an opening 8 3/4 inches in diameter is fastened to triangular wooden supports in each corner of the hardwood case by means of four screws, one in each corner of. the plate. Threaded metal sleeves countersunk in the corner supports receive the four screws. When the screws are removed, the entire barometer case, the aluminum plate, and adjustable ring may be removed from the hardwood case.

(*6*) *Valve and Air Pump.*

(*a*) A valve is mounted on the under side of the aluminum plate near the lower right-hand corner, and an air pump is similarly

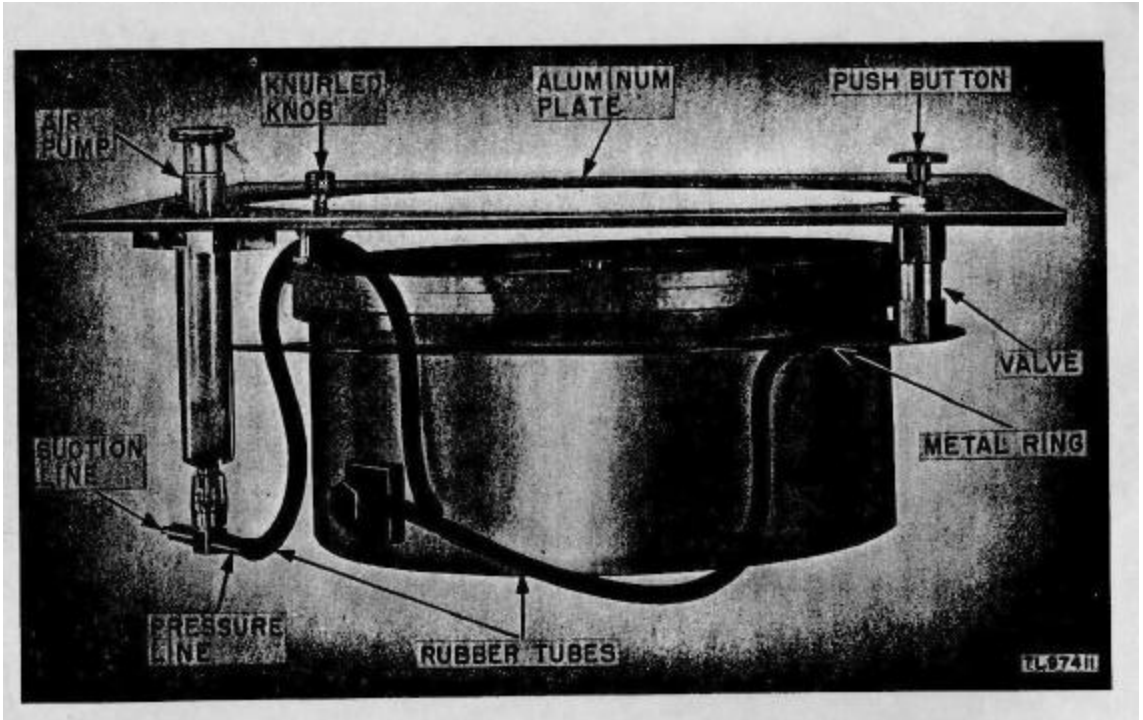


Figure 10. Metal case of precision aneroid barometer removed from hardwood shock-mounting case.

mounted near the lower left-hand corner of the plate (fig. 10). A push button which operates the valve projects through to the top of the aluminum plate. The air pump consists of the barrel and plunger of a glass hypodermic syringe provided with a suitable valve to permit air to be pumped either into or out of the metal barometer case. The top of the plunger of this pump projects through the top of the aluminum plate, thus permitting operation of the pump when the lid of the wooden case is raised. Two pieces of rubber tubing connect the valve and the pump to the barometer case (par. 10b(1) above).

(b) The purpose of the valve is to permit the metal barometer case to be either sealed completely from the outside air or opened to it so that the pressure in the case will be equal to that of the outside air.

(c) The tubing from the case to the pump passes through a mechanism which, in the closed position, pinches the tubing shut. In the open position of the mechanism the tubing is open and air passage through it is unhampered. A knurled knob which operates this mechanism projects through the top of the aluminum plate near the pump plunger (Fig. 10). To close the mechanism and pinch the tubing, turn the knurled knob in a clockwise direction as far as possible. To open the mechanism, turn it counterclockwise not more than three complete turns. Further turning may result in loss of certain small parts.

(d) When the push button operating the valve is depressed, the valve is closed and the barometer case is sealed from the outside air. When the push button is raised, the valve is opened. Closing the lid of the hardwood case automatically depresses the push button and seals the case. *Raising the lid, however, does not open the valve; the push button must be manually raised to open it.*

(*e*) The purpose of the pump is to provide a means of controlling the air pressure within the metal barometer case when the valve is closed and the case is sealed from the outside air. It will be noted that a T-shaped brass tube projects from the bottom of the pump. One end of this tube is a pressure line, the other a suction line. Operation of the pump draws air in through the suction end of the tube and forces it out through the pressure end. Depending upon which end is connected to the barometer case, the pressure inside the case may be decreased or increased by operation of the pump. Since it is anticipated that by far the greatest use of the pump will be to increase the pressure in the case, the barometer, as received in the field, has the rubber tube.

connecting the pump to the case attached to the pressure outlet of the pump.

(*f*) The purpose of the tube-clamping mechanism is to provide a means of cutting off the pump from the remainder of the barometer case. The valve in the pump is fragile and may frequently leak, making it impossible to seal the

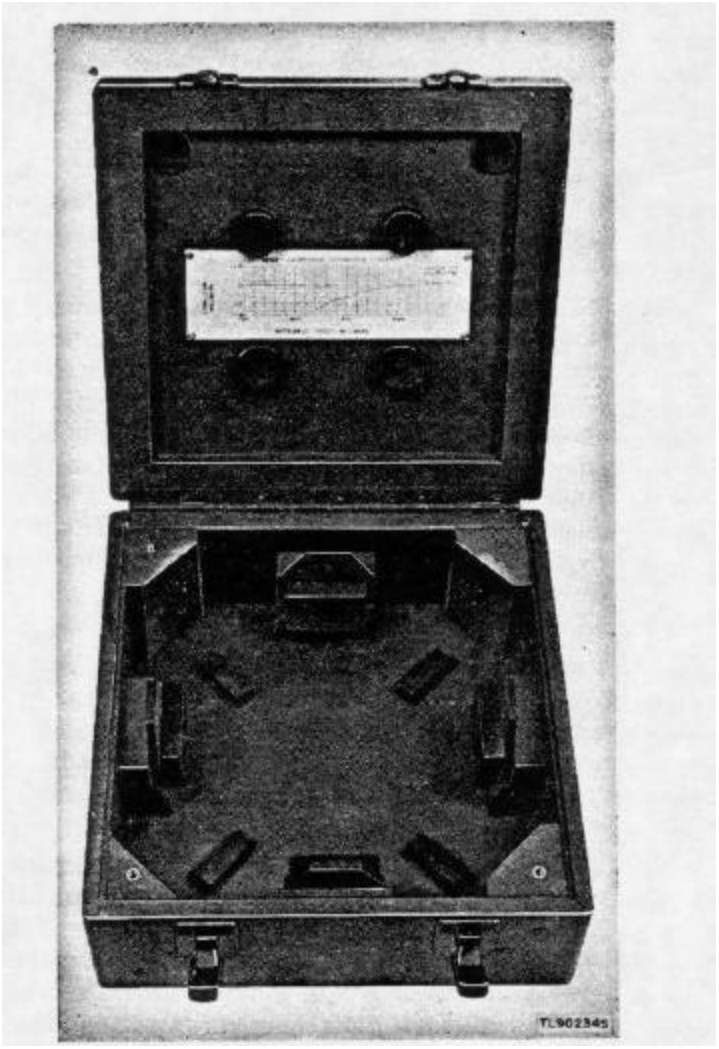
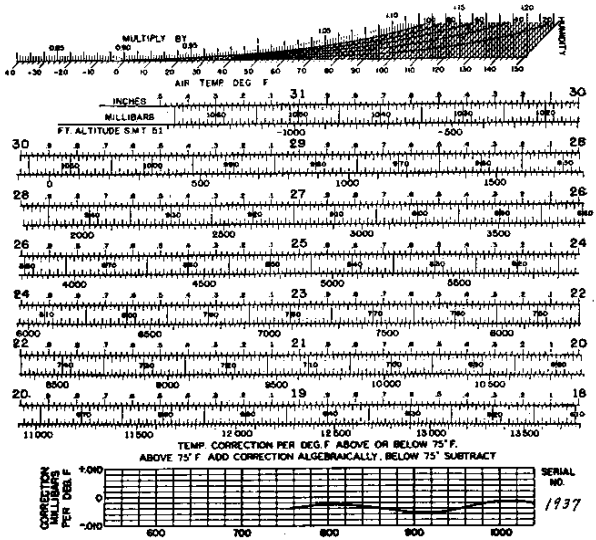


Figure 11. Hardwood case showing rubber shock mounts.

barometer case. The tube-clamping mechanism should be in the closed position, thus pinching shut the tube from the pump at all times except when the pump is actually being operated.

(*g*) Four circular rubber disks are glued in the lid of the hardwood case to protect the cover glass of the barometer case. Two smaller rubber disks are glued in the front corners of the case to hold the pump and valve in a closed position when the lid is closed. A scale calibration correction chart for each instrument is also mounted in the lid of the wooden case.

AIR TEMP AND RELATIVE HUMIDITY CORRECTION FACTOR FOR ALTITUDE



INSTRUMENT SCALE - MILLIBARS TL97412

Figure 12. Temperature correction and pressure conversion chart.

c. Temperature Correction and Pressure Conversion Chart. An individual chart for correcting pressure readings for temperature and for converting pressure readings from millibars to inches of mercury is provided with each Barometer ML-331/TM, ML-332/TM, and ML-333/TM. The temperature correction is applied to each reading of the barometer. The chart is mounted on an aluminum sheet 9 1/4 inches square and is carried in a pocket in the lid of the carrying case.

d. Scale Calibration Chart (Fig. 9). A scale calibration correction chart, mounted in the lid of the wooden barometer case, represents the deviation of the instrument from the secondary-standard calibration equipment located at Anniston Army Depot at the time the instrument leaves the depot. This correction is determined for each individual instrument over the entire range and must be applied to each reading of the aneroid barometer.

secondary calibration equipment at Evans Signal Laboratory, at the time the instrument leaves the laboratory. This correction is determined for each instrument individually over its entire range and must be applied to each reading of the aneroid.

e. Carrying Case (Fig. 8). Barometers ML-331/TM, ML-332/TM, and M-333/TT are transported in lightweight carrying cases made of water-repellent canvas padded with shock insulation material and lined with a rubberized fabric. A flap, fastened with six snap fasteners, insures a rainproof seal. When the barometer leaves Anniston Army Depot, the aluminum temperature correction and pressure correction chart and copies of the required forms are placed in the pocket of the case lid. A webbing handle is provided for carrying the case.

11. RANGE OF BAROMETERS ML-331/TM, ML-332/TM, AND ML-333/TM.

Barometers ML-331/TM, ML-332/TM, and ML-333/TM are calibrated to indicate atmospheric pressure over the following ranges:

Model	Range	Extent of scale	Approximate upper limit of elevation at which instrument can be used
Barometer ML-331/TM	200 mb	1040 to 840 mb	5,000 ft
Barometer ML-332/TM	295 mb	1040 to 745 mb	8,000 ft
Barometer ML-333/TM	490 mb	1030 to 540 mb	16,000 ft

12. DIFFERENCES IN BAROMETERS ML-331/TM, ML-332/TM, AND ML-333/TM.

Barometers ML-331/TM, ML-332/TM, and ML-333/TM are identical-except for differences in the scale range (par. 11) and slight differences in the construction of the aneroid mechanism which these differences in range make necessary. This paragraph also lists the upper limits of elevation above sea level at which the instruments can be used. Slightly greater readability of the scale and more accurate readings may be obtained from Barometer ML-331/TM due to the shorter range. (1040 to 840 mb) and the consequent expansion of the scale.

SECTION II. INSTALLATION AND ASSEMBLY

CAUTION Do not remove Barometer ML-330/FM from its carrying case until the mounting case has been installed (par. 14).

13. SITING OF BAROMETER ML-330(*)/FM.

a. Protection. Barometer ML-330(*)/FM is always installed indoors in its mounting case. The building in which it is installed should be well constructed in order to give maximum protection to the instrument from sun, rain, wind, vibration, excessive temperatures, and rapid temperature changes. The barometer should be mounted on a firm, vibration-free support on or near an inside wall. Avoid drafts or air currents such as might be caused by a door, a chimney opening, or a ventilator. Such currents, if of high or variable velocity, may produce a suction action or "pumping" which will cause fluctuations in the height of the mercury column. This effect will also be noticed when high, gusty winds are blowing. Such conditions often make it difficult to adjust the vernier accurately to the top of the mercury column; in fact, such conditions can render barometer readings worthless. (See note preceding paragraph 21.)

b. Temperature. The place chosen for installation of the barometer should be subjected to a minimum of temperature changes. Never place it near a radiator, a stove, a crack in the wall, or a window or door that is likely to be opened to the outside. While extremes of heat or cold do not damage the instrument, rapid temperature changes cause the thermometer and the brass case to respond more quickly than does the mercury; thus temperature corrections applied to the barometer readings are in error.

c. Lighting. Choose a position for the barometer where the scales are well-lighted by both natural and artificial light. (Fluorescent lights installed inside the case provide light for setting the cistern and adjusting the vernier.)

d. Height. Install the barometer mounting case so that the scale marking of the mean prevailing barometric pressure at the station is approximately at eye level of a person of average height. (The 30-inch mark is average for sea level.) Since various observers who will read a given barometer are usually of different heights, provision must be made to enable each observer to stand in a normal, relaxed position when making the reading. *The observer must not stand on tiptoe to read the barometer.* A taller person may stoop to obtain an accurate reading, but shorter persons must be provided with a stool, platform, or box to stand on.

e. Illustration of Favorable Location for Barometer. For purposes of illustration it may be supposed that the room in which the barometer is to be installed has windows across the north wall; an outside door is on the south wall; a radiator and a door to another

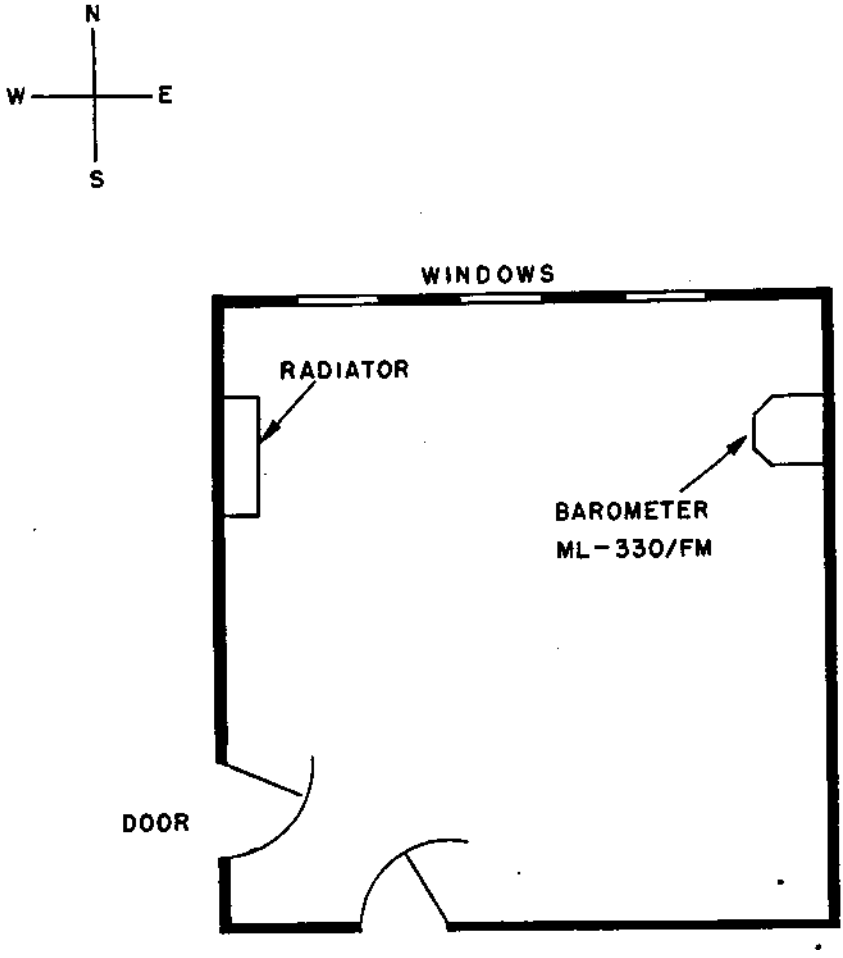


Figure 13. Floor plan showing favorable location for mercury barometer.

room are on the west. Thus the most favorable position for the barometer is on the east wall, near enough to the windows that the barometer scales are well-lighted during the daytime. Figure 13 illustrates the layout of such a room.

14. INSTALLATION OF MOUNTING CASE FOR BAROMETER ML-330/FM.

a. Preparation.

(*1*) Walls of buildings are frequently subject to vibration, either from people moving in the building or from the wind. It is difficult to read a barometer accurately under such conditions. If the walls of the room vibrate, or if they are made of some material that prevents the case from being mounted, it is possible, if the floor is made of concrete or some other firm foundation, to build a vertical rack from the floor and mount the barometer on it. If both the wall and the floor are subject to vibration, the construction of a concrete pier is recommended. This pier should extend through the floor at least 30 inches into the ground beneath, and should not be in contact with any part of the building. A rack for mounting the barometer case should be attached to the pier.

(*2*) An electrical outlet or an extension cord must be provided for connecting the plug and cord of the mounting case.

(*3*) A suitable vertical wall or rack having been provided, use a plumb bob or a stone attached to a piece of cord to insure vertical mounting of the case.

b. Mounting.

(*1*) The mounting case is well-wrapped in corrugated cardboard and several layers of tough kraft paper, and is tied with strong cord. Remove these wrappings.

(*2*) *Screw the case to the wall, do not nail.* The screws will be found inside the mounting case. Open the mounting panel to gain access to the screw holes which are in the back panel of the case (Fig. 6). The mounting panel is opened by loosening the two wing screws on the edge of this panel. (It may be necessary to place two wood crosspieces on the wall and mount the case to these supports.)

(*3*) Insert the screws in the top of the case first. Before inserting the screws at' the bottom of the case, test the vertical alignment of the case by use of the plumb bob. When it is vertical, insert the bottom screws and again test for verticality.

(*4*) Unscrew the three screws in the centering ring until the ends are flush with the inside circumference of the ring. Remove the knurled nut on the support at the top of the mounting case.

15. INSTALLING BAROMETER ML-330(*)/FM.

a. Unpacking Carrying Case.

(*1*) Place the plywood carrying case containing the barometer

on a table or other flat surface and open it. The barometer is packed in rubberized hair.

(*2*) Remove as much of this packing material as is necessary*, but do not destroy it.*

(*3*) Remove the barometer from the case and very slowly and carefully turn it upright.

(*4*) Replace the packing material in the carrying case and put .the case in a dry, safe place.

b. Hanging Barometer.

(*1*) Pass the cistern end of the barometer down through the centering ring near the bottom of the mounting case.

(*2*) Put the swivel hanger over the support at the top of the mounting case, being careful to fit the point of the screw in the swivel hanger into the depression on the support.

(*3*) Replace the knurled nut on the support.

c. Turning Adjusting Screw. Turn the cistern adjusting screw counterclockwise until the mercury in the cistern is lowered sufficiently to expose all of the ivory point. *Never lower the mercury more than 1/4-inch below the ivory point.*

d. Opening Air Vent Screw. After the mercury has been lowered in the cistern, open the air vent screw two full turns to admit air to the cistern. *Do not remove the screw.*

e. Testing for Verticality.

(*1*) As the barometer swings from the hanger, the instrument itself acts as a plumb line and takes a vertical position. Carefully turn the screws in the centering ring until each screw just touches the brass ring at the bottom of the barometer cistern. Then tighten all three screws against this ring without moving the barometer from its vertical position.

(*2*) After the screws in the centering ring have been tightened, verticality should be further tested by turning the cistern adjusting screw very slowly until the mercury in the cistern just makes contact with the ivory point.

(*3*) Slowly turn the barometer about its longitudinal axis through 360° and note whether during this rotation the ivory point and the mercury surface remain in contact as at the beginning of the rotation. If proper contact is maintained as the barometer is rotated, the barometer is in proper vertical position. in observing the position of the ivory point with relation to the mercury

surface, it may prove advantageous to use the reading glass which is furnished with the barometer.

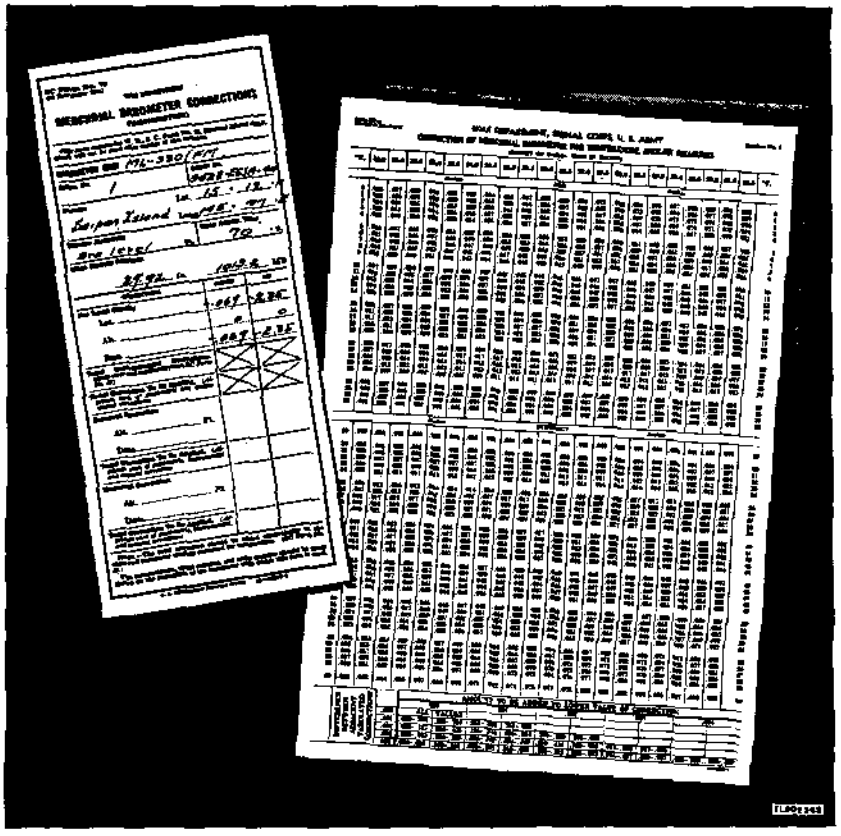


Figure 14. Forms supplied for use with Barometer ML-330/FM.

f. Mercurial Barometer Correction Form. The mercurial barometer correction form accompanies Barometer ML-330 (*) /FM when it leaves Anniston Army Depot. This form gives the instrumental correction, since this may be a variable quantity throughout the scale. The total gravity correction should be applied to each reading of the barometer. Install the mercurial barometer correction form beside the barometer. This correction form is applicable as long as the barometer is used at the original location. If the instrument is moved to another location, it will be necessary to compute gravity corrections in accordance with the instructions given in paragraphs 26c(2) and 56.

g. Thermometer Correction. A correction for the attached thermometer on each mercurial barometer is determined before the barometer leaves Anniston Army Depot. If the correction is large enough to introduce an error in the barometer reading, then the correction is typed on a sheet titled "Results of Thermometer Test" and placed in the carrying case of one of the precision aneroid barometers, in the set. If this sheet is furnished, it should be removed and installed near the mercurial barometer, and the corrections applied to thermometer readings as described in paragraph 21. If the correction sheet is lost, request a duplicate from Anniston Army Depot, Anniston, Alabama, by giving the serial number of the mercurial barometer and thermometer. The serial number for the thermometer is etched on the backplate; therefore, the thermometer must be removed from the casing.

16. REPACKING BAROMETER ML-330(*)/FM FOR TRANSPORT.

CAUTION: Read this paragraph carefully before removing the barometer from its mounting case. Irreparable damage may be done to the instrument by careless handling. Never remove the barometer from the case while the mercury is at or near its normal height.

a. Removing Barometer from Mounting Case.

(1) Close (tighten) the air vent screw.

(*2*) *Very slowly* turn the adjusting screw at the bottom of the cistern until the top of the mercury column rises to a level where it is just visible at the top of the slot in the metal tube. *Do not turn the adjusting screw too far. The mercury must not touch the top of the tube.* One turn too many may force the mercury through the joints of the cistern or the pores of the leather bag and cause serious injury to the instrument.

(*3*) Remove the knurled nut from the top support of the mounting case.

(*4*) Loosen the three screws in the centering ring so that the barometer may be lifted out.

(*5*) Remove the barometer from its support and incline it *very slowly*, listening for a *metallic click* that indicates the mercury has touched the top of the glass tube. Continue inclining the barometer until the tube is horizontal.

(*6*) A bubble now will be noticeable in the mercury in the cistern. It may be necessary to tap the cistern and wait a few moments for this bubble to form. For transportation, the bubble should be about the size of a dime. It will probably be necessary to readjust the cistern adjusting screw until the bubble is of the proper size.

***b*. Packing (Fig. 7).**

(*1*) Wrap the barometer well in tissue paper.

(*2*) Place the barometer in the carrying case, packing the rubberized hair around it in exactly the same manner in which it was originally packed. Make sure there is sufficient packing material at each end so that the barometer is well-cushioned and cannot strike the ends of the case. Take time to fit the sections of hair around the instrument in the best possible manner for safe transportation. (See figure 7 for illustration of proper packing.)

(*3*) Close the case and fasten the catches.

17. Transporting Barometers

a. The accuracy of the mercurial and precision aneroid barometers will be affected by improper handling in shipment. Barometers should be transported by hand as long as they are in actual service.

b. When it becomes necessary to return a barometer for repair or calibration to Anniston Army Depot, notify NICP, Philadelphia, Pennsylvania, who is responsible for requisitions and funding requirements as prescribed in SB 11492 before returning the equipment to Anniston, Alabama.

c. Special handling instructions are required for shipment of mercurial and precision aneroid barometers (para 32).

> ***Note.*** **Air shipment of aneroid barometers requires low-level flights and special precautions as described in paragraph 32; otherwise, permanent damage will result.**

18. INSTALLATION OF BAROMETERS ML-331/TM, ML-332/TM, AND ML-333/TM.

There is no permanent installation of the precision aneroid barometers. Instructions for positioning the instruments when readings are being taken are given in paragraph 27a.

19. REPACKING BAROMETERS ML-331/TM, ML-332/TM, AND ML-333/TM.

No instructions are necessary for repacking, since these barometers are always transported by hand. They should, when in transport, be inclosed in the carrying cases.

20. BAROMETERS ML-331/TM, ML-332/TM, AND ML-333/TM AT REST.

When the precision aneroid barometers are located at the Regional Control Office or at any location of approximately the same average pressure, the lid must be open and the push button raised. The lid may be propped open by resting the lip of the

catch against the lower part of the catch (Fig. 15a), or by inserting a small block or eraser between the lid and base (Fig. 15b). This is done so that the valve fill remain open and the instrument can

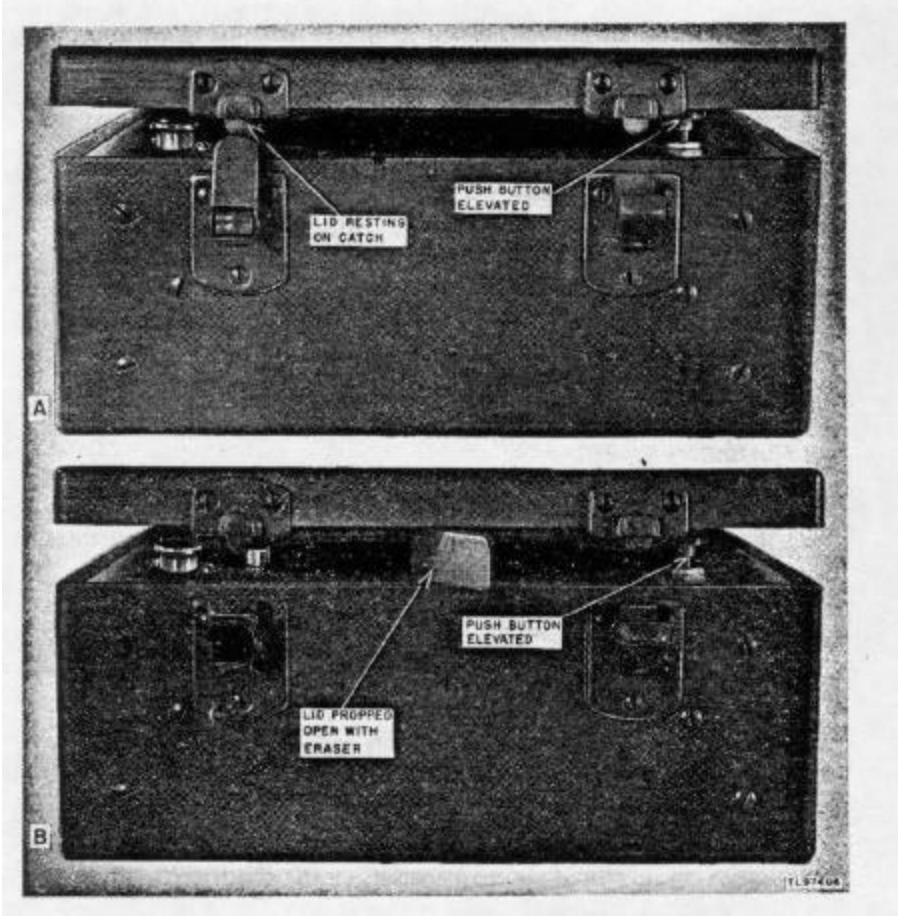


Figure 15. Methods of keeping case open when precision aneroid barometer is at rest.

respond to changes in ambient pressure and not to changes in pressure due to variations in temperature of the volume of air confined within the case.

PART TWO

OPERATING INSTRUCTIONS

SECTION III. OPERATION OF BAROMETER ML-330/FM

NOTE: Do not attempt to take accurate readings on a mercurial barometer that has just been installed. First allow the instrument to come into equilibrium with its environment. It should hang undisturbed for at least 1 week, and preferably 3 weeks, before readings are made to which any degree of significance is attached. Observers should realize that conditions can be so unfavorable as to render barometer readings unreliable. Such conditions occur during strong gusty winds when the level of the mercury pumps up and down in the tube, or when the rate of change in the ambient temperature exceeds 3°F per hour. Under this latter condition the true temperature of the mercury lags behind the temperature indicated by the thermometer sufficiently to cause appreciable error.

21. READING ATTACHED THERMOMETER.

a. Reading Scale.

(*1*) Stand directly in front of the thermometer and take the reading to the nearest 1/4° F or 1/10° C. Use the reading glass to read the graduations on the thermometer (Fig. 16).

(*2*) The line of sight must be perpendicular to the thermometer at the top of the mercury thread. Do not read the thermometer from a position either above or below the top of the mercury thread or parallax will result. (Parallax is an apparent displacement in the position of an object caused by a change in the position of the observer.) Readings taken when the top of the mercury thread is not at eye level may cause errors of several tenths of a degree. Figure 17 is an illustration of this condition.

(*3*) Read the Fahrenheit scale if the barometer reading is to be taken in inches.

(*4*) Read the centigrade scale if the barometer reading is to be taken in millibars.

b. Applying Correction.

(*1*) Most of the thermometers supplied with Barometer ML330/FM are sufficiently accurate that their readings do not require

Figure 16. Correct and incorrect positions for reading thermometer scales.

correction. If the thermometer attached to a particular Barometer ML-330/FM required correction, a sheet titled “Results of Thermometer Test" is supplied. The corrections indicated on

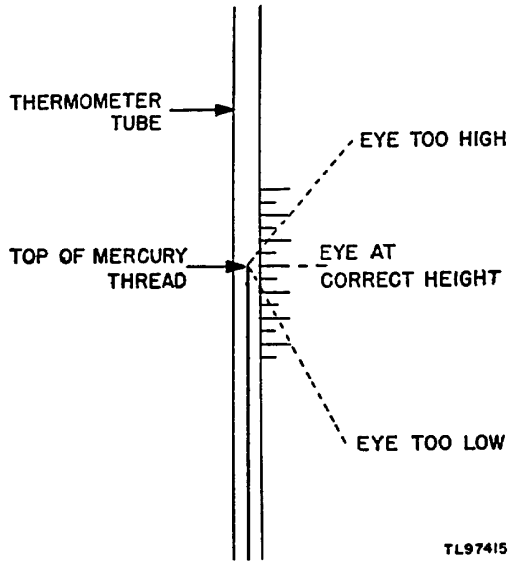


Figure 17. Sketch showing how parallax causes error in reading scales.

this sheet should be applied to all thermometer readings. in practically every case, corrections will be necessary over only a very limited part of the thermometer range. in the second column of the correction sheet labeled *Temperature of Bath ° F.*, find the temperature nearest to the one read on the thermometer scale in subparagraph a above. The correction to be applied to the reading is in the last column.

(*2*) Apply the correction listed to obtain the true temperature. Corrections should be added algebraically.

22. SETTING THE CISTERN.

The operation which is known as setting the cistern consists of adjusting the level of the mercury in the cistern to the ivory point.

a. Preliminary.

(1) Open the doors of the mounting case as far as they will go so that the instrument is completely exposed.

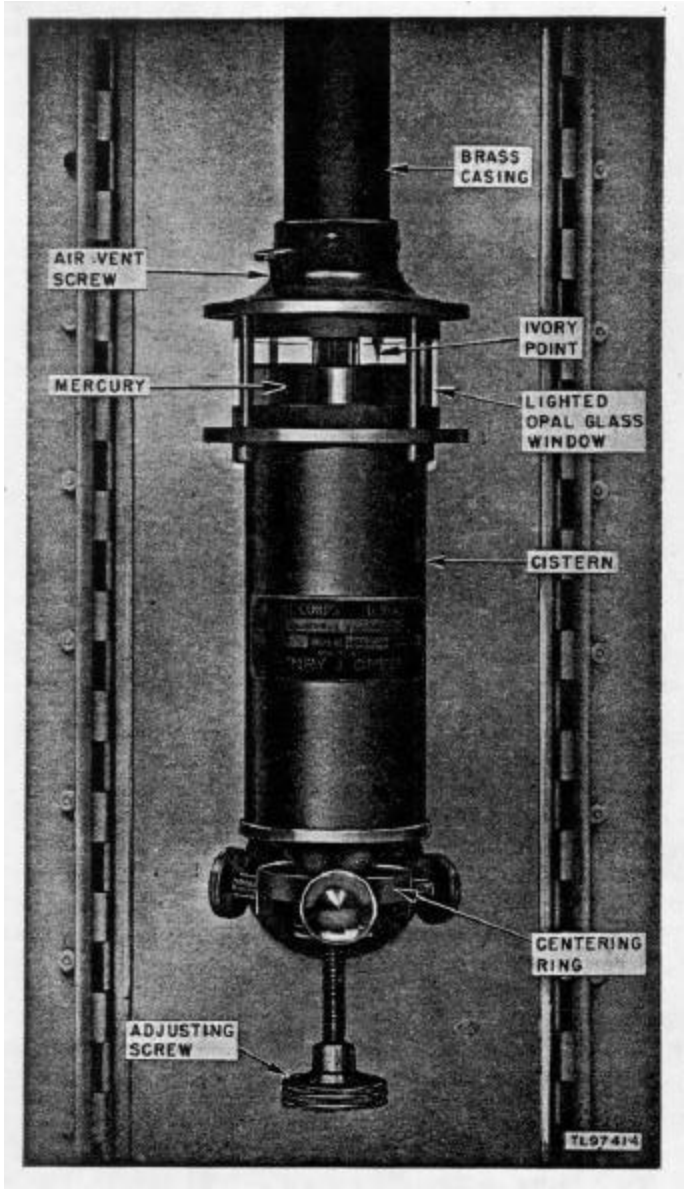


Figure 18. Ivory point in proper contact with mercury surface.

(2) Opening the door of the mounting case automatically closes the switch at the bottom of the case and applies power to the lighting circuit. Depress the switch on the mounting panel (the uppermost of the two switches) for a few moments until a faint glow appears behind the opal glass windows, then release the switch. The lights will come on. (The lights are automatically turned off by dosing the doors of the case.)

(3) Lightly tap the glass cylinder of the cistern to allow the mercury to assume a normal curvature where it contacts the glass.

b. Procedure.

(1) Turn the adjusting screw to lower the surface of the mercury in the cistern until it is definitely below the tip of the ivory point. **Be careful not to turn the adjusting screw far enough to expose the lower end of the glass tube. To do so permits entrance of air into the tube which will ruin the barometer. As a precaution, never lower the mercury surface more than 1/4 inch below the ivory point.**

(2) Now slowly turn the adjusting screw of the barometer, raising the level of the mercury until only the slightest thread of light can be detected between the ivory point and the mercury.

> **NOTE: Because of the small opening in the air vent screw (par. 4e), the constriction in the bore of the glass tube at the lower end, and the relatively large quantity of mercury which must pass through this constriction, the adjusting screw must be turned *extremely slowly.* Turning the screw at a rate which may be entirely appropriate for Barometer ML-512-(*) may momentarily compress the air in the cistern. When the pressure readjusts Itself, it may be found that too much mercury has been raised so that the ivory point will be depressed into the mercury. For this reason the setting must be checked 15 to 30 seconds after It is completed to make sure that the ivory point and mercury surface are still in proper contact.**

(3) Use of the reading glass will result in a more accurate setting of the cistern. As the adjusting screw is turned, sight along and parallel to the mercury surface until no light can be seen between the ivory point and the mercury surface.

(4) Still using the reading glass, check this setting by sighting on the point of contact at an angle of about 30° with the mercury surface. Sighting at this angle makes it easy to determine whether or not the ivory point is making an indentation in the mercury.

(5) If there is more than the slightest dimple where the ivory point makes contact with the mercury surface, reset the cistern

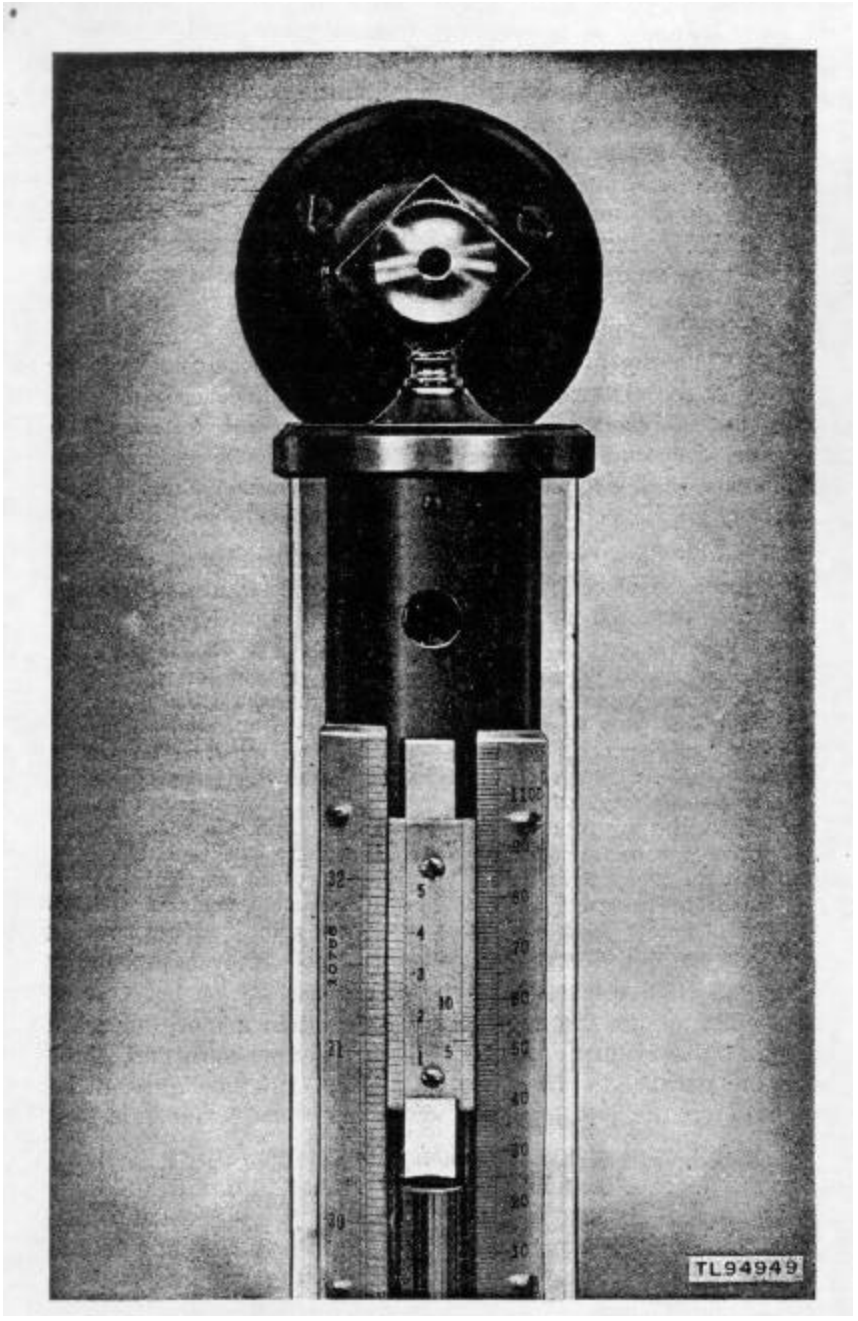


Figure 19. Rounded summit of mercury meniscus before setting vernier.

by turning the adjusting screw until the mercury is lowered enough to again admit light between the mercury and the ivory point. Again slowly raise the mercury surface and use the reading glass while sighting along and parallel to the mercury surface and check the setting by sighting at an angle of about 30°.

(6) If, when sighting on the point of contact at a 30° angle, no depression exists, turn the adjusting screw very slowly until a minute circle can be detected in the mercury around the ivory point.

NOTE: In setting the cistern, be careful not to overshoot. Always bring the mercury up to the ivory point, never down. If it is necessary to reset the level of the cistern, lower the mercury enough so that light may be seen between the ivory point and the mercury surface and then bring it up.

23. ADJUSTING VERNIER.

a. Tap the metal casing lightly with the fingertips near the top of the mercury column. This is done to assure the formation of a proper meniscus (the rounded summit of the mercury in the glass tube). It will be noted that the, meniscus of the mercury column of Barometer ML-330(*)/FM is less rounded and less dome-shaped than the meniscus of Barometer ML-512-(*). This is due to the larger bore of the tube in Barometer ML-330(*)/FM.

b. Turn the knurled thumbscrew (Fig. 3) to raise the vernier *above* the top of the mercury.

c. Then *lower* the vernier slowly until its front lower edge, the top of the mercury meniscus, and the back lower edge of the vernier are directly in line with the eyes held on the same level.

d. As the vernier is lowered, the lighted area of the opal glass window, as seen through the barometer tube between the bottom of the vernier and the top of the mercury column, becomes narrower. When the vernier is near proper adjustment, this lighted area appears as a narrow slit; it is straight across the top and rounded upward in the center across the bottom (Fig. 20).

e. Adjust the vernier until this slit is so narrow it can barely be seen as a continuous streak of light across the opening. in making this adjustment, it is particularly important that the observer's eye be on the same level as the lower edge of the vernier. Check the eye level by slowly moving the eye very slightly above and below the vernier. As the eye is moved up and down, the edge of the vernier will cut off the slit of light completely.

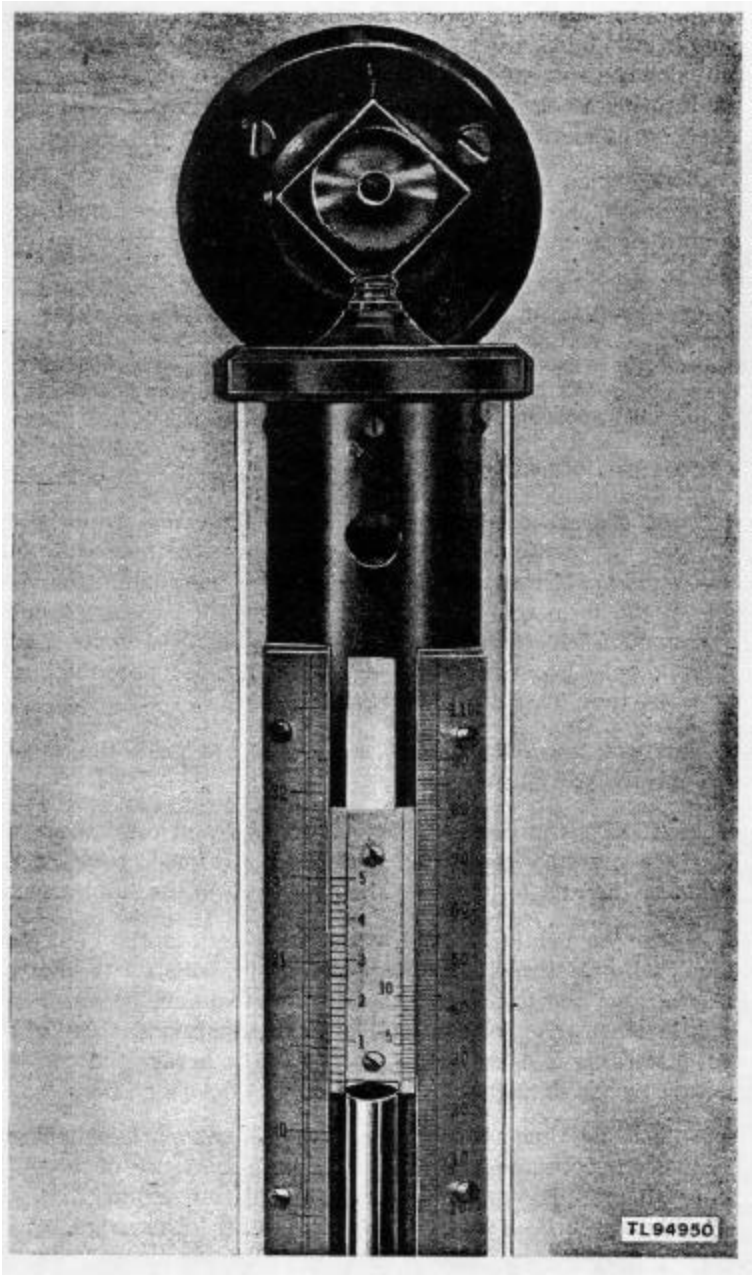


Figure 20. Vernier properly set on mercury meniscus, showing triangular areas of light.

When the slit appears to be the widest, the observer's eye is at the proper level.

f. Now lower the vernier until the slit of light just disappears in the center where the mercury column is highest. Two small, somewhat triangular areas of light will then be seen on each side of the center of the mercury column (Fig. 20). The vernier is now properly adjusted and the scales may be read.

24. READING INCH SCALE (Fig. 21).

a. Value of Scale Divisions.

(*1*) The inch scale is graduated in twentieths of an inch. Expressed decimally, this is .05 inch. Integral inch divisions are numbered; inch and half-inch graduations are the same length and are longer than the other graduations; 1-inch graduations are longer than .05-inch graduations.

(*2*) Twenty-five divisions on the inch vernier are equal to 24 divisions on the adjacent inch scale.

(*a*) This makes the height of the inch vernier scale (24 X .05) 1.20 inches.

(*b*) Since the inch vernier scale has 25 divisions, each division is equal to (1.20 ÷25) .048 inch.

(*3*) Thus, the difference between a division on the inch scale and a division on the inch vernier scale is (.050 - .048) .002 inch.

(*4*) Whenever the zero line (the lowest graduation) of the inch vernier is exactly coincident with one of the inch scale graduations, the first vernier graduation above the zero line will be .002 inch below the next inch scale graduation, the second vernier graduation above the zero line will be .004 inch below the next inch scale graduation, etc.

(*5*) Whenever the zero line is not in coincidence with an inch scale graduation, the vernier graduation that *is* in coincidence, or is nearest to being in coincidence, indicates how many times .002 inch the zero line is from the nearest inch scale graduation.

(*6*) For convenience in reading the vernier, the fifth graduation above the zero line is marked with the number 1, indicating (5 X .002) .01 inch; the tenth graduation is marked with the number 2, indicating (10 X .002) .02 inch; the fifteenth graduation 3, indicating (15 X .002) .03 inch; the twentieth graduation 4, indicating .04 inch; and the twenty-fifth graduation 5, indicating .05 inch.

b. Reading.

(*1*) If the zero line of the inch vernier scale coincides *exactly* with any graduation on the inch scale, that inch graduation is the height of the mercury, and the vernier is not read further.

(*a*) If the zero line is coincident with a whole inch graduation, that designation is the height of the mercury.

(*b*) If the zero line is coincident with one of the graduations *between* whole inches, count the number of such graduations from

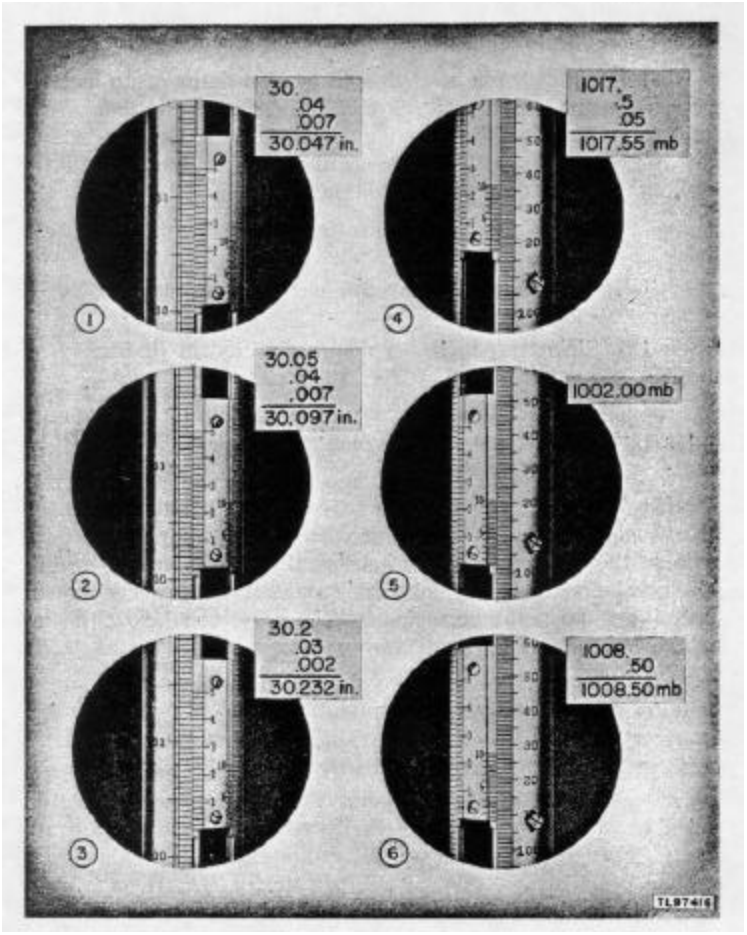


Figure 21. Sample readings of scales of Barometer ML-330(*)/FM, in inches and millibars.

the whole inch designations *below* the zero line. Add this amount to the whole inch reading. The result is the height of the mercury.

> **EXAMPLE:** If the zero line is coincident with the third graduations above 30, the reading is 30 plus .15 (3 X .05) or 30.15 inches.

(c) If the zero line of the inch vernier scale is not coincident with a graduation on the inch scale, look upward along the vernier until the vernier graduation closest in coincidence is found. That graduation determines the decimal portion of the reading.

(2) The following are three examples of how to read the inch scale and vernier:

(a) *Example 1* (*Fig. 21* (1)).

1. In this setting, the zero line of the vernier is above 30 inches and below 30.05.

2. Since the zero line of the vernier does not coincide exactly with a line on the inch scale, look upward along the scales until two lines are discovered to be in coincidence, or nearly so.

3. In this case, the third and fourth lines above 4 on the vernier coincide most nearly with a line on the inch scale.

4. Had the line marked 4 on the vernier scale coincided with a line on the inch scale, the reading would have been .04. Since coincidence is above this point, the reading will be more than .04.

5. If the third vernier line above 4 coincided exactly with a line on the inch scale, the reading would be increased by 3 times .002, or .006. If the fourth vernier line above 4 coincided exactly with a line on the inch scale, the reading would be increased by 4 times .002, or .008. Since the fourth vernier line above 4 is a little *below* the corresponding line on the inch scale, and the third vernier line a little *above* its corresponding line, the approximate reading is .007 more than .04.

6. This makes the total reading 30 inches, plus .04, plus .007, a total of 30.047 inches.

(*b*) *Example 2* (*Fig. 21* (2)).

1. This example illustrates an important point in reading the barometer. The reading from the inch scale is 30 inches, plus .05 (30.05).

CAUTION: Do not forget to add .05 to the final reading. Unless care is exercised in reading the scale, this amount may be overlooked and only the vernier reading added to the whole inch plus the .1 inch value. Whenever the zero of the vernier is above a .05 graduation and below the next .10 graduation on the inch scale, the .05 must be added to the reading.

2. Examination of the vernier shows that no line is in exact coincidence with a line on the inch scale. In this instance, as in the preceding one, the lines that are more nearly in coincidence are the third and fourth lines above 4. If the third line above 4 were in coincidence, the amount to be added would be 3 times .002, or .006. If the fourth line above 4 were in coincidence, the amount to be added would be .008. But since the one is a little above and the other a little below the corresponding lines on the inch scale, the approximate reading is between the two, and is .007.

3. Thus, the total reading is 30.05, plus .04 (since the lines most nearly in coincidence are above the figure 4 which represents .04), plus .007, or 30.097.

(c) *Example 3* (*Fig. 21* (3).)

1. In this instance the zero line of the vernier is above 30.20 and below 30.25.

2. Look up along the scales. The line on the vernier that most nearly coincides with one on the inch scale is the first line above 3.

3. Thus, the reading is 30.20, plus .03, plus .002, or 30.232 inches.

25. READING MILLIBAR SCALE.

a. Value of Scale Divisions.

(*1*) The millibar scale is graduated in whole millibars.

(*2*) Twenty divisions on the millibar vernier scale are equal to 19 divisions on the millibar scale.

(*3*) Thus each vernier graduation is 19/20 of a millibar, and the difference in length between a vernier graduation and a millibar scale graduation is 1/20 of a millibar or .05 mb.

(*4*) For convenience in reading the millibar vernier, the middle of the scale is marked with the number 5 which denotes (.5) millibar and the top graduation is marked with a 10, denoting 1.0 millibar.

(*5*) Whenever the zero line (lowest graduation of the millibar vernier) coincides exactly with a line on the millibar scale, the first vernier graduation above the zero line will be 1/20 millibar (.05) lower than the next millibar scale graduation, the second vernier graduation above the zero line will be 1/10 (.1) millibar below the next graduation on the millibar scale, etc.

b. Reading.

(*1*) When the zero line of the vernier coincides with a line on the millibar scale, the top line of the vernier will coincide with another line on the scale. The reading is then expressed in whole millibars represented by the line which coincides with the zero line of the vernier.

(*2*) When the zero line is not in true coincidence, read the millibar scale to the nearest whole millibar and then use the vernier. Look upward along the scales until a line is discovered that does coincide, and add this fraction, in tenths or five-hundredths of a millibar, to the whole millibar reading.

(*3*) The following are three examples of how to read the millibar scale and vernier.

(*a*) *Example 1* (*Fig. 21* (4)).

1. In this example, the zero line of the vernier is more than 17 millibars above 1000.00, making the reading 1017.00 plus some fraction of a millibar.

2. Since the zero line does not coincide, look up along the scale. The first line above 5 seems to be most nearly in coincidence. The 5 adds .5 to the reading, and the first line above 5 adds .05. The final reading is, therefore, 1017.55 millibars.

(*b*) *Example 2* (*Fig. 21* (5)) In this illustration the zero line of the vernier coincides exactly with the second line above 1000 on the scale, making the reading 1002 millibars.

(*c*) *Example 3* (*Fig. 21* (6)). In this instance the zero line of the vernier is above 1008.00 millibars on the scale. The line numbered 5 seems to coincide exactly, which makes the reading 1008.50 millibars.

26. CORRECTING OBSERVED READING.

a. Purpose.

(*1*) The observed reading of Barometer ML-330(*)/FM is not a true indication of atmospheric pressure. There are instrumental errors (explained below) which require correction. A correction must be applied also to compensate for the effect of gravity which varies with latitude and altitude.

(*2*) The *temperature* of the instrument at the time of reading requires still another correction since a change in temperature affects the length of both the metal scale and the mercury column.

(*3*) By the use of appropriate tables and information given on SC Form No. 79 and Form SC 437, section I, all of these corrections can be determined, in terms of inches and millibars, so that they can be applied to the observed reading of the barometer. When this has been done, the resulting reading represents true atmospheric pressure.

b. Instrumental Errors. Included under this heading is a combination of mechanical and natural errors encountered in constructing the instrument. Due to inherent characteristics of Barometer ML-330(*)/FM instrumental errors are minimized. By using a tube of larger bore and by careful construction and testing, these errors have been made much smaller than they are in Barometer ML-512-(*). They are still present, however, even though in reduced amount.

(*1*) *Capillarity*. In Barometer ML-330(*)/FM the top of the. mercury, or meniscus, in the glass. tube is somewhat convex because of the capillary action between the mercury and the glass. As a result, the mercury is depressed a slight amount and does not indicate the true height of the column. This error is very small. The maximum possible value, even if the meniscus should disappear entirely, does not exceed .005 inch. Capillarity is seldom constant, but it has been largely eliminated by adjusting the scale to compensate for the *average* capillary depression.

(*2*) *Imperfect Vacuum*. It is generally assumed that the space in the barometer tube above the mercurial column is a perfect vacuum, but this is seldom the case. Traces of air or water vapor which may be present in the tube exert a downward pressure upon the top of the column of mercury. In any good barometer the air and vapor present will be slight and correction for vacuum will be almost constant, provided the annual range of pressure for the station is not great. In Barometer ML-330(*)/FM, the error due to imperfect vacuum did not exceed .0005 inch when the instrument was calibrated. This error, however, may increase with time.

(*3*) *Scale Error*. The scale error of Barometer ML-330(*)/FM is extremely small, the total error due to engraving the scale never exceeding .001 inch at any point on the scale; generally it will be less than that amount.

(*4*) *Variable Instrumental Error.* In the past, instrumental errors have been determined for the prevailing surface pressure only. By the use of special calibration equipment the instrumental error for Barometer ML-330(*)/FM has been determined throughout the entire scale range at ½,-inch intervals.

(*5*) *Summary.* It is never possible, nor is it necessary, to know what part of the error is due to each of the three separate factors above. The instrumental corrections over the entire pressure range of the barometer have been determined and are entered in Form SC 437, section I. These corrections have been determined as a result of careful comparisons with extremely accurate standards of pressure. When obtaining corrected readings of Barometer ML-330(*)/FM, the instrumental error for the pressure listed in Form SC 437 which most nearly corresponds to the ambient pressure should be used. No attempt should be made by using personnel to readjust the scales of the barometer.

c. Gravity Corrections.

(1) When a barometer is placed at sea level, at approximately 45° latitude, the gravity has, by definition, a standard value and gravity and corrections are not applied to the barometer readings. At all other locations, corrections for variations in the local value of the gravity from the standard must be applied. The correction for gravity consists of a correction for latitude and altitude. These corrections can be determined, assuming theoretical gravity prevails, from table I (altitude) and table II (latitude) in this manual. There is generally a small difference (seldom alters the correction by more than a few thousandths of an inch) (para 44) between the true value of the local measured gravity and the calculated value. The gravity correction for the regional control station to which Barometer MIL-330 (*) /FSM is shipped has been determined by Anniston Army Depot and is inscribed on the mercurial barometer correction form which accompanies each barometer. This correction must be applied to each reading of the barometer and is based on actual gravity measurements or on the values interpolated from actual measurements. The magnitude of the correction may differ from the value obtained from the tables; therefore, for some stations, it has been necessary to use theoretical values of gravity.

(2) If the location of the regional control station is changed enough to alter the gravity correction by as much as .001 inch, a new gravity correction must be determined for the new location. Theoretically, a change of approximately 300 feet in elevation at sea level, or a change of approximately 20 minutes in latitude at 30-inch pressure and 45° latitude, is required to cause a change of .001 inch in gravity correction. Therefore, when the location of Barometer ML-330(*) /FM is changed by less than 10 miles, or by less than 150 feet in elevation, from the location for which a gravity correction was furnished by Anniston Army Depot, retain the last gravity correction. When a change in location and elevation is involved, a new correction should be requested if the change in the elevation exceeds 75 feet and the change in location exceeds 5 miles. As an emergency measure, until a more precise value can be obtained, a

new gravity correction, if required, can be computed in accordance with directions in paragraph 56. Application should be made through channels for a new gravity correction. The latitude, longitude, and the elevation of the new location should be given in the application. Upon receipt of this request a-new correction, including gravity anomaly, will be determined by Anniston Army Depot.

d. Temperature.

(*1*) The temperature of a barometer affects the accuracy of its reading in two ways:

(*a*) The metal scale expands and contracts with changing temperature and is, therefore, continually changing in length.

(*b*) The mercury itself expands and contracts much more than the scale. For instance, a column of mercury which is 30 inches high at 80° F will be only 29.861 inches high when the mercury is at 32° F temperature and the pressure remains the same. The true pressure of the air, therefore, is not shown by the observed height of the mercury until both the temperature of the scale and the density of the mercury are taken into account.

(*2*) The standard temperatures adopted for the barometer are as follows:

(*a*) The standard temperature for the inch scale of Barometer ML-330/FM is 62° F; the standard temperature for the inch scale of Barometer ML-330A/FM is 32° F.

(*b*) The standard temperature for the mercury is 32° F.

(*c)* The standard temperature for the millibar scale is' the same as that for mercury, 32° F.

(d) By combining the temperature correction for the inch scale with the temperature correction for the mercury, the correction is zero at 28.6° F. On Barometer TML-330A/FM, the combined correction is zero at 32° F.

(e) Since the standard temperature for the millibar scale is the same as the standard temperature for the mercury, 0° C, the combined correction is zero at 0°C.

(3) Thus when observations are made at temperatures other than 28.6° F, using the inch scale, or at temperatures other than 0° C, using the millibar scale, the appropriate correction for temperature given on Form SC-80 must be applied. When stations observations are made on the inch or millibar scale of the ML-330A/FMAI, at temperatures other than 32° F. or 0° C., apply the appropriate corrections for temperature as indicated on the temperature correction sheet furnished with the barometer. An explanation of the temperature correction tables is given in paragraphs 54 and 55. These paragraphs should be read carefully.

e. Application of Corrections. The following three corrections must be applied to every reading of the barometer:

(*1*) *The gravimetric correction*, recorded on SC Form No. 79.

(2) The *instrumental correction*, entered in column s, Form SC 437, section I.

(3) The *temperature correction*, determined as follows:

(*a*) The temperature correction when the barometer is read in inches or millibars is found on Form SC-80.

(*b*) For temperatures above 28.6° F or 0° C the corrections are subtracted; for temperatures below these values, the corrections are added.

CAUTION: In applying these corrections, be careful to use the correct algebraic sign (+) or (-). Applying the algebraic sum of the corrections is another way of saying that all corrections with a minus sign are subtracted and all with a plus sign are added to the observed reading.

f. Station Pressure. True pressure is obtained only after the corrections mentioned in subparagraph e above have been applied to the observed reading.

SECTION IV. OPERATION OF BAROMETERS

ML-331/TM, ML-332/TM, AND ML-333/TM

27. READING BAROMETERS ML-331/TM, ML-332/TM, AND ML-333/TM.

a. Preliminary Procedure.

(1) Remove the aneroid barometer from the carrying case.

(2) Place the instrument on a level horizontal surface. The precision aneroid barometer must always be read in a horizontal position. In making comparisons with a mercurial barometer, the aneroid must be at the same height (within 1/2 foot) as the ivory point of the mercurial barometer.

(3) Open the case *but do not raise the push button controlling the valve.* The metal case of the aneroid should have been sealed by dosing the valve prior to its use in measuring pressure. If the instrument is newly received at the Regional Control Office, the case will have been sealed when it was shipped. If it is being used on a field trip (par. 33), it should have been sealed prior to departure from the Regional Control Office.

NOTE: If the aneroid is being used at a field station where the pressure is within ±50 mb of the pressure at which the barometers were sealed at the Regional Control Office, the valve may be opened at any time without introducing appreciable error in the aneroid reading. As noted in paragraph 20, when the aneroids are at the Regional Control Office the cases are always unsealed and the instruments may be read at any time without special procedure.

(*4*) Note the pressure indicated by the aneroid. If, from leakage or other cause it has departed as much as ±50 mb from the pressure at which it was sealed at the Regional Control Office, readjust the pressure in the metal case by means of the pump. Under no circumstances should the pressure be allowed to vary by more than ±50 mb from the value at which the barometer was sealed. If the ambient pressure at the station where the aneroid is being used differs from the pressure at which it was sealed by more than 50 mb, the case should remain sealed until 15 minutes before the aneroid is actually to be used.

b. Waiting Period.

(*1*) When an aneroid barometer is first received at a-Regional Control Office, sufficient time must be allowed to elapse before it is used to permit recovery from any hysteresis effects (par. 46a) to which it may have been subjected during transportation. If it is known that the instrument has been transported for a long distance by water (where pressure. changes would be small) or if it is known that the pressure in the case was frequently readjusted during transportation so that it remained within 50 mb of the value at which it was sealed, the instrument can be used within 2 hours, if necessary, provided the ambient pressure of the Regional Control Office is within 50 mb of the pressure at which the aneroid case was sealed. Although 2 hours is the minimum waiting period, 1 day's time should be allowed for readjustment if feasible. If the ambient pressure differs from the pressure at which the case was sealed by as much as 100 mb or if it is likely that the barometer was subjected to pressure changes of this amount during transportation, the barometer should not be used for at least 3 days after receipt and preferably 1 week. If pressure differences of the order of 200 mb or more are involved, the barometer should not be used for at least 2 weeks, and preferably 1 month.

(*2*) When an aneroid barometer is taken from the Regional Control Office on field trips for the purpose of making comparisons with station mercurial barometers, a period of at least 2 hours should elapse before use to allow the instrument to reach temperature equilibrium. During this interval the case should re-

main sealed, unless ambient pressure is within 50 mb of the pressure in the case. After this period observations may be started. The instructions for the waiting period, given above, are based on the assumption that the pressure has been held within ± 50 mb of the ambient value at the Regional Control Office during transportation to the field station. If pressure changes greater than this have been encountered during transportation, the waiting times given in subparagraph b(1) above should be used.

c. Procedure Before and After Reading.

(1) When the barometer has rested a sufficient time and it is desired to use it to make an atmospheric pressure measurement, open the valve in the case by lifting the push button. *Wait 15 minutes before making the reading*. Additional readings may be made, if desired, in the next 15-minute interval, but do not keep the interior of the aneroid exposed to atmospheric pressure for more than 30 minutes at any one time.

(2) After the reading is completed, close the valve. Use the pump to adjust the pressure in the metal case-to approximately the same value as when the case was sealed at the Regional Control Office. Wait at least 1 hour before using the instrument again. (The reason for this procedure is given in paragraph 48.)

NOTE: If the pressure at the point where the barometer is being used is within 50 mb of the pressure at which it was sealed at the Regional Control Office, it is not necessary to follow the procedure just outlined. The valve may be opened at any time. After the proper waiting period, the barometer may be used at will until it is to be transported again. At this time it should be resealed.

d. Making Readings.

(1) Tap the instrument lightly to see that the pointer is free and in-equilibrium. If the pointer moves slightly to each side of its rest position, the movement is sufficiently free. The dial must be in good light so that the image of the pointer is clearly visible in the mirror ring. The light should preferably come from directly above or if this condition cannot be satisfied, place the aneroid so that the pointer is directed *toward* the light source.

(2) Use the reading glass to read the scale of the aneroid barometer. To read the instrument correctly, have the eye directly above the pointer so that the image of the pointer in the mirror ring is obscured by the pointer itself. This is important in order to avoid parallax, an effect which can readily be seen by moving the head to either side of the correct position and noticing the difference

in the apparent indication of the pointer.

(3) Sight through the center of the reading glass and estimate the position of the pointer on the scale to the nearest tenth of a millibar. Record the reading. This reading is the "Observed Barometer Reading" or "Aneroid Barometer Reading" to which reference is made in Form SC 436, SC 437, and SC 438. (This reading does not represent atmospheric pressure until it is corrected for temperature and scale errors.)

28. CORRECTING READINGS OF BAROMETERS ML-331/TM, ML-332/TM, AND ML-333/TM.

a. Temperature Correction.

(1) The precision aneroid barometers are designed so that the temperature correction at 75° F is zero. At temperatures above and below this value, the indications of the barometer are slightly affected by temperature. However, this correction need not be applied unless it equals or exceeds .1 millibar, since the scale of the barometer cannot be read with greater accuracy than that. Ordinarily, for temperatures 20° F above or below 75° F the correction will not exceed .1 millibar.

(2) A temperature correction curve showing the difference in calibration due to temperature is determined for each instrument individually. This curve is plotted on a graph which is mounted on an aluminum plate and is carried inside a pocket in the lid of the carrying case. Figure 11 shows such a correction curve, together with a pressure conversion chart.

b. Determining Temperature Correction.

(1) Locate the indicated pressure on the horizontal scale of the temperature correction curve. Note the point on the correction curve which is vertically above or below this pressure valve.

(2) Read the value of the correction to be applied per degree Fahrenheit (above or below 75° F) from the point on the vertical scale of the graph, corresponding to the point on the curve.

(3) Determine the difference between the existing temperature and 75° F.

(4) Multiply the correction (found in subparagraph (2) above) by this difference.

(5) Add or subtract this value from the observed reading as directed on the graph.

c. Example of Temperature Correction.

(1) Assume that the indicated pressure is 1010.3 mb and the temperature 110° F.

(2) Using the temperature correction chart, find the indicated pressure on the horizontal scale. Move up vertically along this pressure line until it intersects the temperature curve. Determine the correction by locating the value on the vertical scale of the graph which is horizontally opposite this point of intersection.

(3) Assume that the temperature correction for this pressure is found to be -.005 mb per degree F. (The correction is estimated to the nearest .001 mb.)

(4) A temperature of 110° F is 35° F above 75° F. Therefore, the correction per degree (-.005) is multiplied by 35, giving a total correction of -.175 mb.

(5) Since the aneroid barometer reading is taken only to the nearest tenth millibar, the correction becomes -.2 mb. Therefore, the pressure corrected for temperature is:

1010.3	mb
-.2	mb
1010.1	mb

d. Scale Correction.

(1) A further correction is made in reading aneroid barometers, namely, one for scale error. Barometers ML-331/TM, ML-332/TM, and ML-333/TM have dials which are hand-engraved by the manufacturer from calibration data taken on the individual instruments; hence, the scale errors of these instruments are usually quite small. There is, however, some possibility of slight error in drawing the scales. in addition, the characteristics of the aneroid cell change slightly with time, particularly when the instrument is new. This introduces a further small error. To correct for these errors as nearly as possible, each instrument is calibrated several times before it is shipped to the Regional Control Office. The errors found in these calibrations are tabulated in Form SC 438, section I, and are shown graphically on the curve of the scale calibration correction chart mounted in the lid of the wooden shock-mounting case.

(2) Even with these precautions, however, it is doubtful if the calibration curve supplied with the instrument will completely correct its

indication. Between the time the aneroid barometers are calibrated at Anniston Army Depot and the time they are received at the regional stations, a slight shift may occur due to transportation or aging of cells. This change should be small and within tolerance.

e. Determining the Scale Correction as Given on the Calibration Curve. The following procedure should be employed in obtaining scale corrections as determined from the calibration curve.

(1) Locate the pressure indicated by the aneroid on the horizontal scale of the graph in the lid of the mounting case. Note the point on the correction curve which is vertically above or below this pressure value.

(2) Read the value of the correction to be applied from the point on the vertical scale of the graph which is horizontally opposite the point on the curve.

(3) Note this value, giving it the proper algebraic sign.

f. Approximate Corrected Aneroid Barometer Reading. If it could be assumed that no change in calibration of the aneroid barometers had occurred since they left Anniston Army Depot., the true pressure would be obtained by adding the scale calibration correction and the temperature correction to each observed reading of the barometers. As noted in subparagraph d (2) above, this assumption is probably not valid. The pressure value thus obtained would be only approximately correct.

g. Completely Corrected Aneroid Barometer Reading.

(1) It is more likely that aging of the aneroid cell and handling of the instrument has caused some slight deviation from the correction found to be applicable on the basis of calibration at Evans Signal Laboratory. Hence the correction shown on the curve must not be applied without first verifying the correction curve over a limited pressure range by comparative readings between the aneroids and Barometer ML-330/FM, as outlined in paragraph 30. If the average correction obtained from these comparisons is different from that indicated on the correction curve for the same pressure values, a modified correction must be determined. A method of obtaining this *modified correction* is given in paragraph 30g.

(2) When the true scale correction has been determined by the method given in paragraph 30g, it should be added algebraically to the temperature correction and this sum of corrections added algebraically to the

observed barometer reading to obtain the *completely corrected barometer reading*.

SECTION V. OPERATION OF THE SET

29. GENERAL.

a. The Set. As explained in paragraph 1, *the set* consists of Barometer ML-330(*)/FM which is installed at the Regional Control Office (RCO) and two precision aneroid barometers which are used by Army Air Force weather inspectors to check mercury and aneroid barometers at field stations.

b. Corrections. Any correction determined for the precision aneroid barometers in comparison with Barometer ML-330(*)/FM and any corrections at the field stations determined for Barometers ML-512-(*) in comparison with the precision aneroid barometers must consist of a series of 10 comparative readings wherein all instruments involved in the comparison are read as nearly simultaneously as possible.

c. Forms. The instructions in this section include the use of the forms furnished with the set. *The success of the entire program of barometer comparisons depends upon complete and meticulous records*. Too much emphasis cannot be placed upon the importance of reading the instruments accurately and recording the data immediately on the forms. An explanation of each form is printed on the form itself and a brief description is given in section X, paragraphs 51 to 53, inclusive.

d. Temperature at Which Observations Are Made. It has been emphasized that the barometers (either mercury or aneroid) should not be read when the temperature is changing in excess of 3° F per hour. Actually, it is desirable that the rate of temperature change be even slower than this, if possible. Other things being equal, better data will be obtained when the ambient temperature is constant, or nearly so. When possible, therefore, comparisons should be made in rooms where the temperature is particularly constant, or at times of day when the rate of change is at a minimum.

30. COMPARISONS AT REGIONAL CONTROL OFFICE.

a. Preliminary.

(1) In making comparisons of the barometers it is assumed that a series of readings is made by one man.

(2) The mercury barometer may be read either in inches of mercury or in millibars unless specific instructions have been issued. If readings are taken in inches, however, the corrected

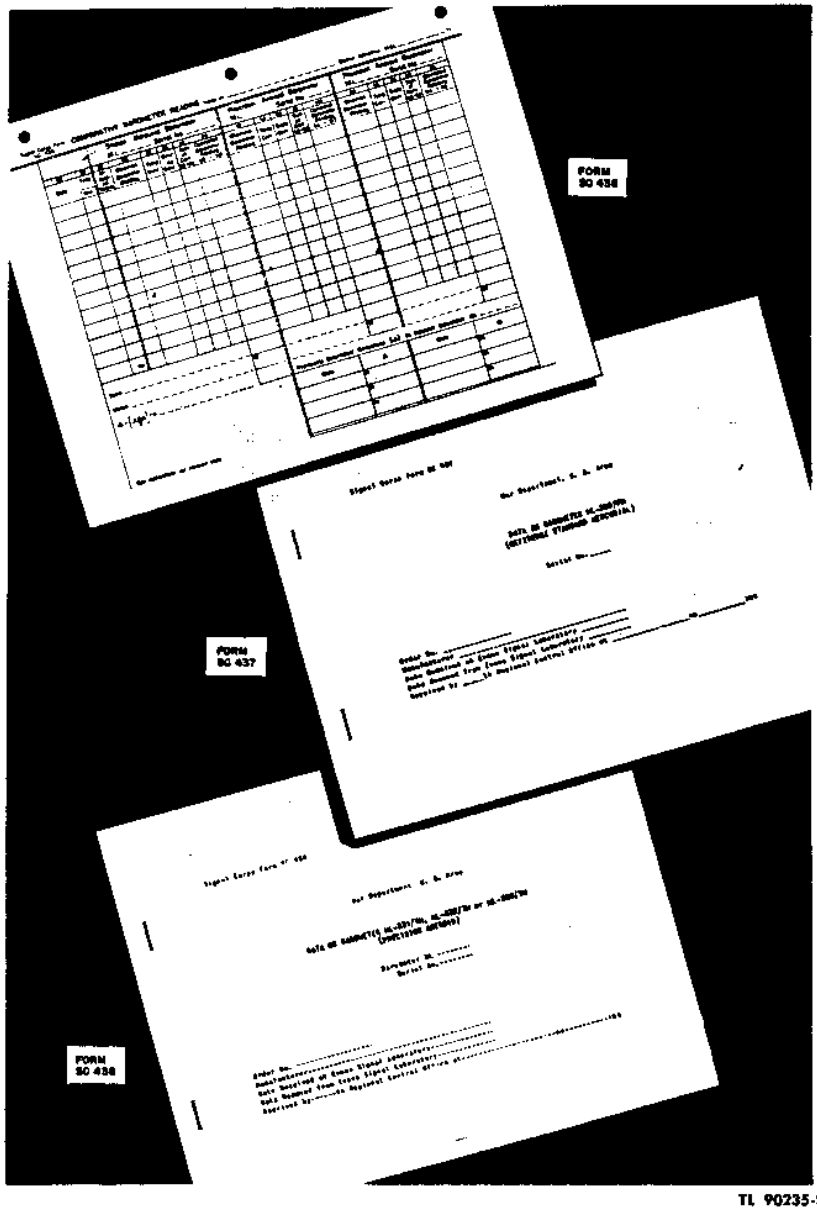


Figure 22. Forms for recording data on set of secondary-standard barometers.

barometer reading must be converted to millibars in order to make comparisons with readings of the precision aneroid barometers.

b. Form SC 437. Obtain Form SC 437, section II. Fill in the date and time, giving standard meridian (columns a and b). (If Greenwich time is used, the standard meridian is entered as 0.) Enter the observer's initials in column c. Record the gravity correction (column h) obtained from SC Form No. 79 which is posted near Barometer ML-330(*)/FM. Record in column g the instrumental corrections obtained from Form SC 437, section I, column s. The instrumental correction to be recorded is that for the pressure value, listed in section I, which is nearest the prevailing station pressure.

c. Taking Readings.

(1) Read the attached thermometer on Barometer ML-330(*)/FM (using the reading glass) in degrees Fahrenheit if the pressure is to be read in inches; in degrees centigrade, if the pressure is to be read in millibars. Apply the thermometer correction (par. 15g) if a correction is supplied and record the corrected temperature in column d.

(2) Set the cistern of Barometer ML-330(*)/FM, using the reading glass.

(3) Set the vernier (do not use the reading glass), but do not read the height of the mercury column.

(4) Immediately read the two aneroid barometers (using the reading glass) and record the indications in column 1.

(5) Read the mercury barometer and apply corrections. Temperature corrections are found in Form SC-80. Gravity and instrumental corrections have already been entered on the form (subpar. b above).

(6) Record the temperature correction for the pressure reading of Barometer ML-330(*)/FM in column f. in entering the tables to obtain this correction, the temperature to be used is the indication of the thermometer attached to Barometer ML-330/FM corrected for the error of the thermometer if any, as explained in paragraph 22b. Record the algebraic sum of the corrections in column i.

(7) Record the corrected reading for Barometer ML-330(*)/FM in column j.

(8) Apply temperature corrections to the readings of the aneroid barometers. (Temperature corrections are plotted on the graph on the aluminum

sheet which is in the carrying case of each aneroid barometer.)

(9) Record the temperature correction for each aneroid (column m) and the corrected aneroid reading (column n). Note that this reading is corrected for temperature but not for scale error.

d. Determining Differences in Pressure.

(1) Determine the difference between the pressure as indicated by Barometer ML-330(*)/FM and by each of the two precision aneroid barometers (column j minus column n).

(2) Record these differences with proper sign in columns o and p respectively, for each of the aneroid barometers. Note that these differences are the true scale corrections of the aneroids *for the particular pressure at which the comparison was made*.

e. Completing the Series. Repeat the operations outlined in subparagraphs b, c, and d above, 10 times, at intervals of .15 to 30 minutes.

f. Summary.

(1) Find the sum of all the corrections determined for each aneroid. Compute the mean value of the correction from the sum of these corrections for each aneroid and record the results, with the proper sign, in the space provided on Form SC 437, section II. The average correction for the average ambient pressure prevailing during the comparison has now been determined for each precision aneroid barometer.

(2) Transcribe all of the data obtained in each series of 10 comparisons for each aneroid from Form SC 437, section II, to Form SC 438, section IV. Fill out Form SC 438 for each aneroid barometer. The work involved in the initial comparison is now complete.

NOTE: Form SC 437 must never leave the Regional Control Office; it is kept with Barometer ML-330/FM.

g. Determining True Scale Corrections for the Precision Aneroids.

(1) As soon as each set of comparisons between Barometer ML-330(*)/FM and the precision aneroids is completed, steps should be taken to correct the scale calibration correction charts in the lids of the wooden aneroid cases. As noted in paragraph 30f, the average pressure difference obtained in that operation is a true scale correction for the average pressure at which the

comparisons were made. It is now necessary to obtain a true scale correction for all pressures throughout the range of the aneroids. This must be obtained separately for each aneroid.

(2) Move along the horizontal pressure scale of the scale calibration correction chart until the pressure value is reached which corresponds to the average pressure prevailing during the comparative readings between the aneroids and Barometer ML-330/FM. Move vertically above or below this line a distance equal to the average pressure difference found in paragraph 30f(1) for the particular instrument being corrected. Positive values should be plotted above the line, negative values below. Mark this point on the graph with a soft pencil.

(3) If the calibration of the aneroid has not changed, this point will plot on the calibration curve supplied with the instrument. If, as predicted in paragraph 28g, the calibration has shifted, the point will not plot on the curve. Determine the difference between the point just plotted on the graph and the correction given by the calibration curve for the same pressure. This difference represents the change in calibration *at that pressure* since the aneroid left Anniston Army Depot.

(4) The difference (change in correction) thus determined should be small. If it is .1 mb or less, it may be ignored. The difference will probably not exceed .3 mb when the aneroid is first received; should it ever exceed 3 whole mb over a long period of time a replacement aneroid should be requisitioned and the doubtful instrument returned to Anniston Army Depot.

(5) This difference will not be the same throughout the pressure range of the instrument. Its value appears to vary directly with absolute pressure. For example, if the change in correction for a pressure of 1000 mb is found to be .4 mb, then the change in correction at 750 mb will be only .3 mb and at 500 mb, .2 mb. Since the aneroids are only read to the nearest .1 mb, determination of the corrections need not be made to a closer value. Since the correction at 1000 mb is .4 mb and at 750 mb is .3 mb, the value should shift from .4 to .3 at a point midway between 750 and 1000 mb or at 875 mb. Similarly, the change in correction from .3 to .2 mb will occur halfway between 750 and 500 mb or at 625 mb. When the change in correction for one pressure value has been determined in accordance with paragraph 30g(3), changes in correction should next be determined, as illustrated above, for the entire pressure range on the basis that their value varies directly with absolute pressure.

(6) When the changes in correction have been determined for the entire pressure range, these values should be added algebraically to the scale corrections for the same pressures on the correction curve. The resulting values will be the true scale corrections for the aneroid. These true corrections should be plotted on the graph in pencil and a new correction curve, connecting these points, drawn in pencil over the old curve. It will be found that this new curve can be erased easily when required. A new curve should be drawn each time a set of comparisons is made between the aneroids and Barometer ML-330/FM.

(7) The true scale correction for any pressure may now be obtained by reference to the *new* correction curve. This correction, determined for any particular pressure, is the *modified correction* referred to in paragraph 28g.

h. Determining Correction to Aneroid Barometers After Return to Regional Control Office from Field Trips.

(1) Before making a field inspection trip, the mean correction resulting from a series of comparisons with Barometer ML-330(*)/FM has been determined for each aneroid, as described in paragraph 30a to 30f, inclusive. These mean corrections have been entered at the bottom of columns o and p in section II, Form SC 437, and each mean correction is ultimately transcribed to the left side of column b, section II, Form SC 438.

(2) After returning from a field inspection trip, a second series of comparisons should be made with Barometer ML330(*)/FM as soon as possible and a new mean correction determined as before (pars. 30a to 30f). This mean correction for each aneroid should be entered in the right side of column b, section II, Form SC 438.

(3) For any particular aneroid, there may be a small difference between the values of these corrections which have been determined prior to and subsequent to the field inspection trip. If a difference exists, it should be quite small, but the inspector obviously will not know whether the correction determined *before* he left the Regional Control Office (and the one he used on his field trip) actually was the true correction at the time comparisons were made, or whether the correction found *after* his return was correct. This difference, then, is the measure of the uncertainty in the value of the instrumental corrections that have been obtained for the mercurial barometers in the field stations. Should the difference between the corrections determined before and after the inspection trip (the difference between the two values entered in

column b, section II, Form SC 438) persistently equal or exceed .2 mb, the aneroid should be replaced.

31. PREPARATIONS FOR FIELD STATION OBSERVATIONS.

a. Equipment Needed. In preparation for his trip to the field station, the inspector will assemble the following equipment:

(1) A supply of Form SC 436, with carbon paper and pencil.

(2) The two precision aneroid barometers with carrying cases.

(3) A reading glass.

(4) The aluminum temperature correction and pressure conversion chart pertaining to each aneroid barometer.

(5) Form SC 438 for each aneroid barometer.

(6) Several SC Forms No. 79.

b. Recording Data.

(1) On each of the Forms SC 438, section II, record the date of departure from the Regional Control Office, the time (giving standard meridian), and the station from which departure is taken (columns c, d, and e).

(2) Enter on Form SC 438, section II, the mean correction to each aneroid as determined by comparison with Barometer ML-330(*)/FM and recorded on Form SC 437, section II. Copy this correction in the left-hand side of column b.

NOTE: Complete data on the correction entered in column b is given in section IV of Form SC 438.

(3) Just before departure from the Regional Control Office read the pressure as indicated by the aneroids and record the readings in column a in each Form SC 438, section II.

c. Packing.

(1) Close the aneroid shock-mounting cases and put them into the carrying cases.

(2) Put the aluminum correction chart and Form SC 438 pertaining to each barometer inside the pocket of the proper carrying case.

(3) Put Form SC 436 and the carbon paper inside the pocket of one of the carrying cases.

32. TRANSPORTATION OF ANEROID BAROMETER BETWEEN REGIONAL CONTROL OFFICE AND FIELD STATIONS.

a. Sealing Case. When the aneroid barometer is to be transported from the Regional Control Office on field trips, the metal barometer case should be sealed at the pressure prevailing at the Regional Control Office. As noted in paragraph 10b(6) (d), closing the lid of the wooden shock-mounting case closes the valve. This is not a guarantee that the case is sealed, however, unless the tube-pinching mechanism (par. 10b(6) (c)) is also closed.

b. Maintaining Pressure in Case. in order to avoid introducing large hysteresis errors the pressure in the case should be maintained at a value within ±50 mb of the pressure at which the case was sealed. Care must be exercised that this is done during transportation and until immediately before the barometer is used for comparisons with station mercurial barometers. Leakage into or out of the metal barometer cases is usually quite small; in all instances the rate of leakage was less than 3 mb-per hour when the barometers Anniston Army Depot. However, in order to insure that the pressure does not change more than ±50 mb during transportation, the barometer should be removed from its canvas carrying case about every 12 hours, the lid of the wooden case opened, and the indication of the barometer checked. Ordinarily a few strokes of the pump will compensate for any leakage which has occurred.

c. Pressure Change in Case Due to Temperature. Aside from leakage, temperature change is the principal cause of pressure change within the case while it is sealed. It should be borne in mind that a temperature change of 10° F will cause a pressure change of about 20 mb in the case.

CAUTION: It is important to remember this fact. If the barometer is being transported in such a manner that it is exposed to large temperature changes it will be necessary to readjust the pressure in the case much more often than every 12 hours, as recommended above. Wrapping the case in heat-insulating materials will reduce the rate of temperature change in the case and thus make the period of pressure readjustment less frequent. However, every precaution must be taken to insure that the pressure in the case remains within 50 mb of the pressure at which it was sealed.

33. MAKING COMPARATIVE READINGS AT FIELD STATIONS.

a. Preliminary.

(1) Upon arrival at the field station, remove the barometers from the carrying case and the Forms SC 438 from the pockets.

(2) On Form SC 438, section II, record the mode of transportation (air, rail, etc.) in column f; the maximum altitude encountered on trip (applicable only if the trip was by air) in column g; the minimum and maximum temperature encountered during the trip in columns h and i (this may be estimated if it cannot be measured); the destination, column j; date and time of arrival in columns k and l.

(3) Open the barometer case, but do not unseal it (that is, do not pull up the push button). Read the pressure and record in column m.

(4) If the pressure in the barometer case has changed appreciably (20 to 50 mb) from that at which it was sealed at the Regional Control Office, operate the pump for a few strokes and restore the original pressure. It may be advisable to operate the pump until the pressure is not more than 50 mb beyond the value at which the case was sealed. in this way, the number of times the pump must be operated will be reduced and the average pressure will be more nearly that at which the case was sealed.

(5) Record the elevation of the field station in column n, Form SC 438, section II.

(6) Record the serial number of the station barometer to be tested in column o.

> **NOTE: Remember that all data entered on Form SC 438, section II, except that in column b, must be repeated for each station visited during an inspection trip.**

(7) If the pressure in the barometer case has been kept within ±50 mb of the value at which the case was sealed, wait 2 hours before using the instrument for comparative readings.

> **CAUTION: During strong gusty winds or abrupt changes in temperature or pressure, barometer readings are unreliable. Inspectors should wait until the barometer tendency has been steady or changing slightly for a period of 3 hours. The ambient temperature should not have changed more than 3° F per hour during this interval and the maximum gust velocity of the wind should preferably not exceed 20 miles per hour.**

b. Taking Comparative Readings. Assuming that conditions are favorable for observations and the necessary time has elapsed to allow the

aneroid barometers to stabilize and reach temperature equilibrium, perform the following steps:

(1) Place both precision aneroid barometers at approximately the same elevation as the ivory point of the station mercury barometer. (A tolerance of 6 inches above or below the ivory point is allowed.)

(2) Remove Form SC 436 from the lid of the carrying case and using one carbon, record the following: the date (column a), and the time, giving standard meridian, (column b). If the station barometer has both an inch and a millibar scale, it will be necessary to determine an instrumental correction for each scale separately. in this case, two original copies and two carbon copies of Form SC 436 should be prepared. Readings of the inch scale of the station barometer should be entered on one copy of the form; millibar scale readings on the other copy of the form. Temperature corrections and gravity corrections should similarly be entered in inches and millibars on the two forms respectively.

CAUTION: The inch and millibar scales must be read and the readings recorded separately. Reading one scale only and using conversion tables to obtain the equivalent value on the other scale will not be satisfactory.

(3) Open the valves of each aneroid and allow the pressure in the barometer case to come to equilibrium with the ambient pressure.

(4) Read the attached thermometer on the station barometer and record the temperature in column c, Form SC 436. (Barometers ML-512-(*) have no thermometer correction.)

NOTE: If the station barometer has both an inch and a millibar scale, both the Fahrenheit and centigrade scales of the attached thermometer should be read and the temperatures entered on the two copies of SC Form 436. There are a few Barometers ML-512-(*) in use that have an inch and a millibar scale but do not have a centigrade scale on the thermometer. In this case, the reading of the Fahrenheit scale should be reduced to its equivalent value in the centigrade scale.

(5) After the valves have been open 15 minutes, set the cistern and vernier of the station barometer, but do not read it.

(6) As soon as possible after setting the station barometer read the indication of each aneroid barometer in millibars and record the reading in columns i and n, Form SC 436. If the station barometer is being read in both inches and millibars, enter the aneroid readings on that copy of Form SC 436 which contains the millibar readings of the station barometer.

NOTE: Each inspector will have one Barometer ML-331/TM and one additional aneroid, either ML-331/TM, ML-332/TM, or ML-333/TM. The choice of this second aneroid has been determined by the maximum elevation of the highest weather station in that particular region. Thus, at stations of high elevation, the pressure may be below the range of Barometer ML-331/TM and it will be impossible to obtain a reading on it. A barometer of limited range has been supplied because it is intrinsically more accurate and the readability is greater. It will therefore be possible to obtain more reliable readings at all weather stations in the region which are at an elevation within the range of Barometer ML-331/TM. This will probably include most of the stations.

(7) Read and record the station barometer indication in column d. If the barometer has two scales, read both.

(8) Record the temperature correction to the station barometer (column e, Form SC 436) (obtained from Form SC-80).

(9) Record the gravity correction to the station barometer (found on SC Form No. 79) in column f.

(10) Record the sum of the temperature and gravity corrections in column g.

NOTE: Since the purpose of this comparison is to determine a new instrumental correction to the station barometer, the total instrumental correction, as recorded on SC Form No. 79 for Baraometer ML-512-(*) is *not* applied. (The correction listed on the form as *instrumental correction* should not be included.)

(11) Apply the temperature and gravity corrections to the mercurial barometer reading and record the result in column h. The corrected barometer reading in inches, as well as the value in millibars, should be entered in each box in this column.

(12) Determine the temperature corrections for the observed aneroid readings and record them in columns j and o, Form SC 436 (par. 28b).

(13) Determine the true scale correction for the observed aneroid readings and record them in columns k and p. The scale correction is determined from the new scale calibration correction curve that was drawn in in pencil following the last comparison of the aneroid with Barometer ML-330/FM (par. 30g(6)).

(14) Apply the temperature and scale corrections to the observed aneroid readings to obtain the corrected barometer readings and record them in columns m and r, Form SC 436. If both inch and millibar readings are being made, the corrected aneroid readings should be converted to inches and entered in columns m and r of the form used for data in inches.

c. Converting Readings. The corrected reading for the precision aneroid barometers is in millibars. When it is necessary to convert the readings of the

aneroid barometers into inches of mercury, use table IV in this technical manual. Table III may be used when it is desired to convert from inches into millibars.

> **CAUTION: The pressure conversion scale furnished on the aluminum sheet with each precision aneroid barometer should not be used for pressure conversion purposes, since it is not sufficiently accurate. No use is made of this scale in the program of barometer comparisons.**

d. Repetition. Ten consecutive comparisons must be made at each station. A period of 15 minutes must elapse after the valve of the aneroid is opened before any data are taken. After observational technique has been improved, it is believed that two observations can be made in a 15-minute period. Not more than this number should be made in a 15-minute interval. These should be made immediately following the original waiting period of 15 minutes since it is not recommended that the barometers be subjected to ambient station pressure for more than 30 minutes at any one time. After this exposure they should again be sealed and pumped up to the pressure at which they were sealed at the Regional Control Office and allowed to remain at this pressure for at least 1 hour before additional comparisons are made. This procedure should be continued until 10 comparative readings are obtained. Each time the valve is reopened, the observer should wait 15 minutes before taking any data. The series may be interrupted at any point as long as the aneroids are sealed and pumped up to their original pressure.

e. Summary.

(1) Find the sum of the corrected mercurial barometer readings (column h, Form SC 436).

(2) Find the sum of the corrected readings for both precision aneroid barometers (columns m and r). Record the sums.

(3) Compute the mean corrected barometer reading (derived by adding the 10 or more comparisons and dividing by the number of readings made) for the station mercurial barometer and each of the aneroids.

(4) The average of the two means for the aneroids should be obtained by adding the corrected aneroid readings, t and u, and dividing by two. The correction for the station mercurial barometer is then obtained by subtracting s, the mean of the corrected readings of the station mercurial barometer from the average of the two aneroids. The result is the new instrumental

correction to the station mercurial barometer reading. As previously noted, if the station barometer has both an inch and millibar scale, separate readings will have been made and entered on separate forms; hence a separate inch and millibar instrumental correction will have been obtained. If the station barometer is provided with an inch scale only, the average of the two means of the aneroid readings should be converted to inches so that the instrumental correction will also be in inches.

(5) Enter the new instrumental correction with the date in the first box at the bottom of Form SC 436.

(6) Enter the instrument correction to the station mercurial barometer (determined in subpar. (4) above) on a new SC Form No. 79. Copy other data pertaining to the station mercurial barometer from the old copy of SC Form No. 79 and mount the newly-filled out SC Form No. 79 on top of the old form. Do not destroy the old form. If the station mercurial barometer is ever removed to a new location, or returned as being defective, all SC Forms No. 79 should accompany the instrument.

f. Disposition of Form SC 436. The original of Form SC 436 is filed at the field station. The carbon copy is returned by the inspector and filed at the Regional Control Office.

Note: The mean values of Aneroid Barometer ML-331/TM, ML-332/TM, or ML-333/TM should always agree within .3 millibar. If either barometer exceeds the value when compared with Mercurial Barometer ML/330(*) /FM, replace the barometer. Replacement of barometers may be requisitioned through NICP, Phila, Pa., to Anniston Army Depot, Anniston, Alabama. The defective barometer should be returned for calibration or repair when a replacement is received from the depot. The procedure to be followed when new barometers are requisitioned or returned for repair and calibration is given in paragraph 58.

PART THREE

MAINTENANCE INSTRUCTIONS
SECTION VI. PREVENTIVE MAINTENANCE TECHNIQUES

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34. BAROMETER ML-330/FM.

It cannot be emphasized too strongly that Barometer ML330/FM is a precision instrument that must not be subjected to jolts, vibrations, or sudden changes in position. The doors of the mounting case must be kept closed when the instrument is not in use. Aside from dusting the case and the instrument lightly with a soft cloth at infrequent intervals, there is no preventive maintenance to be performed. The best care the barometer can have is to be left alone. A maintenance calibration check will be made by the using organization at least once every 6 months and, returned to Anniston Army Depot for depot maintenance and recalibration every 5 years.

35. REPLACING BURNED-OUT BULBS IN MOUNTING CASE FOR BAROMETER ML-330(*)/FM.

If the fluorescent bulbs behind the opal glass windows burn out, they must be replaced. Two spare bulbs are mounted inside the case.

a. Remove the barometer from the case according to directions in paragraph 16. After removing the barometer from the case, place it on a horizontal surface.

b. Loosen the wingnuts in the mounting panel of the case. The panel is hinged to the case. It may now be opened, exposing the interior of the case with the bulbs and wiring (Fig. 6).

c. Remove the burned-out bulb. Take one of the spare bulbs from the holders in the center and insert it in place of the burned out bulb. Turn on the switch to make sure the bulb lights.

d. Close the mounting panel and tighten the wingnuts.

e. *Very slowly* turn the barometer upright and mount it in the case according to directions in paragraph 15.

36. TEST FOR VACUUM.

a. If there are any doubts as to the accuracy of Barometer ML-330(*)/FM, one method of checking the instrument is to make the *Test for Vacuum*. This test involves compressing the rarified

air, water vapor, etc., above the mercury surface in the glass tube into a small bubble at the top of the tube and measuring its size. The brass casting at the top of the brass tube, containing the swivel hanger by which the barometer is supported, masks the top of the glass tube and must be removed before the bubble can be inspected.

(1) First remove the barometer from the mounting case, leaving the level of the mercury in the cistern at its normal height.

> **CAUTION: When the barometer is removed from its case without first raising the cistern adjusting screw until the tube is filled with mercury, great care must be exercised to prevent air entering the tube. Under no circumstances should the tube be turned to a horizontal or near-horizontal position. The instrument should be handled very carefully until it is returned to its case.**

(2) Rest the cistern of the barometer on the floor, maintaining the tube upright.

(3) Loosen the screws in the brass flange (or collar) at the bottom of the scale cover glass until the flange can be lowered on the tube, but do not remove the screws.

(4) Lower the flange and the cover glass until the four screws holding the casting at the top of the brass tube are exposed.

(5) Remove these screws and lift the casting out of the top of the brass tube. *These screws are very small. Be extremely careful not to lose them or strip their threads when they are replaced.*

(6) Carefully remove the cork gasket over the top of the glass tube. The top of the tube is now exposed.

(7) Gradually tilt the top of the barometer from a vertical position. As this is done, the top of the mercury column rises in the tube. A metallic click will generally be heard when the tube is filled.

(8) Very slowly continue to tilt the top of the instrument until the top of the tube has been lowered vertically a distance of one inch below the point at which the tube was filled. A small bubble will be formed at the top of the tube.

(9) Using dividers, or a similar instrument, adjust the points to the diameter of the bubble and measure the diameter on an inch scale.

b. The size of the bubble in a new barometer should be 1/8 inch or less. Its size will generally increase slightly with age of the

barometer, as water vapor and air, not completely removed when the tube was filled, collect above the mercury surface. When the diameter of the bubble is $^{1}/_{8}$ inch, the error in reading the barometer due to these trapped gasses is slightly less than .001 inch. If the bubble diameter increases to $^{3}/_{16}$ inch, the error will be about .003 inch. If this size is reached, it is advisable to requisition another barometer as prescribed in paragraph 58 before returning the defective barometer to Anniston Army Depot

c. The test for vacuum should be applied to each Barometer ML-330(*)/FM when it is first received at the Regional Control Office. Thereafter, this test should be applied about every 6 months or at any intermediate time if the barometer has experienced any unusual treatment.

37. BAROMETERS ML-331/TM, ML-332/TM, AND ML-333/TM.

a. The precision aneroid barometers should be handled with great care. They should never be dropped, jolted, or exposed to more than a minimum of vibration. Aside from dusting the top of the shock-mounting case and wiping the cover glass with a soft damp cloth and polishing with a soft dry cloth, there is no maintenance to be performed.

b. Ordinarily, there is no need for removing the metal case from the shock-mounting case and this should not be done. However, there may be a few instances where the average pressure at the Regional Control Office is more than 50 mb *less* than that of some of the stations in the region. in these instances it will be necessary to remove the metal barometer case from the shockmounting case in order that the rubber tube connection to the pump may be changed so that air can be exhausted from the barometer case. This is done by removing the four screws in the corners of the aluminum plate and removing this plate and the metal barometer case from the hardwood case. When the metal case is free, the rubber tubing and connections for the valve and pump will be exposed. Be sure that the rubber tube has been clamped shut by means of the knurled knob, then remove the rubber tube from its connection to one end of the T-shaped brass tube projecting from the pump and replace it firmly on the other end. The metal barometer case can now be evacuated by the pump. After the instrument is replaced in the shock-mounting case it may be used exactly as described previously, except that it is now kept pumped *down* to the average Regional Control Office pressure between observations. Care should be exercised in replacing the metal case in the hardwood shock-mounting case to insure

that the rubber tubes are free and are not pinched between the sides of the cases. It is emphasized that this procedure is necessary only at stations where the average pressure is more than 50 mb *higher* than that of the Regional Control Office.

WARNING: No adjustment is to be made to the precision aneroid barometers through the plugged opening in the cover glass. If the error of these instruments exceeds 3 mb, the barometer should be returned to Anniston Army Depot, where special calibration equipment is available. These instruments are always hand-carried while in service. Defective instruments being returned for replacement may be shipped by common carrier.

SECTION VII. LUBRICATION

38. LUBRICATION OF ADJUSTING SCREW OF BAROMETER ML-330/FM.

Because of the weight of the mercury which is raised and lowered by the cistern adjusting screw it will be necessary to oil the screw sparingly at infrequent intervals to prevent wear. To lubricate, coat the threads very lightly with Oil, Lubricating, Preservative, Special (PS). *Under no circumstances should any other part of the barometer be lubricated.*

CAUTION: When lubricating this screw, be careful not to lower it too far. Never lower the mercury surface in the cistern more than 1/4 inch below the tip of the ivory point.

39. LUBRICATION OF BAROMETERS ML-331/TM, ML-332/TM, AND ML-333/TM.

There is no lubrication whatever to the precision aneroid barometers; in fact, lubrication of the aneroid mechanism would be definitely harmful. However, the hinges of the hardwood shockmounting case may occasionally require a few drops of Oil, Lubricating, Preservative, Special (PS).

SECTION VIII. MOISTUREPROOFING AND FUNGIPROOFING

40. MOISTUREPROOFING AND FUNGIPROOFING.

The moistureproofing and fungiproofing treatment is not required for Barometers ML-330(*)/FM, ML-331/TM, ML-332/TM, or ML-333/TM. All parts believed subject to deterioration have already been treated.

PART FOUR

AUXILIARY EQUIPMENT
(NOT USED)

PART FIVE

REPAIR INSTRUCTIONS

Note. Secondary standard barometers are required to be calibrated to extreme accuracy, using special calibration and pressure measuring equipments These barometers cannot be adjusted or repaired by maintenance personnel. All unserviceable equipment must be returned to Anniston Army Depot, as described in SB 11-492, with a work order and the log forms for each individual instrument.

SECTION IX. THEORY OF EQUIPMENT

41. AIR PRESSURE.

a. Air has weight and exerts a pressure. The weight of the layers above compresses and increases the density of the layers below, so that the pressure exerted at a given place is the result of the weight of all the air above it.

b. At sea level, under normal conditions, this pressure is approximately 14.7 pounds per square inch. This is the weight of a column of air having a cross-sectional area of 1 square inch and extending vertically from sea level to the upper limits of the atmosphere. Atmospheric pressure gradually diminishes with elevation above sea level because there is less air above to exert a pressure.

c. The pressure at a given point, however, seldom is constant because the weight of air above it is subject to changes caused by movement of air masses, temperature, water vapor content, and other factors.

42. MEASURING PRESSURE.

a. Air pressure is measured by balancing the weight of a column of air against a column of liquid whose weight is known in terms of its height, its density, and the acceleration of gravity at the point where the measurement is made.

b. Galileo, the great Italian physicist who is called "the father of experimental science," proved that a suction pump will not raise water more than 34 feet, and from this inferred that "nature's resistance to a vacuum" at sea level can be measured by a column of water about 34 feet high. in 1643 Galileo's pupil and successor, Evangelista Torricelli, devised a more convenient means of measuring pressure by using a tube of mercury instead of water.

c. Since mercury is approximately 13.6 times heavier than water, normal air pressure at sea level raises mercury to a height of about 30 inches (29.92 inches to be exact). Torricelli proved this by filling a glass tube more than 30 inches long and closed at one end with mercury. He covered the open end and inverted the tube in a vessel containing mercury, keeping the open end below the mercury surface. When the open end of the tube was uncovered, the mercury fell to about 30 inches. From this Torricelli concluded that the column of mercury in the tube was sustained by the pressure of the air on the surface of the mercury in the vessel.

d. in 1648, Pascal, the French mathematician, carried the Torricelli tube to the top of a high tower in Paris and found a slight fall in the height of the mercury column. Other experiments with the tube on a mountain top proved his theory that air pressure depends upon the weight of air above a point and that the higher the elevation above sea level, the lower the pressure.

43. BAROMETER.

a. When Torricelli's tube is set up permanently as a means of measuring the pressure of the atmosphere, it is called a mercurial barometer (from Greek *baros*, weight, + meter). Several forms of mercurial barometers have been devised, all based on Torricelli's principle, but differing in construction.

b. Barometer ML-330/FM is of the Fortin type, the distinguishing feature of which is a flexible cistern that enables the level of the mercury to be brought into coincidence with the zero of the scale.

c. Until comparatively recently, all barometer scales were graduated in inches or millimeters, or both. Now, the *bar*, defined as a pressure of 1,000,000 dynes per square centimeter, has been adopted as a unit for measuring atmospheric pressure. For convenience, pressures are actually measured and reported in millibars. A millibar is 1/1000 of a bar.

d. The millibar is solely a unit of pressure. It cannot, strictly speaking, be used also as a measure of length to measure the height of a mercury column. Similarly, it is theoretically incorrect to use the inch, which is a unit of length, as a unit of air pressure. Air pressure (par. 41) is measured by balancing the weight of a column of liquid against the weight of a column of air. The weight of a column of liquid may be determined by knowing its length, its density, and the acceleration of gravity. If density and acceleration of gravity are always constant, then the weight of a column of liquid will vary directly with its height. Neither density nor gravity remain constant, but, by applying the corrections for temperature and gravity, variable values in density and gravity may be reduced to their respective standard values. When this is done, the height of a column of liquid can be used as a measure of weight, or pressure. It is, however, incorrect to speak of the height of a mercury column in inches as being a measure of the pressure of the air until temperature and gravity corrections have been applied to this height to reduce the density of the mercury and the effect of gravity to standard conditions. Even then, the pressure should be referred to as being in inches of mercury.

e. The millibar is not associated with a unit of length in the same sense that a pressure in inches of mercury is associated with a linear measurement in inches. However, since both millibars and inches of mercury are a measure of air pressure, there is, obviously, an equivalent value in millibars for every pressure in inches of mercury. For convenience in use and to avoid making readings in inches and converting the corrected pressure to millibars by use of a table, a scale has been attached to the barometer which is graduated in units of such length that, when the height of the barometer is measured in these units and all corrections applied, the value obtained will be numerically equal to the atmospheric pressure measured in millibar units of pressure.

44. GRAVITY ANOMALY.

The gravity corrections given in tables I and II in this manual, are computed on the assumption that the earth is a homogeneous body, of true oblate spheroid shape, the density of which does not vary. This assumption is only approximately correct; mineral deposits, bodies of water, and other elements cause variations in density, while hills and mountains cause variations in shape. These variations, though minor when compared to the average density and diameter of the earth, are sufficient to cause slight differences between the true local value of gravity (or measured value) and the theoretical computed value obtained from tables. These differences, known as *gravity anomaly*, cannot be computed. They must be determined from accurate measurements made at the location where the value of gravity anomaly is desired. in many places on the earth's surface the value of gravity anomaly is not large enough to be significant in pressure measurements; in others, particularly in some of the islands of the Pacific, it is large enough to introduce a noticeable error in barometric measurements. The gravity correction given on SC Form No. 79 includes a gravity anomaly correction. Where the value of the anomaly actually has been measured for the location to which Barometer ML-330/FM was originally shipped, the correction is exact. If measurements have not been made at the location, an estimated value, based on data for the nearest locations, is included.

45. PRINCIPLES OF ANEROID BAROMETER.

a. General.

(1) The aneroid is a form of "elastic" barometer, that is, one in which the elastic deformation of some solid system is used as an indicator of atmospheric pressure.

(2) The aneroid type of barometer can be made extremely sensitive and is convenient to use because of its portability. A further advantage is that its readings are not affected by variation in the force of gravity.

(3) The aneroid barometer is subject to errors due to irregularities in the elasticity of the metal and for this reason it should not be relied upon as an instrument for routine meteorological observations unless compared frequently (at least every 90 days) with a mercurial barometer.

b. The Vidie Barometer. The type of aneroid most generally used is one invented in 1843 by Lucien Vidie, which uses a wafer-like cell, (sometimes called diaphragm or capsule) of thin, flexible

metal, usually brass or German silver, which is very nearly exhausted of air. The opposite sides of the cell are kept apart by a strong internal metal spring; some models use a stiff external spring for this purpose. Usually the elastic properties of the spring determine those of the whole instrument. The residual air in the cell can be adjusted to give a partial correction for temperature. The movement of the cell, caused by variations in pressure, is greatly magnified, and is indicated on a dial by a train of gears and levers.

c. Principle of Operation. The barometers treated in this manual differ from the Vidie type in that the material of the cell itself serves as a spring, making the use of an internal or external spring unnecessary. The aneroid element of these barometers consists of a cell of beryllium copper which has been almost completely exhausted of air, only enough being left inside to help compensate for changes in the spring properties of the cell as a result of changes in temperature. Corrugations in the cell increase the flexibility of the metal so that there is a greater movement with changes in pressure. Changes in the atmospheric pressure cause the cells to expand and contract. This movement is magnified and transmitted by a lever system connected to a pointer which indicates the pressure on a dial graduated in millibars.

46. ERRORS OF ANEROID BAROMETER.

Factors which introduce errors into the readings of the aneroid barometer are hysteresis, temperature, scale errors, and drift.

a. Hysteresis.

(1) One of the chief causes of error in an aneroid barometer is hysteresis. All elastic materials tend to change shape when placed under stress. As soon as the stress is removed, they return almost to their original shape. The retardation or failure of the material to assume completely its original form is known as hysteresis. All aneroid barometers are subject to the effects of hysteresis although an attempt is made to keep these effects to a minimum by the proper selection and treatment of materials. Over a long period of time hysteresis effects gradually tend to be reduced to a very small amount if the barometer is kept at one location so that pressure changes are small.

(2) Hysteresis occurs in the pressure sensitive cell of the aneroid barometer. Appreciable errors may be noticed immediately after a large and rapid pressure change. These errors can

be greatly reduced by waiting a sufficient length of time before taking a reading. It is difficult to make a specific recommendation as to the interval of time necessary to reduce hysteresis errors to a minimum since hysteresis varies with the amount of change in pressure, with the rate of change, and with the time involved, that is, the length of time at which the barometer has been subjected to a pressure differing from current atmospheric values.

(3) For pressure changes occurring at any fixed station, hysteresis errors are usually small enough to be neglected. When the barometer is subjected to a comparatively large pressure change for a short time only, and then restored to its previous values, hysteresis effects are small and may quickly disappear, although the length of time will vary with different instruments. Hysteresis errors are probably most pronounced when a barometer is transported by airplane, especially if the flight is of several hours duration and the plane flies at high altitude.

b. Temperature. A second and exceedingly important error which affects the aneroid is change in temperature. Without compensation for changes in temperature the errors of an aneroid would be quite large. If a barometer is maintained at a constant pressure, a change in temperature, if not compensated, will cause a movement of the pointer on the dial. This indicated change in pressure is due to a physical change in the dimensions of the instrument and also to variations in the stiffness of the pressure sensitive cell. This latter condition may be compensated, for the most part, by leaving a small amount of air in the cell. Thus, when a change in temperature occurs, the change in pressure of the air inside the cell partially balances the change in strength of the metal. This does not entirely compensate for changes in temperature. Therefore, temperature correction curves are provided for the barometers. These corrections, however, are small, indicating that the greater part of the error has been compensated.

c. Drift.

(1) Another error to which the barometer is subject is *drift* (often called creep), which is due to changes in the aneroid cell occurring slowly over a long period of time. Drift and hysteresis are probably evidences of the same phenomenon. Drift is apparently caused by molecular readjustments in the metals of which the cell is made. Alterations in the shape of the cell occur because of the tendency of all materials to assume a new permanent shape when placed under steady stress. In meteorological textbooks,

drift is sometimes referred to as "secular change", for it is an error which continues to change over a long period of time.

(2) Drift is manifested by a gradual increase in the difference between the indications of the aneroid barometer and a mercurial barometer with which it may be compared. Errors of drift are largely eliminated in the aneroid barometers covered by this technical manual when they are compared with Barometer ML-330/FM and new calibration curves constructed.

(3) Some barometers seem to drift because of very minute leaks in the evacuated cell. Usually a leaking cell is detected before the instrument leaves the manufacturer's plant, but occasionally a leak can develop in a barometer that has been in use some time. The indications of a leak are progressively lower readings than are normal for the station. There is no way to remedy the defect. Return the barometer and requisition a new one.

(4) For the first few months after the aneroid is built, the drift effects are more pronounced, but after this time they usually

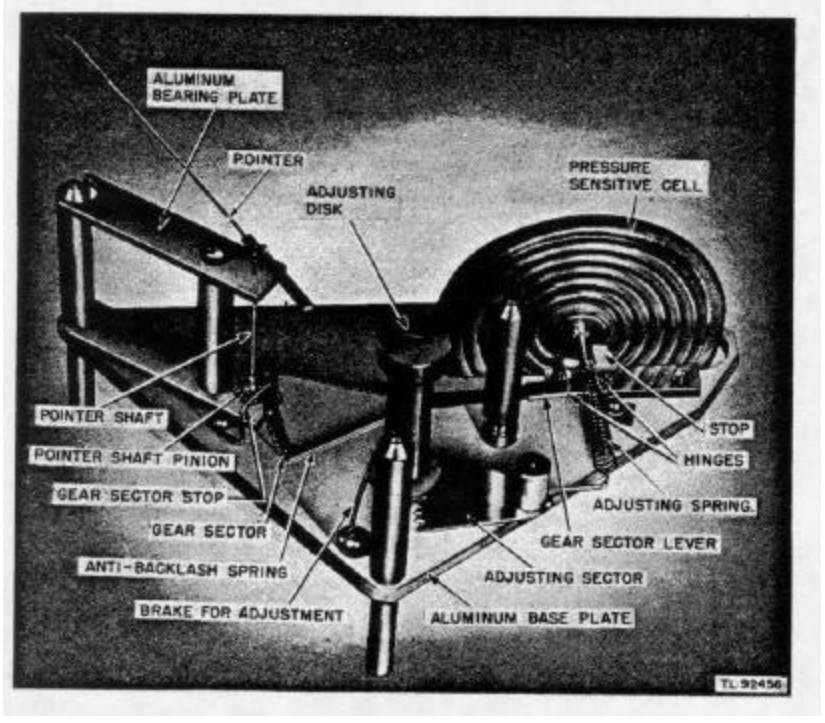

Figure 23. Aneroid mechanism of Barometer ML-331/TM, ML-332/TM or ML-333/TM.

become negligible. In general, the longer the barometer is in use, the more consistent the performance is likely to be.

(5) Occasionally a barometer will show a persistent drift. To detect this condition, note the difference for the ambient pressure of the meteorological station between the last scale calibration curve and the one supplied with the instrument. If periodic checks indicate that this difference exceeds 3 millibars, requisition a new barometer in accordance with instructions furnished by the using agencies and SB 11492. Return the instrument to Anniston Army Depot for repair.

47. BAROMETERS ML-331/TM, ML-332/TM, and ML-333/TM.

a. Mechanism.

(1) The mechanism of these aneroid barometers is built upon a triangular-shaped aluminum base plate. The difference in range of the three instruments is achieved by changing the spring rate of the pressure sensitive cell and the magnification ratio of the lever system. The aneroid element is a single corrugated cell of beryllium copper about 2 inches in diameter and $^{1}/_{8}$ inch in thickness. The lead exhaust tube through which the cell is evacuated is pinched off and sealed at the end.

(2) The movement of the cell, caused by the varying pressure of the atmosphere, is transmitted to a gear-sector lever by thin strips of beryllium copper which act as hinges. A fixed hinge serves as the fulcrum of the gear sector lever. The teeth of the gear sector engage a small pinion on the pointer shaft. A wire safety stop prevents the teeth of the gear sector from becoming disengaged from the pinion gear during severe vibrations or rough handling. A small auxiliary coil spring is attached to the gear sector lever. The tension of the spring can be varied by an adjusting disk which has a gear at its lower end which meshes with a brass adjusting sector. The adjusting disk is reached through a plugged opening in the plastic window. The range of adjustment is approximately 10 millibars.

> **Warning: This adjustment is never made at the meteorological stations, the instrument must be returned to Anniston Army Depot, Anniston, Alabama, for adjustment and calibration.**

Backlash in the gears is removed by means of a small wire spring attached to the lower side of the gear sector. The tension of this spring is transmitted to the pointer shaft by a nylon thread looped once around a small lucite drum at the base of the pointer

shaft. A stop is provided to prevent expansion of the cell below its lower scale limit during air transportation.

(3) The pinion is fastened to the pointer shaft which revolves in a jeweled bearing at the bottom and extends through a hole in the top bearing plate. The pointer, fastened to the end of the shaft, is made of three sections of fine aluminum tubing and is clamped to the shaft by a small setscrew.

b. Magnification. Magnification of the cell movement is accomplished in three stages:

(1) The first stage is a simple lever magnification, being the ratio of the distance between the fixed hinge (which acts as the fulcrum of the lever) and the teeth of the gear sector to the distance between the two hinges.

(2) The second stage is the ratio of the diameter of the gear sector to the diameter of the pinion.

(3) The third stage is the ratio of the distance between the pointer shaft and the scale being read to the radius of the pinion.

48. MEANS EMPLOYED TO REDUCE HYSTERESIS ERRORS IN BAROMETERS ML-331/TM, ML-332/TM, AND ML-333/TM.

a. The use which was to be made of these aneroid barometers eliminated any possibility of keeping them at a reasonably constant pressure such as is experienced by station barometers. It was known that in travelling from station to station throughout a weather region, the changes in pressure involved would be so erratic in nature that it would be impossible to compute hysteresis corrections from calibration data. When these particular barometers were tested, it was found that the hysteresis errors were larger than had been expected, and in cases of large pressure changes, required weeks rather than days to disappear. It was manifestly impossible to require the inspector to wait at high-elevation stations for 2 or 3 weeks before using the instruments, hence some other method of minimizing hysteresis had to be found.

b. After many tests, a method was found which, although it would not eliminate hysteresis errors, insured that their value would be nearly constant, provided a special technique was employed. If the barometers were maintained at room pressure for a long interval, the pressure suddenly reduced, the barometer read after a short fixed interval (about 15 minutes), and then the pressure returned to room value for at least 1 hour, this cycle could be repeated many times with unusually constant

results. Obviously, each reading of the barometer contained a relatively large hysteresis error, but this error was nearly constant for a fixed pressure change. If then, the barometers could be calibrated and could be used in the same way, hysteresis errors could be eliminated by calibration. Although the amount of the hysteresis error varies with the amount the pressure is reduced, the error can be reduced to a negligible quantity, provided the same procedure of reading is followed, both in use and in calibration. This was the *only* successful means found by which this error could be so reduced.

c. This special technique has made necessary the use of an airtight case, the inclusion in the barometer of the valve and pump,. described in paragraph 10b (6), and has required that the pressure in the barometer case be maintained approximately constant (± 50 mb) regardless of what the ambient pressure may be except immediately prior to the time of use.

d. In calibrating the barometers, the normal room pressure was approximately sea-level pressure. The instruments were calibrated at approximately 30 mb intervals throughout their range. During calibration their pressure was first held at room value, then reduced to 30 mb below room pressure, the instrument read at the end of 15 minutes, and the pressure again increased to room value. After a waiting period of 1 hour the pressure was again reduced, but this time to 60 mb below room value, the instrument read in 15 minutes, and the pressure again increased to room value. This was repeated until the pressure range of the instrument was covered. When the scale calibration correction curve for the instrument is plotted from these data, the correction for the hysteresis error remaining after a 15-minute exposure to a changed pressure is included in the curve. During these tests it was found that hysteresis error for changes in pressure of as much as 50 mb were negligible. It was also found that the change in hysteresis error between 15 and 30 minutes was very little; hence, in use, barometers could remain exposed to reduced pressures for as long as 30 minutes.

e. In use, making field comparisons, the aneroid barometers must be maintained at approximately constant pressure until within 15 minutes of the time of their use. Within 30 minutes after being exposed to a new pressure, however, they should be resealed and the pressure within the case pumped back to its original value. If this technique is followed, hysteresis error will be negligible; if it is not followed, *this error may be as large as 1.5 mb.*

f. During calibration, the barometers, except during limited intervals, were exposed to sea-level pressure. When in use in the weather regions it would prove difficult and laborious to attempt to maintain them ht that pressure, unless the Regional Control Office is located at or near sea level. Thus it seemed advisable to select the average pressure of the Regional Control Office as the pressure value at which they are to be maintained constant (within ±50 mb) in use. If the average pressure at the Regional Control Office does not differ from sea-level pressure by more than .50 mb, the scale-calibration correction curve, determined at sea level, should be equally valid at the Regional Control Office, except for small differences due to drift after calibration. If there is a large difference between the average pressure at the Regional Control Office and sea-level pressure, the scale calibration correction curve will probably contain some hysteresis error. If a new correction curve is drawn in accordance with the methods given in paragraph 30g (6), this difficulty will be largely eliminated.

49. TEMPERATURE CORRECTION CHART USED WITH BAROMETERS ML-331/TM, ML-332/TM, AND ML-333/TM.

A temperature correction has been plotted individually for each instrument and is given on the aluminum temperature correction and pressure conversion chart. Specific instructions for the use of this temperature curve are given in paragraph 28 b.

50. Unsatisfactory Equipment Report

Equipment being returned to Anniston Army Depot, Anniston, Alabama, for repairs or calibration will require an unsatisfactory report per instructions described in TMI 88-750 and forwarded in accordance with instructions in SB 11492.

a. When trouble in equipment used by Army Ground Forces or Army Service Forces occurs more often than repair personnel feel is normal, War Department Unsatisfactory Equipment Report, W.D., A.G.O. Form No. 468 should be filled out and forwarded through channels to the Office of the Chief Signal Officer, Washington 25, D. C. Refer to TM 38-250 for complete instructions on the handling of this report.

b. When trouble in equipment used by Army Air Forces occurs more often than repair personnel feel is normal, Army Air Forces Form No. 54 should be filled out and forwarded through channels.

Figure 24 deleted by change 4

APPENDIX

SECTION X. EXPLANATION OF FORMS

51. EXPLANATION OF SIGNAL CORPS FORM SC 436, COMPARATIVE BAROMETER READINGS.

a. Purpose. On this form is recorded data pertaining to one station mercurial barometer and the pair of precision aneroid barometers. A supply of the forms must be taken by the Army Air Force inspector to the field station from the Regional Control Office. All entries should be made in pencil, in duplicate, before the inspector leaves the station.

b. Procedure.

(1) It is assumed that the inspector is thoroughly familiar with the procedure to be followed in reading the mercurial barometer, the precision aneroid barometer, and in making simultaneous observations.

(2) In order to obtain a representative correction to the station barometer, no less than 10 simultaneous comparative readings should be made.

c. Column Headings. With reference to the column headings it should be noted that:

(1) The gravity correction (column f) is the sum of correction for altitude and latitude as given on SC Form No. 79.

(2) The *Sum of Corrections* (columns g, i, and q) is to be understood as the algebraic sum, and each *Sum of Corrections* is to be added algebraically to the *Observed Barometer Reading* to which it applies in order to obtain the *Corrected Barometer Reading*.

(3) The temperature corrections to each aneroid barometer (columns j and o) are to be obtained from the aluminum temperature correction and pressure conversion chart furnished with each aneroid.

(4) The scale correction to each aneroid barometer is obtained from the modified scale calibration correction curve. (This is the curve drawn in pencil, as directed in paragraph 30g(16).) The scale correction is entered in column k for one aneroid and in column p for the other.

d. Instrumental Correction. Upon completion of the series of readings, the corrected pressure valves of the station mercurial barometer, and of the two precision aneroid barometers should be added and a mean value for each obtained. The difference between the mean of the readings of the station mercurial barometer and the average of the two means of the aneroid barometer readings is the instrumental correction to the station barometer.

e. Average Correction. Under *Previously Determined Corrections* (Δ) *to Barometer No.* ____ the average correction to the station barometer obtained in each series of comparative readings will be entered on each Form SC 436. After seven series of comparisons have been entered (i.e., after the station barometer has been corrected on seven separate occasions) it will be necessary to drop the first entry for (Δ) on the form, and to copy in the box marked (1) the (Δ) value obtained in the second series of comparisons. Values obtained for (Δ) in the third series of comparisons will be copied in the box marked (2), and so on, the value for (Δ) in the seventh series being entered in the last box, marked (6). As each new sheet is made out, the top value for (Δ) is dropped and each following correction is advanced one space, the value for (Δ) in the last previous series of comparisons always being written in the box marked (6).

f. Filing Forms. The original of Form SC 436 should be filed at the field station where the comparative readings were made. The carbon copy should be carried by the inspector to the Regional Control Office for filing there. If instrumental corrections for both inch and millibar scales have been determined, a separate Form SC 436 should have been executed for each correction.

52. EXPLANATION OF SIGNAL CORPS FORM SC 437, DATA ON BAROMETER ML-330(*)/FM, REFERENCE STANDARD MERCURIAL.

a. Purpose. Signal Corps Form SC 437 records data pertaining to one Barometer ML-330(*)/FM. This form is to be kept at the Regional Control Office with the barometer. If the barometer is removed from its initial location for use elsewhere, or if it is returned to Anniston Army Deport, Anniston, Alabama, this form must accompany it. Data in section I is recorded Anniston Army Deport, Anniston, Alabama; nothing is added to section I after the barometer reaches the Regional Control Office. Section II provides for recording data obtained in simultaneous comparisons of the three barometers (Barometer ML-330(*)/FM and the two precision aneroid barometers) at the Regional Control Office.

b. Section I (Pink Sheet). Section I gives the instrumental correction for each Barometer ML-330(*)/FM. It contains data obtained in simultaneous comparative readings on two secondary-standard mercurial barometers and Barometer ML-330(*)/FM at the time of the original scale calibration of the instrument at Anniston Army Deport, Anniston, Alabama. On the basis of calibration data obtained, separate instrumental corrections will have been determined for the inch scale and the millibar scale and these corrections entered in column s. Comparisons are made over the entire range of the scale. The corrections entered in column s are for different pressure points over the range. The pressure value for which the correction applies is found in column r.

c. Section II (White Sheet).

(1) Section II of Form SC 437 is provided for recording data obtained in comparative simultaneous readings of Barometer ML330(*)/FM and the two precision aneroid barometers which compose the set furnished to each Regional Control Office.

CAUTION

When comparative readings are taken, there will always be data from two aneroids to be recorded. in order that data for each comparative reading may be segregated from other comparisons, alternate lines of section II of the form run completely across the form. Data for the two aneroid readings should be entered above and below the intermediate shorter lines. Data for Barometer ML-330(*)/FM should be entered opposite the aneroid -data above or below the dotted portion of the intermediate line.

(2) The procedure in recording data is outlined below:

(a) in column a, record day, month, and year.

(b) in column b, enter the standard meridian.

(c) Provision has been made for the use of either the inch or the millibar scale of the barometer. If the inch scale is used, the attached thermometer should be read in degrees Fahrenheit, and the corrected barometer reading, in inches, entered in the proper box in column j. The corrected barometer reading, in inches, must then be converted into millibars by the use of table m in this manual and entered in the box in column j below the inch value.

(d) If the millibar scale is read, the centigrade scale of the attached thermometer should be used, the appropriate corrections, in millibars, applied to the barometer reading, and the

corrected barometer reading, in millibars, entered in the proper box in column j. When the millibar scale is used, no entries should be made on the dashed line in columns d to j, inclusive.

(e) In column i, the *Sum of Corrections* is to be understood as the *algebraic* sum and is to be added algebraically to the Barometer Reading (column e) to obtain the *Corrected Barometer Reading* (column j).

(f) Enter. the complete nomenclature of the instrument as well as the serial number in column k.

(g) Record the readings of each precision aneroid barometer to the nearest tenth of a millibar in column 1.

(h) Evaluate the temperature correction to each aneroid barometer reading from the curve on the chart *Temperature Correction per Degree F above or below 75° F* furnished with each instrument and record in column.

(i) Add the *Temperature Correction* algebraically to the *Aneroid Barometer Reading* to obtain the *Corrected Aneroid Barometer Reading* and record in column n.

(j) Determine the correction to each aneroid barometer in each comparison and enter in columns o and p.

(k) Summarize the corrections obtained for each aneroid barometer in a series of 10 comparisons and record in columns o and p at the bottom of the page. Obtain the mean.

53. EXPLANATION OF SIGNAL CORPS FORM SC 438, DATA ON BAROMETERS ML-331/TM, ML-332/TM, OR ML-333/TM (PRECISION ANEROID).

a. General. Data recorded on this form are to be used as a complete and permanent record of the history and performance of one precision aneroid barometer. When the form is not in use, it is to be kept in the pocket in the lid of the carrying case of the aneroid barometer to which it pertains, whether the barometer is at the Regional Control Office, on a field trip, or is returned Anniston Army Deport, Anniston, Alabama. When the instrument is returned to the laboratory, data entered on this form will enable the performance of the instrument to be evaluated properly.

b. Section I (White Sheet). Entries in this section of the form will be completed before the aneroid barometer is issued from Evans Signal Laboratory.

(1) Values in the column headed *Temperature Corrections per °F above or below 75° F* are identical to the values on the

temperature correction curve and pressure conversion chart furnished with each precision aneroid barometer.

(2) The column headed *Scale Correction at 75° F* contains data on which the scale calibration correction chart (in the lid of the shock-mounting case) is based. Should that chart become lost, a new scale calibration correction curve may be constructed on the basis of the data entered in this column.

(3) If the precision aneroid barometer is returned to Evans Signal Laboratory for recalibration, new calibration data will be entered in section I of the form.

c. Section II (Pink Sheet).

(1) This section of the form provides for entry of data pertaining to field trips of the aneroid barometer. A separate line of the form is used for each field station visited, except that in column b only one entry is made in the column *Before Trip* and only one in the column *After Trip*, regardless of the number of stations visited during the trip.

(2) The column entries are as follows:

(a) In column b, left side, enter average correction to the precision aneroid as determined by comparison with Barometer ML-330/FlL.

(b) In column g, enter data only when barometer is transported by air.

(c) In columns h and i, estimated values may be entered if measured values are unavailable. The temperature values desired are the highest and lowest temperatures to which the instrument was exposed during transport.

(d) In column o, enter the nomenclature of the instrument (Barometer ML-2-( )), as well as the serial number of the tested barometer.

(e) In column p, enter the average correction determined for the station barometer at each different station.

d. Section III (Green Sheet). Data obtained in each comparative reading in series with the station mercurial are recorded in this section. This information is a repetition of that given in Signal Corps Form SC 436 *Comparative Barometer Readings* and is repeated in Form SC 438 in order to make this form, a complete and independent record of a given aneroid barometer. The column entries are as follows:

(1) In heading of column b. enter standard meridian.

(2) In columns g and n, the *Sum of Corrections* is the *algebraic sum*.

(3) In columns h and o, to obtain the *Corrected Barometer Reading* add the *Sum of Corrections algebraically* to the observed barometer reading.

(4) In column i, enter the nomenclature ML-512-(*)) as well as the serial number of the instrument.

(5) In column p enter the correction obtained for each reading of the barometer. After a complete series of observations have been made, obtain the sum and mean of *Correction to Mercurial Barometer* and enter them immediately below the last entry in column p.

e. Section IV (White Sheet). This section provides for recording each comparative reading in a series of comparisons made on Barometer ML-330/FM and one precision aneroid, prior to and upon completion of each inspection trip in which the aneroid barometer is used. Column headings are self-explanatory.

54. EXPLANATION OF FORM SC-80, SECTIONS 1, 2, AND 3, CORRECTION OF MERCURIAL BAROMETER FOR TEMPERATURE, ENGLISH MEASURES.

a. Formula for Reducing Readings to Standard Temperatures.

(1) Temperature correction tables are computed by simple formulas taking into account the known coefficients of expansion of the mercury and of the brass scale. The scale here refers to all metal parts between the ivory point and the top of the mercury column. It is assumed that the temperature of the scale is the same as that of the mercury and that it can be read on the attached thermometer.

(2) The formula for reducing the observed readings in inches to standard temperature is:

$$C = - B \frac{m\,(t\text{-}32^\circ) - l\,(t\text{-}62^\circ)}{1 + m\,(t\text{-}32^\circ)}$$

where B is the observed height of the barometer in inches; t is the temperature of the attached thermometer in degrees Fahrenheit; m = .0001010, the cubical expansion of mercury per degree Fahrenheit and l = .0000102, the linear expansion of brass per degree Fahrenheit. It will be seen that the cubical expansion of mercury is approximately 10 times as great as the linear expansion of brass.

b. Interpolation.

(1) Purpose.

(a) Form SC-80 (sections 1, 2, and 3) gives the temperature corrections to be applied to each reading of the barometer in inches. When the observed thermometer or pressure reading falls between two of the values given in the table, the temperature correction must be derived by interpolation; that is, by obtaining an intermediate term between two values given in the table.

1. Sections 1, 2, and 3 list temperature corrections only for barometer readings in whole and half inches, yet actual readings are obtained to the nearest .001 inch.

2. Thermometer readings are taken to the nearest 1/4° F. Half-degree temperatures are listed from 60° to 95°. Temperatures below 60° and above 96°, however, are given in whole degrees. It is necessary, then, to interpolate when the thermometer reading involves an intermediate quarter-degree temperature.

(b) Interpolating for *either* the barometer reading or the thermometer reading is called *single interpolation*. Interpolating for both barometer and thermometer readings is called *double interpolation*.

(2) Single Interpolation.

(a) Thermometer Reading. When the thermometer reading is not listed in Form SC-80 but the barometer reading is, find the correction values for the temperature immediately above and below the observed reading. A value between the two will be the interpolated temperature value.

EXAMPLE: Thermometer reading 95.5° F; observed barometer reading 30.000 inches. The pertinent part of the tables which would be used in obtaining the correction under these circumstances is:

°F	Height of barometer in inches
	30.000
95	.180
(95.5)	(.181)
96	.182

(Interpolated data which has been added to the table is shown in parentheses.)

Since the correction at 30.0 inches is .180 for 95° and .182 for 96°, it is obvious that the value for 95.5° is .181. The reading of the barometer corrected for temperature is then: 30.000 - .181, 29.819 inches.

(b) Barometer Reading. When the thermometer reading is listed in the table but the pressure reading is not, proceed as follows: Locate the thermometer reading in the tables and follow the horizontal line across to the two values in the vertical pressure columns immediately below and above the observed reading. Subtract the lower value from the higher. Locate the difference thus obtained (.001, .002, .003, or .004) in the first column of the interpolation table at the bottom of the pages. in the horizontal line opposite this difference, a series of decimal pressure intervals is listed; for example, after .001 the intervals .000.250, .500-.750, .251-.500, and .751-.000 are listed. Locate the decimal part of the observed barometer reading in one of these intervals on the same horizontal line with the difference in correction already obtained. Suppose the observed reading is 30.886 inches and the difference between the corrections for 30.5 and for 31.0 inches is .002 inch. Follow the horizontal line opposite .002 to the last pressure interval listed (.875-.000). The decimal value .886 occurs in .the interval between .875-.000. The column heading above this interval gives the amount to be added to the correction listed in the table for the pressure value immediately below the observed pressure. The sum obtained is the interpolated temperature correction which is subtracted from the observed reading of the barometer to obtain true pressure.

EXAMPLE: Thermometer reading: 86° F; observed height of barometer: 30.297 inches. The pertinent part of the table is:

°F	Height of barometer in inches		
	30.000	(30.297)	30.500
86	.155	(.157)	.158

(Data added to tables to illustrate interpolated values are in parentheses.)

The difference between the lower correction and the higher correction is:

.158
-.155
.003

In the first column of the interpolation table of sections 1, 2, and 3, Form SC-80, designated "Differences between adjacent tabulated corrections," find the horizontal line marked .003. Follow this line across to the box which contains the decimal value of the observed reading. This value (.297) is between .250-.416. According to the column heading, the amount to be added to the lower value of the correction is .002.

The lower value of the correction is: .155
The sum to be added is: +.002
Thus, the sum of the correction is: .157.

This amount is subtracted from the observed reading of the barometer.

30.297
-.157
30.140 is the barometer reading corrected for temperature.

(3) Double Interpolation.

(a) Necessity. When neither the thermometer reading nor the barometer reading is listed in the table, it is necessary to interpolate for both. Double interpolation involves both types of single interpolation. That is, it is finding an intermediate value between two thermometer values given in the table and finding an intermediate value between two pressure values given in the table.

(b) Disposal of Decimals. The interpolated value will contain three or four decimal places, depending on the value of the corrections between which interpolation is to be made. Only three decimal places are used in the final value of the temperature correction, and while it is doubtful whether the accuracy obtained justifies consideration of the fourth decimal value, certain rules have been established for determining corrections which involve four decimal places and these rules are in general use throughout the weather services of the United States. It is recommended, therefore, that these rules be applied in determining interpolated values. When the value obtained by interpolation contains four digits in the decimal, it must be reduced to three as follows:

1. Drop the fourth digit when it is less than five (.0634=.063).

2. Increase the preceding figure by one if the fourth digit is more than five (.0637=.064).

3. When the fourth digit is five, drop it if the third digit is an even number (.0685=.068) ; increase the third digit by one if it (the third digit) is an odd number (.0615=.062).

(c) Examples of Double Interpolation. There are three types of double interpolation. An example of each is given below:

EXAMPLE 1. Thermometer reading: 52.5° F, observed barometer reading: 30.297 inches. Interpolate first for temperature by taking the mid-value between 52° and 53° for barometer height of 30.000 and 30.500 inches, as follows:

°F	Height of barometer in inches		
	30.000	(30.297)	30.500
52	.064		.065
(52.5)	(.065)	(.066)	(.066)
53	.155		.067

(Interpolated values are in parentheses.)

To find the interpolated pressure, subtract the lower interpolated temperature correction value from the higher.

.066
<u>- .065</u>
.001

This leaves .001. Find this value in the first column of the interpolation table and follow the line across to the decimal part of the barometer reading (.297). Since the decimal value is between .251-.500, this is the box headed .001, and this amount is added to the lower value of the correction.

.065
<u>+.001</u>
.066

Subtracting this value from the observed reading:

30.297 inches
<u>-.066</u>
30.231 inches is the pressure reading corrected for temperature.

EXAMPLE 2. Thermometer reading: 115.5° F; observed barometer reading: 29.834 inches. Interpolate first for temperature as before:

°F	Height of barometer in inches		
	29.500	(29.834)	30.000
115	.229		.233
(115.5)	(.2305)	(.234)	(.2345)
116	.232		.236

(Interpolated values are in parentheses.)

Subtract the lower interpolated correction value, .2305, from the greater, .2345. The remainder is .004. This is the last line in the interpolation table. Follow it across to the box containing .834, the decimal part of the observed reading, between .813-.937. The amount to be added to the lower value is .003.

.2305
+.003
.2335

When the value obtained by interpolation contains four digits in the decimal, it must be reduced to three according to the rules given in subparagraph (b), disposal of decimals. Following this rule, the interpolated correction, .2335, becomes .234. Subtract the interpolated value from the observed barometer reading.

.29.834 inches
-.234
29.600 inches is the barometer reading, corrected for temperature.

EXAMPLE 3. Thermometer reading: 110.5° F; observed barometer reading: 30.395 inches.

°F	Height of barometer in inches		
	30.000	(30.395)	30.500
110	.220		.224
110.5	(.2215)	(.224)	(.2250)
111	.223		.226

(Interpolated values are shown in parentheses.)

To obtain the temperature correction for 110.5° F take the mid-value between .220 and .223 which is .2215. The mid-value between .224 and .226 is .2250. Subtracting the lower value from the higher, the result is .0035. Since this value is halfway between .003 and .004, the correction for both of these values must be obtained from the interpolation table. For a difference of .003, the amount to be added is .002; for a difference of .004, the amount to be added is .003. Adding these two and finding the mean gives .0025.

.002
+.003
2).005
.0025

When this amount is added to .2215, the lower value of the interpolated temperature .correction, the result is as follows:

.2215
+.0025
.224

Subtract this amount from 30.395 for the observed barometer reading.

30.395 inches
-.224 inches
30.171 inches is the barometer reading corrected for temperature.

c. Extension of Form SC-80, Sections 1, 2, and 3, English Measures.

(1) In sections 1, 2, and 3 the column headed 10.0 inches is provided to permit extension of these tables to pressures below 22 inches of mercury.

(2) Since the temperature correction for any given temperature is directly proportional to the observed height of the barometer, the correction can be computed by adding or subtracting the individual corrections for any combination of pressures which totals the observed pressure.

(3) For example, to compute the temperature correction for a pressure of 20.0 inches with a thermometer reading of 65° F, proceed as follows:

(a) At 65° F, pressure 30.0 inches, correction is -.099.

(b) At 65° F, pressure 10.0 inches, correction is -.033.

(c) Subtracting pressures and corresponding temperature corrections, the correction for a pressure of 20.0 inches at 65° F, is -.066.

55. EXPLANATION OF FORM SC-80, SECTIONS 4 AND 5, CORRECTION OF MERCURIAL BAROMETER FOR TEMPERATURE, DYNAMIC MEASURES.

a. Formula. The formula for reducing observed reading to the standard temperature, 0° C is:

$$C = - B \quad \frac{(m\text{-}l)\, t}{1 + mt}$$

where B is the observed height of the barometer in millibars; t is the temperature of the attached thermometer in degrees centigrade; m = .0001818, and l = .0000184. Since the observed height can be determined to the nearest .05 millibar only, the tabulated temperature corrections have been rounded off to this order of accuracy.

b. Interpolation.

(1) Thermometer Reading. The centigrade scale of the thermometer is read to .1° C intervals. Since the tables list corrections for only whole and half degree intervals, it will be necessary to interpolate between values listed in the tables for temperatures intermediate between whole and half degrees. It will be noted from the tables that the differences in correction between half degrees are always either .05 or .10 millibar. Since barometer heights are measured only to the nearest .05 millibar, interpolated corrections to less than .05 millibar would not improve the accuracy of the

reading and should not be made. The only places where interpolation is possible, then, is where the difference in correction is .10 mb. When the difference between adjacent corrections is .10 millibar and the temperature is intermediate between tabulated corrections, add .05 millibar to the correction for the next lowest temperature listed.

> **EXAMPLE:** If the temperature is 20.1° or 20.6°, use the correction for 20° or 20.5°,-respectively. If the temperature is 20.4° or 20.9°, use the correction for 20.5° or 21°. If the temperature is 20.2° or 20.3°, add .05 mb to the correction for 20°. If the temperature is 20.7° or 20.8°, add .05 mb to the correction for 20.5°. When the difference between adjacent corrections is .05 mb, use the lower correction for temperatures whose decimal parts are .1°, .2°, .6°, and .7°; use the higher correction for decimal parts of .3°, .4°, .8°, and .9°.

(2) Barometer Reading. The interpolation table at the bottom of sections 4 and 5, Form SC-80 is similar in construction and principle to the interpolation table for English measures. (See paragraph 54.) It should be used in the same way except as noted below.

> **EXAMPLE:** Observed barometer reading: 753.65 miillibars; temperature: 37.5° C. Obtain the two correction values from the table for the nearest pressure above and below the observed value. In this instance, these values are 4.50 millibars (correction for 740 millibars) and 4.65 millibars (correction for 760 millibars). Subtracting the lower value from the higher, the difference is .15 millibar. Locate this value in the interpolation table in the column "Differences between adjacent tabulation corrections." From the observed barometer reading, 753.65 millibars, subtract the next lower tabulated pressure value, in this case, 740 millibars. The difference is 13.65. Follow the line marked .15, in the left column of the interpolation table, across the table until a pressure interval, or "box," is found which includes 13.65. This will be found in the box designated 10.05-16.65. According to the column heading, the correction to be added is .10 millibar. This value is added to 4.50, the lower value of the correction, and makes the total temperature

correction 4.60 millibars. Subtract this from the observed pressure.

753.65	millibars
-4.60	
749.05	millibars

The barometer reading corrected for temperature is 749.05 millibars.

(3) Comparison of Methods.

(a) In the examples given above, there appears to be a difference in the way the interpolation tables for inches and for millibars are used. in the inch table, the decimal part of the observed reading was used in entering the interpolation table. In the millibar table, the difference between the observed reading and the next lower tabulated pressure value was used. These procedures are, actually, the same.

(b) Since pressure values are tabulated for each inch and half inch, using the decimal part of the observed reading actually amounts to-subtracting the next lower tabulated pressure from the observed reading. For decimal parts over .500 this may not at first seem to be true. Note, however, that there are two pressure intervals listed in each of the correction columns in the interpolation table for inches. Note also that the minimum and maximum values of these pressure intervals differ from each other by exactly .500; hence, a decimal having a value of .287 has the same correction as the decimal part .787.

(c) As an example, a pressure of 30.287 inches differs from the next lower tabulated pressure value (30.000 inches) by .287 inch. A pressure of 30.787 inches also differs from the next lower tabulated pressure value (30.500 inches) by .287 inch. Therefore, both of these pressures would have the same correction applied and the two interpolation tables are the same in principle of use.

c. Extension of Form SC-80, Sections 4 and 5, Dynamic Measures.

In the millibar table the column headed 300 (millibars) has been provided to permit extension of these tables to pressures below 740 millibars. The principle involved in this extension is identical to that discussed in paragraph for extension of the inch table. For example, the temperature correction for a pressure of 680 millibars at 22.0° C can be computed by evaluating the differences in tabulated corrections for the 98° and 300-millibar columns, as follows:

(1) At 22° C, barometer 980 millibars, correction is: 3.50 millibars.

(2) At 22° C, barometer 300 millibars, correction is: 1.05 millibars.

(3) Subtract pressures and corresponding temperature corrections. For pressure 680 millibars and temperature 22° C, the correction is 2.45 millibars.

SECTION XI. EXPLANATION OF TABLES

56. EXPLANATION OF TABLE I, REDUCTION OF BAROMETER TO STANDARD GRAVITY, ALTITUDE TERM, ENGLISH MEASURES, AND TABLE II, REDUCTION OF BAROMETER TO STANDARD GRAVITY, LATITUDE TERM, ENGLISH MEASURES.

a. General. As noted in paragraph 26c, the gravity corrections furnished on SC Form No. 79 for use with Barometer ML-330/FM are, in most cases, based either on actually measured gravity values or on values interpolated from actual measurements. Hence, these corrections may differ in magnitude from corresponding corrections obtained from the tables. As noted in paragraph 26c(2), however, when the location of a station is changed, and a correction based on measured values of gravity is not immediately available, a gravity correction for emergency use must be computed from tables I and II on the basis of the altitude, latitude, and average annual pressure of the station. A gravity correction for the barometer must be computed for each separate station on the basis of the average annual pressure. This correction is entered on SC Form No. 79 and is applied to each barometer reading. The value of the correction varies with changes in pressure but for a particular location, the variation from the annual average, caused by fluctuations in atmospheric pressure, is so small that it may be neglected.

b. Altitude Correction. The total gravity correction consists of two parts: a correction for the *altitude* of the station and a correction for its *latitude*. An altitude correction must be applied because the value of the acceleration of gravity decreases with elevation above sea level, hence for the same pressure and temperature a vertical mercury column will actually be longer at a higher elevation than at a lower one. in order that pressures measured at

different stations may be compared, the altitude correction must be subtracted from the observed reading to reduce the length of the mercury column to the length it would have *at the same pressure* at sea level. (This must not be confused with sea level pressure. The altitude correction is applied to obtain a more nearly correct value of station pressure, which at elevations above sea level is obviously less than sea-level pressure.) in the rare case where a station may be located below sea level, the altitude correction should be determined from the table in the same manner as for stations above sea level, but it should be *added* to the observed barometer reading rather than subtracted.

c. Use of Altitude Tables.

(1) Altitude corrections are given in table I. The column of figures in the extreme left of this table gives station elevation in intervals of 300 feet from sea level (zero elevation) to 3,000 feet above sea: level, and in intervals of 500 feet from 3,000 to 15,000 feet above sea level. The line of figures extending horizontally across the top of the table headed "Observed height of the barometer in inches" gives the mean annual station pressure from 16 to 30 inches.

(2) When either the station elevation or mean pressure is not listed in the table, it will be necessary to find the value of the correction by single interpolation. When neither the elevation nor the mean pressure is listed in the table, double interpolation must be used.

(3) As an example of the application of double interpolation in this table, assume that the station elevation is 7,740 feet and that the mean pressure is 21.06 inches. The applicable part of table I will be:

Height above sea level	Observed height of barometer in inches		
	20	(21.06)	22
7,500	.014		.016
(7,740)	(.0145)	(.016)	(.0165)
8,000	.015		.017

(Interpolated values added to table are in parentheses.)

(a) First interpolate to obtain the corrections at 20 and 22 inches for 7,740 feet. The difference between the true elevation and the next lower tabular value is: 7,740-7,500=240 feet. The difference between tabulated elevation intervals is 500 feet. The difference between the corrections for both 20 and 22 inches at the tabulated intervals is .001 inch (.015-.014 and .017-.016).

(b) The following proportion may be set up where x is equal to the amount that must be added to the lower value of the correction to obtain the true value:

$$\frac{240}{500} = \frac{x}{.001} \quad x = .00048$$

Reducing to four decimals, the true corrections for 20 and 22 inches, then, will be: .014+.0005=--.0145 and .016+.0005=.0165.

(c) By a similar equation of proportion, the correction for 21.06 inches may be found:

21.06-20.00=1.06, 22-20=2.
.0165-.0145=.002

Then, $\frac{1.06}{2.00} = \frac{x}{.002}$ $x = .00106$, or reducing to four decimals x=.0011. Then the correction for 7,740 feet and 21.6 inches mean pressure is .0145+.0011=.0156. Reducing to the nearest thousandth inch, the correction is .016 inch.

NOTE

See paragraph 54b(3) (b) for rules for reducing decimals.

d. Latitude Correction.

(1) The latitude correction is applied to compensate for the shape of the earth. Since the distance from the surface to the center of the earth gradually decreases towards the poles, the value of the acceleration of gravity increases from the equator toward each pole. By common agreement, the acceleration of gravity at 45° latitude was selected as a standard value to which all barometer readings would be corrected. Since this agreement was reached, more accurate measurements have been made to determine the acceleration of gravity and the value agreed upon for 45° latitude has been found to be slightly in error. The value selected for standard gravity actually occurs at about 45-1/2° latitude.

(2) As noted in b above, all other factors remaining constant, the height of a vertical mercury column increases with decreasing values of the acceleration of gravity. If, then, the gravity correction is zero at 45-1/2° latitude, a mercury column will be higher than it should be at all latitudes below 45-1/2° since the value of the acceleration of gravity is lower than the standard value in these latitudes. Conversely, for latitudes above 45-1/2°, where the acceleration of gravity has a higher value than standard, a mercury column will be shorter than it should be. If all readings of a barometer are to be reduced to standard gravity, a correction must be added when the barometer is located above 45-1/2° and a correction subtracted when it is in latitudes below 45-1/2°.

e. Use of Latitude Tables. Latitude corrections to be applied are given in table II. in the column on the left side of the tables, latitudes from 0° to 90° are listed by degree intervals. Across the top of the table the mean annual station pressure is listed in 1-inch intervals from 16 to 31 inches. Corrections in decimal parts of an inch are given in the body of the table. When the latitude and mean pressure of the station are not listed in the table, the value of the correction must be obtained by interpolation.

NOTE

The corrections given in tables I and II are given in inches of mercury only. When gravity corrections in millibars are to be computed, obtain the gravity correction in inches from the table and multiply this value by 33.86395.

57. EXPLANATION OF TABLE III, INCHES OF MERCURY INTO MILLIBARS, AND TABLE IV, MILLIBARS INTO INCHES OF MERCURY.

a. Table III, *Inches of Mercury into Millibars*, is provided so that mercurial barometer readings in inches may be converted into millibars.

b. Table IV, *Millibars into Inches of Mercury*, is provided so that barometer readings in millibars may be converted into inches of mercury.

c. Readings of the mercurial barometer in either inches or millibars must be corrected for gravity and temperature before the conversion tables are used.

SECTION XII. REQUISITIONING INFORMATION

58. Requisitioning of Equipment

The process by which new instruments are requested, and unserviceable instruments are returned to Anniston Army Depot for calibration and repair, is covered in SB 11492. Interagency request for additional equipments or repair of existing equipments and procedures for transporting standard barometers will be coordinated with the National Inventory Control Point in Philadelphia, Pa. The accuracy required of these barometers requires special handling and should be transported by hand as long as they are in actual service.

SECTION XIII. GLOSSARY

59. GLOSSARY OF TERMS USED IN THIS MANUAL.

Ambient temperature (or pressure). The temperature or pressure of the air surrounding the thermometer or barometer.

Anomaly. The departure of a meteorological element from its normal value. in this manual used chiefly in connection with gravity to indicate the departure from the theoretical value.

Attached thermometer. A thermometer attached to a mercurial barometer for the purpose of ascertaining its temperature.

Capillarity. The action by which the surface of a liquid, when in contact with the sides of a tube of small bore, is elevated or depressed Centering ring. A metal ring, fitted with three screws, which maintains the mercurial barometer in a vertical position.

Centigrade. A temperature scale, in which, at standard pressure, the melting point of ice is 0° and the boiling point of water, 100°.

Cistern. A reservoir which contains part of the mercury of a Fortin-type mercurial barometer and defines the zero point of the barometer. The outside housing is of brass with a glass cylinder at the top to permit a view of the mercury surface; the mass of mercury is held within a kid leather bag, the amount being controlled by an adjusting screw at the bottom.

Correction. A quantity to be applied, when required, to the indication (or the recording) of an instrument to cause the indicated value to equal the true value. When the true value is subtracted from the indicated value, the difference is termed an error; when the

indicated value is subtracted from the true value, the difference is called a correction. in a given case, error and correction are numerically of the same magnitude, but of opposite sign. The application of the correction compensates for the error.

Fahrenheit. The scale generally used in English-speaking countries for measuring temperature in which, at standard pressure, the melting point of ice is 32°, and the boiling point of water, 212°. Named for Gabriel Daniel Fahrenheit, born 1686, in Danzig.

Ivory point. A small cone-shaped piece of ivory attached to the inside surface of the top of the barometer cistern, the point of the cone being the zero end of the barometer scales.

Meniscus. The convex upper surface of a mercury column in a barometer tube.

Millibar. A unit of measurement of atmospheric pressure, in use since 1914. A millibar is one-thousandth of a bar: the bar is defined as a pressure of one million dynes per square centimeter.

Precision aneroid barometers. The term precision is applied to Barometers ML-331/TM, ML-332/TM, and ML-333/TM, because of their higher-than-average degree of accuracy.

Regional Control Office. Headquarters of an Army Air Force weather region.

Vernier. An auxiliary scale for estimating fractions of a scale division when the reading to the nearest whole division on the main scale is not sufficient. The vernier is made to slide alongside the divisions of the main scale. It is named for its inventor Pierre Vernier, a French mathematician.

Zero level. When the surface of the mercury in the cistern is adjusted to the tip of the ivory point, it is said to be adjusted to zero level since the end of the ivory point is the zero end of the barometer scales, the point from which all measurements of the height of the mercury column are made.

SECTION XIV. MAINTENANCE PARTS

60. MAINTENANCE PARTS FOR BAROMETERS ML-330/FM, ML-331/TM, ML-332/TM, AND ML-333/TM.

This equipment will not be repaired in the field but will be returned Anniston Army Depot, for repairs and recalibration.

SECTION XV. TABLES

Table I.
REDUCTION OF BAROMETER TO STANDARD GRAVITY
ALTITUDE TERM, ENGLISH MEASURES

[Correction to be subtracted for height above sea level]

Height above sea level in feet	Observed height of barometer in inches							
	16	18	20	22	24	26	28	30
0	.....	.....	.....	.....	.....	.....	0.000	0.000
300	.....	.....	.....	.....	.....	.....	.001	.001
600	.....	.....	.....	.....	.....	.....	.002	.002
900	.....	.....	.....	.....	.....	0.002	.003	.003
1200	.....	.....	.....	.....	.....	.003	.003	.004
1500	.....	.....	.....	.....	.....	.004	.004	.004
1800	.....	.....	.....	.....	0.004	.004	.005	.005
2100	.....	.....	.....	.....	.005	.005	.006	.006
2400	.....	.....	.....	.....	.006	.006	.006	.....
2700	.....	.....	.....	.....	.006	.007	.007	.....
3000	.....	.....	.....	0.006	.007	.008	.008	.....
3500	.....	.....	.....	.007	.008	.009	.010	.....
4000	.....	.....	.....	.009	.009	.010	.....	.....
4500	.....	.....	.....	.010	.010	.011	.....	.....
5000	.....	.....	0.010	.011	.011	.012	.....	.....
5500	.....	.....	.011	.012	.013	.014	.....	.....
6000	.....	.....	.011	.013	.014	.015	.....	.....
6500	.....	0.011	.012	.014	.015	.....	.....	.....
7000	.....	.012	.013	.015	.016	.....	.....	.....
7500	.....	.013	.014	.016	.017	.....	.....	.....
8000	.....	.014	.015	.017	.018	.....	.....	.....
8500	.....	.015	.016	.018	.....	.....	.....	.....
9000	.....	.016	.017	.019	.....	.....	.....	.....
9500	.....	.016	.018	.020	.....	.....	.....	.....
10000	0.15	.017	.019	.021	.....	.....	.....	.....
10500	.016	.018	.020	.022	.....	.....	.....	.....
11000	.017	.019	.021	.....	.....	.....	.....	.....
11500	.018	.020	.022	.....	.....	.....	.....	.....
12000	.018	.021	.023	.....	.....	.....	.....	.....
12500	.019	.021	.024	.....	.....	.....	.....	.....
13000	.020	.022	.025	.....	.....	.....	.....	.....
13500	.021	.023	.026	.....	.....	.....	.....	.....
14000	.021	.024	.....	.....	.....	.....	.....	.....
14500	.022	.025	.....	.....	.....	.....	.....	.....
15000	.023	.026	.....	.....	.....	.....	.....	.....

Adapted from Table 134, Smithsonian Physical Tables, Eighth Revised Edition, 1934

Table II.

REDUCTION OF BAROMETER TO STANDARD GRAVITY, LATITUDE TERM, ENGLISH MEASURES

[From latitude 0° to 45°, correction to be subtracted]

Latitude (°)	Height of barometer in inches															
	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
	Correction								Subtract				Correction			
0	0.043	0.046	0.048	0.051	0.054	0.056	0.059	0.062	0.064	0.067	0.070	0.072	0.075	0.078	0.080	0.083
5	.042	.045	.047	.050	.053	.055	.058	.061	.063	.066	.069	.071	.074	.077	.079	.082
6	.042	.045	.047	.050	.052	.055	.058	.060	.063	.066	.068	.071	.073	.076	.079	.081
7	.042	.044	.047	.049	.052	.055	.057	.060	.062	.065	.068	.070	.073	.075	.078	.081
8	.041	.044	.046	.049	.052	.054	.057	.059	.062	.064	.067	.070	.072	.075	.077	.080
9	.041	.043	.046	.048	.051	.054	.056	.059	.061	.064	.066	.069	.071	.074	.076	.079
10	.040	.043	.045	.048	.050	.053	.055	.058	.060	.063	.066	.068	.071	.073	.076	.078
11	.040	.042	.045	.047	.050	.052	.055	.057	.060	.062	.065	.067	.070	.072	.075	.077
12	.039	.042	.044	.047	.049	.051	.054	.056	.059	.061	.064	.066	.069	.071	.074	.076
13	.039	.041	.043	.046	.048	.051	.053	.055	.058	.060	.063	.065	.068	.070	.072	.075
14	.038	.040	.043	.045	.047	.050	.052	.055	.057	.059	.062	.064	.066	.069	.071	.073
15	.037	.040	.042	.044	.047	.049	.051	.053	.056	.058	.060	.063	.065	.067	.070	.072
16	.036	.039	.041	.043	.046	.048	.050	.052	.055	.057	.059	.062	.064	.066	.068	.071
17	.036	.038	.040	.042	.045	.047	.049	.051	.053	.056	.058	.060	.062	.065	.067	.069
18	.035	.037	.039	.041	.044	.046	.048	.050	.052	.054	.057	.059	.061	.063	.065	.067
19	.034	.036	.038	.040	.042	.045	.047	.049	.051	.053	.055	.057	.059	.062	.064	.066
20	.033	.035	.037	.039	.041	.043	.045	.047	.050	.052	.054	.056	.058	.060	.062	.064
21	.032	.034	.036	.038	.040	.042	.044	.046	.048	.050	.052	.054	.056	.058	.060	.062
22	.031	.033	.035	.037	.039	.041	.043	.045	.047	.049	.050	.052	.054	.056	.058	.060
23	.030	.032	.034	.036	.038	.039	.041	.043	.045	.047	.049	.051	.053	.054	.056	.058
24	.029	.031	.033	.034	.036	.038	.040	.042	.043	.045	.047	.049	.051	.052	.054	.056

25	.028	.030	.031	.033	.035	.037	.038	.040	.042	.043	.045	.047	.049	.050	.052	.054
26	.027	.028	.030	.032	.033	.035	.037	.038	.040	.042	.043	.045	.047	.048	.050	.052
27	.026	.027	.029	.030	.032	.033	.035	.037	.038	.040	.041	.043	.045	.046	.048	.049
28	.024	.026	.027	.029	.030	.032	.033	.035	.036	.038	.039	.041	.043	.044	.046	.047
29	.023	.025	.026	.027	.029	.030	.032	.033	.035	.036	.037	.039	.040	.042	.043	.045
30	.022	.023	.025	.026	.027	.029	.030	.031	.033	.034	.035	.037	.038	.040	.041	.042
31	.021	.022	.023	.024	.026	.027	.028	.030	.031	.032	.033	.035	.036	.037	.038	.040
32	.019	.020	.022	.023	.024	.025	.026	.028	.029	.030	.031	.032	.034	.035	.036	.037
33	.018	.019	.020	.021	.022	.023	.025	.026	.027	.028	.029	.030	.031	.032	.034	.035
34	.017	.018	.019	.020	.021	.022	.023	.024	.025	.026	.027	.028	.029	.030	.031	.032
35	.015	.016	.017	.018	.019	.020	.021	.022	.023	.024	.025	.026	.027	.027	.028	.029
36	.014	.015	.015	.016	.017	.018	.019	.020	.021	.022	.022	.023	.024	.025	.026	.027
37	.012	.013	.014	.015	.015	.016	.017	.018	.019	.019	.020	.021	.022	.022	.023	.024
38	.011	.012	.012	.013	.014	.014	.015	.016	.016	.017	.018	.018	.019	.020	.020	.021
39	.009	.010	.011	.011	.012	.012	.013	.014	.014	.015	.015	.016	.017	.017	.018	.018
40	.008	.009	.009	.010	.010	.011	.011	.012	.012	.013	.013	.014	.014	.015	.015	.016
41	.007	.007	.007	.008	.008	.009	.009	.009	.010	.010	.011	.011	.012	.012	.012	.013
42	.005	.005	.005	.006	.006	.006	.007	.007	.007	.008	.008	.008	.009	.009	.009	.010
43	.004	.004	.004	.004	.005	.005	.005	.005	.005	.006	.006	.006	.006	.007	.007	.007
44	.002	.002	.002	.003	.003	.003	.003	.003	.003	.003	.004	.004	.004	.004	.004	.004
45	.001	.001	.001	.001	.001	.001	.001	.001	.001	.001	.001	.001	.001	.001	.001	.001

Adapted from Table 49, Smithsonian Meteorological Tables, Fifth Revised Edition, 1939

Table II.

REDUCTION OF BAROMETER TO STANDARD GRAVITY, LATITUDE TERM, ENGLISH MEASURES, (CONTD)

[From latitude 46° to 90°, correction to be added]

Latitude (°)	Height of barometer in inches															
	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
	Correction								Add				Correction			
46	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0 001	0.001	0.001	0.001	0.001
47	.002	.002	.003	.003	.003	.003	.003	.003	.003	.003	.004	.004	.004	.004	.004	.004
48	.004	.004	.004	.004	.005	.005	.005	.005	.006	.006	.006	.006	.006	.007	.007	.007
49	.005	.005	.006	.006	.006	.007	.007	.007	.008	.008	.008	.009	.009	.009	.010	.010
50	.007	.007	.007	.008	.008	.009	.009	.010	.010	.010	.011	.011	.012	.012	.012	.013
51	.008	.009	.009	.010	.010	.011	.011	.012	.012	.013	.013	.014	.014	.015	.015	.016
52	.010	.010	.011	.011	.012	.012	.013	.014	.014	.015	.015	.016	.016	.017	.018	.018
53	.011	.012	.012	.013	.014	.014	.015	.016	.016	.017	.018	.018	.019	.019	.020	.021
54	.012	.013	.014	.015	.015	.016	.017	.018	.019	.019	.020	.021	.022	.022	.023	.024
55	.014	.015	.015	.016	.017	.018	.019	.020	.021	.021	.022	.023	.024	.025	.026	.027
56	.015	.016	.017	.018	.019	.020	.021	.022	.023	.024	.024	.026	.026	.027	.028	.029
57	.016	.018	.019	.020	.021	.022	.023	.024	.025	.026	.027	.028	.029	.030	.031	.032
58	.018	.019	.020	.021	.022	.023	.025	.026	.027	.028	.029	.030	.031	.032	.033	.035
59	.019	.020	.022	.023	.024	.025	.026	.028	.029	.030	.031	.032	.033	.035	.036	.037
60	.020	.022	.023	.024	.026	.027	.028	.029	.031	.032	.033	.034	.036	.037	.038	.040
61	.022	.023	.024	.026	.027	.028	.030	.031	.033	.034	.035	.037	.038	.039	.041	.042
62	.023	.024	.026	.027	.029	.030	.032	.033	.034	.036	.037	.039	.040	.042	.043	.044
63	.024	.026	.027	.029	.030	.032	.033	.035	.036	.038	.039	.041	.042	.044	.045	.047
64	.025	.027	.028	.030	.032	.033	.035	.036	.038	.040	.041	.043	.044	.046	.047	.049
65	.026	.028	.030	.031	.033	.035	.036	.038	.040	.041	.043	.045	.046	.048	.050	.051
66	.028	.029	.031	.033	.034	.036	.038	.040	.041	.043	.045	.047	.048	.050	.052	.053
67	.029	.030	.032	.034	.036	.038	.039	.041	.043	.045	.047	.048	.050	.052	.054	.056
68	.030	.032	.033	.035	.037	.039	.041	.043	.045	.046	.048	.050	.052	.054	.056	.058
69	.031	.033	.035	.036	.038	.040	.042	.044	.046	.048	.050	.052	.054	.056	.058	.060

70.....	.032	.054	.036	.038	.040	.042	.044	.046	.048	.050	.052	.053	.055	.057	.059	.061
71.....	.033	.035	.037	.039	.041	.043	.045	.047	.049	.051	.053	.055	.057	.059	.061	.063
72.....	.034	.036	.038	.040	.042	.044	.046	.048	.050	.052	.054	.057	.059	.061	.063	.065
73.....	.034	.037	.039	.041	.043	.045	.047	.049	.052	.054	.056	.058	.060	.062	.064	.067
74.....	.035	.037	.040	.042	.044	.046	.048	.051	.053	.055	.057	.059	.062	.064	.066	.068
75.....	.036	.038	.040	.043	.045	.047	.049	.052	.054	.056	.058	.061	.063	.065	.067	.070
76.....	.037	.039	.041	.044	.046	.048	.050	.053	.055	.057	.060	.062	.064	.066	.069	.071
77.....	.037	.040	.042	.044	.047	.049	.051	.054	.056	.058	.061	.063	.065	.068	.070	.072
78	.038	.040	.043	.045	.047	.050	.052	.055	.057	.059	.062	.064	.066	.069	.071	.074
79.....	.039	.041	.043	.046	.048	.051	.053	.055	.058	.060	.063	.065	.067	.070	.072	.075
80.....	.039	.042	.044	.046	.049	.051	.054	.056	.059	.061	.063	.066	.068	.071	.073	.076
81	.040	.042	.045	.047	.049	.052	.054	.057	.059	.062	.064	.067	.069	.072	.074	.077
82.....	.040	.042	.045	.047	.050	.052	.055	.057	.060	.062	.065	.067	.070	.072	.075	.077
83.....	.040	.043	.045	.048	.050	.053	.056	.058	.061	.063	.066	.068	.071	.073	.076	.078
84.....	.041	.043	.046	.048	.051	.053	.056	.059	.061	.064	.066	.069	.071	.074	.076	.079
85.....	.041	.044	.046	.049	.051	.054	.056	.059	.061	.064	.067	.069	.072	.074	.077	.079
90.....	.042	.044	.047	.049	.052	.055	.057	.060	.062	.065	.068	.070	.073	.075	.078	.081

Adapted from Table 49, Smithsonian Meteorological Tables, Fifth Revised Edition, 1939.

Table III

INCHES OF MERCURY INTO MILLIBARS

1 inch = 33.86395 mb.

Inches	0.000	0.002	0.004	0.006	0.008	Inches	0.000	0.002	0.004	0.006	0.008
16.00	541.8	541.9	542.0	5420	542.1	16.45	557.1	557.1	557.2	557.3	557.3
16.01	542.2	542.2	542.3	542.4	542.4	16.46	557.4	557.5	557.5	557.6	557.7
16.02	542.5	542.6	542.6	542.7	542.8	16.47	557.7	557.8	557.9	557.9	558.0
16.03	542.8	542.9	543.0	543.0	543.1	16.48	558.1	558.1	558.2	558.3	558.3
16.04	543.2	543.2	543.3	543.4	543.4	16.49	558.4	558.5	558.6	558.6	558.7
16.05	543.5	543.6	543.7	543.7	543.8	16.50	558.8	558.8	558 9	559.0	559.0
16.06	543.9	543.9	544.0	544.1	544.1	16.51	559.1	559.2	559.2	559.3	559.4
16.07	544.2	544.3	544.3	544.4	544.5	16.52	559.4	559.5	559.6	559.6	559.7
16.08	544.5	544.6	544.7	544.7	544.8	16.53	559.8	559.8	559.9	560.0	560.0
16.09	544.9	544.9	545.0	545.1	545.1	16.54	560.1	560.2	560.2	560.3	560.4
16.10	545.2	545.3	545.3	545.4	545.5	16.55	560.4	560.5	560.6	560.7	560.7
16.11	545.5	545.6	545.7	545.7	545.8	16.56	560.8	560.9	560.9	561.0	561.1
16.12	545.9	546.0	546.0	546.1	546.2	16.57	561.1	561.2	561.3	561.3	561.4
16.13	546.2	546.3	546.4	546.4	546.5	16.58	561.5	561.5	561.6	561.7	561.7
16.14	546.6	546.6	546.7	546.8	546.8	16.59	561.8	561.9	561.9	562.0	562.1
16.15	546.9	547.0	547.0	547.1	547.2	16.60	562.1	562.2	562.3	562.3	562.4
16.16	547.2	547.3	547.4	547.4	547.5	16 61	562.5	562.5	562.6	562.7	562.8
16.17	547.6	547.6	547.7	547.8	547.9	16.62	562.8	562.9	563.0	563.0	563.1
16.18	547.9	548.0	548.1	548.1	548.2	16.63	563.2	563.2	563.3	563.4	563.4
16.19	548.3	548.3	548.4	548.5	548.5	16 64	563.5	563.6	563.6	563.7	563.8
16.20	548.6	548.7	548.7	548.8	548.9	16.65	563.8	563.9	564.0	564.0	564.1
16.21	548.9	549.0	549.1	549.1	549.2	16.66	564.2	564.2	564.3	564.4	564.4
16.22	549.3	549.3	549.4	549.5	549.5	16.67	564.5	564.6	564.6	564.7	564.8
16.23	549.6	549.7	549.7	549.8	549.9	16.68	564.9	564.9	565.0	565.1	565.1
16.24	550.0	550.0	550.1	550.2	550.2	16.69	565.2	565.3	565.3	565.4	565.5
16.25	550.3	550.4	550.4	550.5	550.6	16.70	565.5	565.6	565.7	565.7	565.8
16.26	550.6	550.7	550.8	550.8	550.9	16.71	565.9	565.9	566.0	566.1	566.1
16.27	551.0	551.0	551.1	551.2	551.3	16.72	566.2	566.3	566.3	566.4	566.5
16.28	551.3	551.4	551.4	551.5	551.6	16.73	566.5	566.6	566.7	566.7	566.8
16.29	551.6	551.7	551.8	551.8	551.9	16.74	566.9	567.0	567.0	567.1	567.2
16.30	552.0	552.1	552.1	552.2	552.3	16.75	567.2	567.3	567.4	567.4	567.5
16.31	552.3	552.4	552.5	552.5	552.6	16.76	567.6	567.6	567.7	567.8	567.8
16.32	552.7	552.7	552.8	552.9	552 9	16.77	567.9	568.0	568.0	568.1	568.2
16.33	553.0	553.1	553.1	553.2	553.3	16.78	568.2	568.3	568.4	568.4	568.5
16.34	553.3	553.4	553.5	553.5	553.6	16.79	568.6	568.6	568.7	568.8	568.8
16.35	553.7	553.7	553.8	553.9	553.9	16.80	568.9	569.0	569.0	569.1	569.2
16.36	554.0	554.1	554.1	554.2	554.3	16.81	569.3	569.3	569.4	569.5	569.5
16.37	554.4	554.4	554.5	554.6	554.6	16.82	569.6	569.7	569.7	569.8	569.9
16.38	554.7	554.8	554.8	554.9	555.0	16.83	569.9	570.0	570.1	570.1	570.2
16.39	555.0	555.1	555.2	555.2	555.3	16.84	570.3	570.3	570.4	570.5	570.5
16.40	555.4	555.4	555.5	555.6	555.6	16.85	570.6	570.7	570.7	570.8	570.9
16.41	555.7	555.8	555.8	555.9	556.0	16.86	570.9	571.0	571.1	571.1	571.2
16.42	556.0	556.1	556.2	556.2	556.3	16.87	571.3	571.4	571.4	571.5	571.6
16.43	556.4	556.5	556.5	556.6	556.7	16.88	571.6	571.7	571.8	571.8	571.9
16.44	556.7	556.8	556.9	556.9	557.0	16.89	572.0	572.0	572.1	572.2	572.2

Table III (cont'd)
INCHES OF MERCURY INTO MILLIBARS
1 Inch - 33.86395 mb.

Inches	0.000	0.002	0.004	0.006	0.008	Inches	0.000	0.002	0.004	0.006	0.008
16.90	572.3	572.4	572.4	572.5	572.6	17.35	587.5	587.6	587.7	587.7	587.8
16.91	572.6	572.7	572.8	572.8	572.9	17.36	587.9	587.9	588.0	588.1	588.1
16.92	573.0	573.0	573.1	573.2	573.2	17.37	588.2	588.3	588.4	588.4	588.5
16.93	573.3	573.4	573.5	573.5	573.6	17.38	588.6	588.6	588.7	588.8	588.8
16.94	573.7	573.7	573.8	573.9	573.9	17.39	588.9	589.0	589.0	589.1	589.2
16.95	574.0	574.1	574.1	574.2	574.3	17.40	589.2	589.3	589.4	589.4	589.5
16.96	574.3	574.4	574.5	574.5	574.6	17.41	589.6	589.6	589.7	589.8	589.8
16.97	574.7	574.7	574.8	574.9	574.9	17.42	589.9	590.0	590.0	590.1	590.2
16.98	575.0	575.1	575.1	575.2	575.3	17.43	590.2	590.3	590.4	590.5	590.5
16.99	575.3	575.4	575.5	575.6	575 6	17.44	590.6	590.7	590.7	590.8	590.9
17.00	575.7	575.8	575.8	575.9	576.0	17.45	590.9	591.0	591.1	591.1	591.2
17.01	576.0	576.1	576.2	576.2	576.3	17.46	591.3	591.3	591.4	591.5	591.5
17.02	576.4	576.4	576.5	576.6	576.6	17.47	591.6	591.7	591.7	591.8	591.9
17.03	576.7	576.8	576.8	576.9	576.0	17.48	591.9	592.0	592.1	592.1	592.2
17.04	577.0	577.1	577.2	577.2	577.3	17.49	592.3	592.3	592.4	592.5	592.6
17.05	577.4	577.4	577.5	577.6	577.7	17.50	592.6	592.7	592.8	592.8	592.9
17.06	577.7	577.8	577.9	577.9	578.0	17.51	593.0	593.0	593.1	593.2	593.2
17.07	578.1	578.1	578.2	578.3	578.3	17.52	593.3	593.4	593.4	593.5	593.6
17.08	578.4	578.5	578.5	578.6	578.7	17.53	593.6	593.7	593.8	593.8	593.9
17.09	578.7	578.8	578.9	578.9	579.0	17.54	594.0	594.0	594.1	594.2	594.2
17.10	579.1	579.1	579.2	579.3	579.3	17.55	594.3	594.4	594.4	594.5	594.6
17.11	579.4	579.5	579.5	579.6	579.7	17.56	594.7	594.7	594.8	594.9	594.9
17.12	579.8	579.8	579.9	580.0	580.0	17.57	595.0	595.1	595.1	595.2	595.3
17.13	580.1	580.2	580.2	580.3	580.4	17.58	595.3	595.4	595.5	595.5	595.6
17.14	580.4	580.5	580.6	580.6	580.7	17.59	595.7	595.7	595.8	595.9	595.9
17.15	580.8	580.8	580.9	581.0	581.0	17.60	596.0	596.1	596.1	596.2	596.3
17.16	581.1	581.2	581.2	581.3	581.4	17.61	596.3	596.4	596.5	596.5	596.6
17.17	581.4	581.5	581.6	581.6	581.7	17.62	596.7	596.8	596.8	596.9	597.0
17.18	581.8	581.9	581.9	582.0	582.1	17.63	597.0	597.1	597.2	597.2	597.3
17.19	582.1	582.2	582.3	582.3	582.4	17.64	597.4	597.4	597.5	597.6	597.6
17.20	582.5	582.5	582.6	582.7	582.7	17.65	597.7	597.8	597.8	597.9	598.0
17.21	582.8	582.9	583.0	583.0	583.1	17.66	598.0	598.1	598.2	598.2	598.3
17.22	583.1	583.2	583.3	583.3	583.4	17.67	598.4	598.4	598.5	598.6	598.6
17.23	583.5	583.5	583.6	583.7	583.7	17.68	598.7	598.8	598.9	598.9	599.0
17.24	583.8	583.9	583.9	584.0	584.1	17.69	599.1	599.1	599.2	599.3	599.3
17.25	584.2	584.2	584.4	584.4	584.4	17.70	599.4	599.5	599.5	599.6	599.7
17.26	584.5	584.6	584.6	584.7	584.8	17.71	599.7	599.8	599.9	599.9	600.0
17.27	584.8	584.9	585.0	585.0	585.1	17.72	600.1	600.1	600.2	600.3	600.3
17.28	585.2	585.2	585.3	585.4	585.4	17.73	600.4	600.5	600.5	600.6	600.7
17.29	585.5	585.6	585.6	585.7	585.8	17.74	600.7	600.8	600.9	600.9	601.0
17.30	585.8	585.9	586.0	586.0	586.1	17.75	601.1	601.2	601.2	601.3	601.4
17.31	586.2	586.3	586.3	586.4	586.5	17.76	601.4	601.5	601.6	601.6	601.7
17.32	586.5	586.6	586.7	586.7	586.8	17.77	601.8	601.8	601.9	602.0	602.0
17.33	586.9	586.9	587.0	587.1	587.1	17.78	602.1	602.2	602.2	602.3	602.4
17.34	587.2	587.3	587.3	587.4	587.5	17.79	602.4	602.5	602.6	602.6	602.7

Table III (cont'd)
INCHES OF MERCURY INTO MILLIBARS
1 Inch - 33.86395 mb.

Inches	0.000	0.002	0.004	0.006	0.008	Inches	0.000	0.002	0.004	0.006	0.008
17.80	602.8	602.8	602.9	603.0	603.0	18.25	618.0	618.1	618.2	618.2	618.3
17.81	603.1	603.2	603.3	603.3	603.4	18.26	618.4	618.4	618.5	618.6	618.6
17.82	603.5	603.5	503.6	603.7	603.7	18.27	618.7	618.8	618.8	618.9	619.0
17.83	603.8	603.9	603.9	604.0	604.1	18.28	619.0	619.1	619.2	619.2	619.3
17.84	604.1	604.2	604.3	604.3	604.4	18.29	619.4	619.4	619.5	619.6	619.6
17.85	604.5	604.5	604.6	604.7	604.7	18.30	619.7	619.8	619.8	619.9	620.0
17.86	604.8	604.9	604.9	605.0	605.1	18.31	620.0	620.1	620.2	620.3	620.3
17.87	605.1	605.2	605.3	605.4	605.4	18.32	620.4	620.5	620.5	620.6	620.7
17.88	605.5	605.6	605.6	605.7	605.8	18.33	620.7	620.8	620.9	620.9	621.0
17.89	605.8	605.9	606.0	606.0	606.1	18.34	621.1	621.1	621.2	621.3	621.3
17.90	606.2	606.2	606.3	606.4	606.4	18.35	621.4	621.5	621.5	621.6	621.7
17.91	606.5	606.6	606.6	606.7	606.8	18.36	621.7	621.8	621.9	621.9	622.0
17.92	606.8	606.9	607.0	607.0	607.1	18.37	622.1	622.1	622.2	622.3	622.4
17.93	607.2	607.2	607.3	607.4	607.5	18.38	622.4	622.5	622.6	622.6	622.7
17.94	607.5	607.6	607.7	607.7	607.8	18.39	622.8	622.8	622.9	623.0	623.0
17.95	607.9	607.9	608.0	608.1	608.1	18.40	623.1	623.2	623.2	623.3	623.4
17.96	608.2	608.3	608.3	608.4	608.5	18.41	623.4	623.5	623.6	623.6	623.7
17.97	608.5	608.6	608.7	608.7	608.8	18.42	623.8	623.8	623.9	624.0	624.0
17.98	608.9	608.9	609.0	609.1	609.1	18.43	624.1	624.2	624.2	624.3	624.4
17.99	609.2	609.3	609.3	609.4	609.5	18.44	624.5	624.5	624.6	624.7	624.7
18.00	609.6	609.6	609.7	609.8	609.8	18.45	624.8	624.9	624.9	625.0	625.1
18.01	609.9	610.0	610.0	610.1	610.2	18.46	625.1	625.2	625.3	625.3	625.4
18.02	610.2	610.3	610.4	610.4	610.5	18.47	6255	625.5	625.6	625.7	625.7
18.03	610.6	610.6	610.7	610.8	610.8	18.48	625.8	625.9	625.9	626.0	626.1
18.04	610.9	611.0	611.0	611.1	611.2	18.49	626.1	626.2	626.3	626.3	626.4
18.05	611.2	611.3	611.4	611.4	611.5	18.50	626.5	626.6	626.6	626.7	626.8
18.06	611.6	611.7	611.7	611.8	611.9	18.51	626.8	626.9	627.0	627.0	627.1
18.07	611.9	612.0	612.1	612.1	612.2	18.52	627.2	627.2	627.3	627.4	627.4
18.08	612.3	612.3	612.4	612.5	612.5	18.53	627.5	627.6	627.6	627.7	627.8
18.09	612.6	612.7	612.7	612.8	612.9	18.54	627.8	627.9	628.0	628.0	628.1
18.10	612.9	613.0	613.1	613.1	613.2	18.55	628.2	628.2	628.3	628.4	628.4
18.11	613.3	613.3	613.4	613.5	613.5	18.56	628.5	628.6	628.7	628.7	628.8
18.12	613.6	613.7	613.8	613.8	613.9	18.57	628.9	628.9	629.0	629.1	629.1
18.13	614.0	614.0	614.1	614.2	614.2	18.58	629.2	629.3	629.3	629.4	629.5
18.14	614.3	614.4	614.4	614.5	614.6	18.59	629.5	629.6	629.7	629.7	629.8
18.15	614.6	614.7	614.8	614.8	614.9	18.60	629.9	629.9	630.0	630.1	630.1
18.16	615.0	615.0	615.1	615.2	615.2	18.61	630.2	630.3	630.3	630.4	630.5
18.17	615.3	615.4	615.4	615.5	615.6	18.62	630.5	630.6	630.7	630.7	630.8
18.18	615.6	615.7	615.8	615.8	615.9	18.63	630.9	631.0	631.0	631.1	631.2
18.19	616.0	616.1	616.1	616.2	616.3	18.64	631.2	631.3	631.4	631.4	631.5
18.20	616.3	616.4	616.5	616.5	616.6	18.65	631.6	631.6	631.7	631.8	631.8
18.21	616.7	616.7	616.8	616.9	616.9	18.66	631.9	632.0	632.0	632.1	632.2
18.22	617.0	617.1	617.1	617.2	617.3	18.67	632.2	632.3	632.4	632.4	632.5
18.23	617.3	617.4	617.5	617.5	617.6	18.68	632.6	632.6	632.7	632.8	632.8
18.24	617.7	617.7	617.8	617.9	617.9	18.69	632.9	633.0	633.1	633.1	633.2

Table III (cont'd)
INCHES OF MERCURY INTO MILLIBARS
1 Inch - 33.86395 mb.

Inches	0.000	0.002	0.004	0.006	0.008	Inches	0.000	0.002	0.004	0.006	0.008
18.70	633.3	633.3	633.4	633.5	633.5	19.15	648.5	648.6	648.6	648.7	648.8
18.71	633.6	633.7	633.7	633.8	633.9	19.16	648.8	648.9	649.0	649.0	649.1
18.72	633.9	634.0	634.1	634.1	634.2	19.17	649.2	649.2	649.3	649.4	649.4
18.73	634.3	634.3	634.4	634.5	634.5	19.18	649.5	649.6	649.6	649.7	649.8
18.74	634.6	634.7	634.7	634.8	634.9	19.19	649.8	649.9	650.0	650.1	650.1
18.75	634.9	635.0	635.1	635.2	635.2	19.20	650.2	650.3	650.3	650.4	650.5
18.76	635.3	635.4	635.4	635.5	635.6	19.21	650.5	650.6	650.7	650.7	650.8
18.77	635.6	635.7	635.8	635.8	635.9	19.22	650.9	650.9	651.0	651.1	651.1
18.78	636.0	636.0	636.1	636.2	636.2	19.23	651.2	651.3	651.3	651.4	651.5
18.79	636.3	636.4	636.4	636.5	636.6	19.24	651.5	651.6	651.7	651.7	651.8
18.80	636.6	636.7	686.8	636.8	636.9	19.25	651.9	651.9	652.0	652.1	652.2
18.81	637.0	637.0	637.1	637.2	637.3	19.26	652.2	652.3	652.4	652.4	652.5
18.82	637.3	637.4	637.5	637.5	637.6	19.27	652.6	652.6	652.7	652.8	652.8
18.83	637.7	637.7	637.8	637.9	637.9	19.28	652.9	653.0	653.0	653.1	653.2
18.84	638.0	638.1	638.1	638.2	638.3	19.29	653.2	653.3	653.4	653.4	653.5
18.85	638.3	638.4	638.5	638.5	638.6	19.30	653.6	653.6	653.7	653.8	653.8
18.86	638.7	638.7	638.8	638.9	638.9	19.31	653.9	654.0	654.0	654.1	654.2
18.87	639.0	639.1	639.1	639.2	639.3	19.32	654.3	654.3	654.4	654.5	654.5
18.88	639.4	639.4	639.5	639.6	639.6	19.33	654.6	654.7	654.7	654.8	654.9
18.89	639.7	639.8	639.8	639.9	640.0	19.34	654.9	655.0	655.1	655.1	655.2
18.90	640.0	640.1	640.2	640.2	640.3	19.35	655.3	655.3	655.4	655.5	655.5
18.91	640.4	640.4	640.5	640.6	640.6	19.36	655.6	655.7	655.7	655.8	655.9
18.92	640.7	640.8	640.8	640.9	641.0	19.37	655.9	656.0	656.1	656.1	656.2
18.93	641.0	641.1	641.2	641.2	641.3	19.38	656.3	656.4	656.4	656.5	656.6
18.94	641.4	641.5	641.5	641.6	641.7	19.39	656.6	656.7	656.8	656.8	656.9
18.95	641.7	641.8	641.9	641.9	642.0	19.40	657.0	657.0	657.1	657.2	657.2
18.96	642.1	642.1	642.2	642.3	642.3	19.41	657.3	657.4	657.4	657.5	657.6
18.97	642.4	642.5	642.5	642.6	642.7	19.42	657.6	657.7	657.8	657.8	657.9
18.98	642.7	642.8	642.9	642.9	643.0	19.43	658.0	658.0	658.1	658.2	658.2
18.99	643.1	643.1	643.2	643.3	643.3	19.44	658.3	658.4	658.5	658.5	658.6
19.00	643.4	643.5	643.6	643.6	643.7	19.45	658.7	658.7	658.8	658.9	658.9
19.01	643.8	643.8	643.9	644.0	644.0	19.46	659.0	659.1	659.1	659.2	659.3
19.02	644.1	644.2	644.2	644.3	644.4	19.47	659.3	659.4	659.5	659.5	659.6
19.03	644.4	644.5	644.6	644.6	644.7	19.48	659.7	659.7	659.8	659.9	659.9
19.04	644.8	644.8	644.9	645.0	645.0	19.49	660.0	660.1	660.1	660.2	660.3
19.05	645.1	645.2	645.2	645.3	645.4	19.50	660.3	660.4	660.5	660.6	660.6
19.06	645.4	645.5	645.6	645.7	645.7	19.51	660.7	660.8	660.8	660.9	661.0
19.07	645.8	645.9	645.9	646.0	646.1	19.52	661.0	661.1	661.2	661.2	661.3
19.08	646.1	646.2	646.3	646.3	646.4	19.53	661.4	661.4	661.5	661.?	661.6
19.09	646.5	646.5	646.6	646.7	646.7	19.54	661.7	661.8	661.8	661.9	662.0
19.10	646.8	646.9	646.9	647.0	647.1	19.55	662.0	662.1	662.2	662.2	662.3
19.11	647.1	647.2	647.3	647.3	647.4	19.56	662.4	662.4	662.5	662.6	662.6
19.12	647.5	647.5	647.6	647.7	647.7	19.57	662.7	662.8	662.9	662.9	663.0
19.13	647.8	647.9	648.0	648.0	648.1	19.58	663.1	663.1	663.2	663.3	663.3
19.14	648.2	648.2	648.3	648.4	648.4	19.59	663.4	663.5	663.5	663.6	663.7

Table III (cont'd)
INCHES OF MERCURY INTO MILLIBARS
1 Inch - 33.86395 mb.

Inches	0.000	0.002	0.004	0.006	0.008	Inches	0.000	0.002	0.004	0.006	0.008
19.60	663.7	663.8	663.9	663.9	664.0	20.05	679.0	679.0	679.1	679.2	679.2
19.61	664.1	664.1	664.2	664.3	664.3	20.06	679.3	679.4	679.4	679.5	679.6
19.62	664.4	664.5	664.5	664.6	664.7	20.07	679.6	679.7	679.8	679.9	679.9
19.63	664.7	664.8	664.9	665.0	665.0	20.08	680.0	680.1	680.1	680.2	680.3
19.64	665.1	665.2	665.2	665.3	665.4	20.09	680.3	680.4	680.5	680.5	680.6
19.65	665.4	665.5	665.6	665.6	665.7	20.10	680.7	680.7	680.8	680.9	680.9
19.66	665.8	665.8	665.9	666.0	666.0	20.11	681.0	681.1	681.1	681.2	681.3
19.67	666.1	666.2	666.2	666.3	666.4	20.12	681.3	681.4	681.5	681.5	681.6
19.68	666.4	666.5	666.6	666.6	666.7	20.13	681.7	681.7	681.8	681.9	682.0
19.69	666.8	6668	666.9	667.0	667.1	20.14	682.0	682.1	682.2	682.2	682.3
19.70	667.1	667.2	667.3	667.3	667.4	20.15	682.4	682.4	682.5	682.6	682.6
19.71	667.5	667.5	667.6	667.7	667.7	20.16	682.7	682.8	682.8	682.9	683.0
19.72	667.8	667.9	667.9	668.0	668.1	20.17	683.0	683.1	683.2	683.2	683.3
19.73	668.1	668.2	668.3	668.3	668.4	20.18	683.4	683.4	683.5	683.6	683.6
19.74	668.5	668.5	668.6	668.7	668.7	20.19	683.7	683.8	683.8	683.9	684.0
19.75	668.8	668.9	668.9	669.0	669.1	20.20	684.1	684.1	684.2	684.3	684.3
19.76	669.2	669.2	669.3	669.4	669.4	20.21	684.4	684.5	684.5	684.6	684.7
19.77	669.5	669.6	669.6	669.7	669.8	20.22	684.7	684.8	684.9	684.9	685.0
19.78	669.8	669.9	670.0	670.0	670.1	20.23	685.1	685.1	685.2	685.3	685.3
19.79	670.2	670.2	670.3	670.4	670.4	20.24	685.4	685.5	685.5	685.6	685.7
19.80	670.5	670.6	670.6	670.7	670.8	20.25	685.7	685.8	685.9	685.9	686.0
19.81	670.8	670.9	671.0	671.0	671.1	20.26	686.1	686.2	686.2	686.3	686.4
19.82	671.2	671.3	671.3	671.4	671.5	20.27	686.4	686.5	686.6	686.6	686.7
19.83	671.5	671.6	671.7	671.7	671.8	20.28	686.8	686.8	686.9	687.0	687.0
19.84	671.9	671.9	672.0	672.1	672.1	20.29	687.1	687.2	687.2	687.3	687.4
19.85	672.2	672.3	672.3	672.4	672.5	20.30	687.4	687.5	687.6	687.6	687.7
19.86	672.5	672.6	672.7	672.7	672.8	20.31	687.8	687.8	687.9	688.0	688.0
19.87	672.9	672.9	673.0	673.1	673.1	20.32	688.1	688.2	688.3	688.3	688.4
19.88	673.2	673.3	673.4	673.4	673.5	20.33	688.5	688.5	688.6	688.7	688.7
19.89	673.6	673.6	673.7	673.8	673.8	20.34	688.8	688.9	688.9	689.0	689.1
19.90	673.9	674.0	674.0	674.1	674.2	20.35	689.1	689.2	689.3	689.3	689.4
19.91	674.2	674.3	674.4	674.4	674.5	20.36	689.5	689.5	689.6	689.7	689.7
19.92	674.6	674.6	674.7	674.8	674.8	20.37	689.8	689.9	689.9	690.0	690.1
19.93	674.9	675.0	675.0	675.1	675.2	20.38	690.1	690.2	690.3	690.4	690.4
19.94	675.2	675.3	675.4	675.5	675.5	20.39	690.5	690.6	690.6	690.7	690.8
19.95	675.6	675.7	675.7	675.8	675.9	20.40	690.8	690.9	691.0	691.0	691.1
19.96	675.9	676.0	676.1	676.1	676.2	20.41	691.2	691.2	691.3	691.4	691.4
19.97	676.3	676.3	676.4	676.5	676.5	20.42	691.5	691.6	691.6	691.7	691.8
19.98	676.6	676.7	676.7	676.8	676.9	20.43	691.8	691.9	692.0	692.0	692.1
19.99	676.9	677.0	677.1	677.1	677.2	20.44	692.2	692.2	692.3	692.4	692.5
20.00	677.3	677.3	677.4	677.5	677.5	20.45	692.5	692.6	692.7	692.7	692.8
20.01	677.6	677.7	677.8	677.8	677.9	20.46	692.9	692.9	693.0	693.1	693.1
20.02	678.0	678.0	678.1	678.2	678.2	20.47	693.2	693.3	693.3	693.4	693.5
20.03	678.3	678.4	678.4	678.5	678.6	20.48	693.5	693.6	693.7	693.7	693.8
20.04	678.6	678.7	678.8	678.8	678.9	20.49	693.9	693.9	694.0	694.1	694.1

Table III (cont'd)
INCHES OF MERCURY INTO MILLIBARS
1 Inch - 33.86395 mb.

Inches	0.000	0.002	0.004	0.006	0.008	Inches	0.000	0.002	0.004	0.006	0.008
20.50	694.2	694.3	694.3	694.4	694.5	20.95	709.4	709.5	709.6	709.7	709.7
20.51	694.5	694.6	694.7	694.8	694.8	20.96	709.8	709.9	709.9	710.0	710.1
20.52	694.9	695.0	695.0	695.1	695.2	20.97	710.1	710.2	710.3	710.3	710.4
20.53	695.2	695.3	695.4	695.4	695.5	20.98	710.5	710.5	710.6	710.7	710.7
20.54	6956	695.6	695.7	695.8	695.8	20.99	710.8	710.9	710.9	711.0	711.1
20.55	695.9	696.0	696.0	696.1	696.2	21.00	711.1	711.2	711.3	711.3	711.4
20.56	696.2	696.3	696.4	696.4	696.5	21.01	711.5	711.5	711.6	711.7	711.8
20.57	696.6	696.6	696.7	696.8	696.9	21.02	711.8	711.9	712.0	712.0	712.1
20.58	696.9	697.0	697.1	697.1	697.2	21.03	712.2	712.2	712.3	712.4	712.4
20.59	697.3	697.3	697.4	697.5	697.5	21.04	712.5	712.6	712.6	712.7	712.8
20.60	697.6	697.7	697.7	697.8	697.9	21.05	712.8	712.9	713.0	713.0	713.1
20.61	697.9	698.0	698.1	698.1	698.2	21.06	713.2	713.2	713.3	713.4	713.4
20.62	698.3	698.3	698.4	698.5	698.5	21.07	713.5	713.6	713.6	713.7	713.8
20.63	698.6	698.7	698.7	698.8	698.9	21.08	713.9	713.9	714.0	714.1	714.1
20.64	699.0	699.0	699.1	699.2	699.2	21.09	714.2	714.3	714.3	714.4	714.5
20.65	699.3	699.4	699.4	699.5	699.6	21.10	714.5	714.6	714.7	714.7	714.8
20.66	699.6	699.7	699.8	699.8	699.9	21.11	714.9	714.9	715.0	715.1	715.1
20.67	700.0	700.0	700.1	700.2	700.2	21.12	715.2	715.3	715.3	715.4	715.5
20.68	700.3	700.4	700.4	700.5,	700.6	21.13	715.5	715.6	715.7	715.7	715.8
20.69	700.6	700.7	700.8	700.8	700.9	21.14	715.9	716.0	716.0	716.1	716.2
20.70	701.0	701.1	701.1	701.2	701.3	21.15	716.2	716.3	716.4	716.4	716.5
20.71	701.3	701.4	701.5	701.5	701.6	21.16	716.6	716.6	716.7	716.8	716.8
20.72	701.7	701.7	701.8	701.9	701.9	21.17	716.9	717.0	717.0	717.1	717.2
20.73	702.0	702.1	702.1	702.2	702.3	21.18	717.2	717.3	717.4	717.4	717.5
20.74	702.3	702.4	702.5	702.5	702.6	21.19	717.6	717.6	717.7	717.8	717.8
20.75	702.7	702.7	702.8	702.9	702.9	21.20	717.9	718.0	718.1	718.1	718.2
20.76	703.0	703.1	703.2	703.2	703.3	21.21	718.3	718.3	718.4	718.5	718.5
20.77	703.4	703.4	703.5	703.6	703.6	21.22	718.6	718.7	718.7	718.8	718.9
20.78	703.7	703.8	703.8	703.9	704.0	21.23	718.9	719.0	719.1	719.1	719.2
20.79	704.0	704.1	704.2	704.2	704.3	21.24	719.3	719.3	719.4	719.5	719.5
20.80	704.4	704.4	704.5	704.6	704.6	21.25	719.6	719.7	719.7	719.8	719.9
20.81	704.7	704.8	704.8	704.9	705.0	21.26	719.9	220.0	720.1	720.2	720.2
20.82	705.0	705.1	705.2	705.3	705.3	21.27	720.3	720.4	720.4	720.5	720.6
20.83	705.4	705.5	705.5	705.6	705.7	21.28	720.6	720.7	720.8	720.8	720.9
20.84	705.7	705.8	705.9	705.9	706.0	21.29	721.0	721.0	721.1	721.2	721.2
20.85	706.1	706.1	706.2	706.3	706.3	21.30	721.3	721.4	721.4	721.5	721.6
20.86	706.4	706.5	706.5	706.6	706.7	21.31	721.6	721.7	721.8	721.8	721.9
20.87	706.7	706.8	706.9	706.9	707.0	21.32	722.0	722.0	722.1	722.2	722.3
20.88	707.1	707.1	707.2	707.3	707.4	21.33	722.3	722.4	722.5	722.5	722.6
20.89	707.4	707.5	707.6	707.6	707.7	21.34	722.7	722.7	722.8	722.9	722.9
20.90	707.8	707.8	707.9	708.0	708.0	21.85	723.0	723.1	723.1	723.2	723.2
20.91	708.1	708.2	708.2	708.3	708.4	21.36	723.3	723.4	723.5	723.5	723.6
20.92	708.4	708.5	708.6	708.6	708.7	21.37	723.7	723.7	723.8	723.9	723.9
20.93	708.8	708.8	708.9	709.0	709.0	21.38	724.0	724.1	724.1	724.2	724.3
20.94	709.1	709.2	709.2	709.3	709.4	21.39	724.3	724.4	724.5	724.6	724.6

Table III (cont'd)
INCHES OF MERCURY INTO MILLIBARS
1 Inch - 33.86395 mb.

Inches	0.000	0.002	0.004	0.006	0.008	Inches	0.000	0.002	0.004	0.006	0.008
21.40	724.7	724.8	724.8	724.9	725.0	21.85	739.9	740.0	740.1	740.1	740.2
21.41	725.0	725.1	725.2	725.2	725.3	21.86	740.3	740.3	740.4	740.5	740.5
21.42	725.4	725.4	725.5	725.6	725.6	21.87	740.6	740.7	740.7	740.8	740.9
21.43	725.7	725.8	725.8	725.9	720.0	21.88	740.9	741.0	741.1	741.1	741.2
21.44	726.0	726.1	726.2	726.2	726.3	21.89	741.3	741.3	741.4	741.5	741.6
21.45	726.4	726.4	726.5	726.6	726.7	21.90	741.6	741.7	741.8	741.8	741.9
21.46	726.7	726.8	726.9	726.9	727.0	21.91	742.0	742.0	742.1	742.2	742.2
21.47	727.1	727.1	727.2	727.3	727.3	21.92	742.3	742.4	742.4	741.5	741.6
21.48	727.4	727.5	727.5	727.6	727.7	21.93	742.6	742.7	742.8	742.8	742.9
21.49	727.7	727.8	727.9	727.9	728.0	21.94	743.0	743.0	743.1	743.2	743.2
21.50	728.1	728.1	728.2	728.3	728.3	21.95	743.3	743.4	743.4	743.5	743.6
21.51	728.4	728.5	728.5	728.6	728.7	21.96	743.7	743.7	743.8	743.9	743.9
21.52	728.8	728.8	728.9	729.0	729.0	21.97	744.0	744.1	744.1	744.2	744.8
21.53	729.1	729.2	729.2	729.3	729.4	21.98	744.3	744.4	744.5	744.5	744.6
21.54	729.4	729.5	729.6	729.6	729.7	21.99	744.7	744.7	744.8	744.9	744.9
21.55	729.8	729.8	729.9	730.0	730.0	22.00	745.0	745.1	745.1	745.2	745.3
21.56	730.1	730.2	730.2	730.3	730.4	22.01	745.3	745.4	745.5	745.5	745.6
21.57	730.4	730.5	730.6	730.6	730.7	22.02	745.7	745.8	745.8	745.9	746.0
21.58	730.8	730.9	730.9	731.0	731.1	22.03	746.0	746.1	746.2	746.2	746.3
21.59	731.1	721.2	731.3	731.3	731.4	22.04	746.4	746.4	746.5	746.6	746.6
21.60	731.5	731.5	731.6	731.7	731.7	22.05	746.7	746.8	746.8	746.9	747.0
21.61	731.8	731.9	731.9	732.0	732.1	22.06	747.0	747.1	747.2	747.2	747.3
21.62	732.1	732.2	732.3	732.3	732.4	22.07	747.4	747.4	747.5	747.6	747.6
21.63	732.5	732.5	732.6	732.7	732.7	22.08	747.7	747.8	747.9	747.9	748.0
21.64	732.8	732.9	733.0	733.0	733.1	22.09	748.1	748.1	748.2	748.3	748.3
21.65	733.2	733.2	733.3	733.4	733.4	22.10	748.4	748.5	748.5	748.6	748.7
21.66	733.5	733.6	733.6	733.7	733.8	22.11	748.7	748.8	748.9	748.9	749.0
21.67	733.8	733.9	734.0	734.0	734.1	22.12	749.1	749.1	749.2	749.3	749.3
21.68	734.2	734.2	734.3	734.4	734.4	22.13	749.4	749.5	749.5	749.6	749.7
21.69	734.5	734.6	734.6	734.7	734.8	22.14	749.7	749.8	749.9	750.0	750.0
21.70	734.8	734.9	735.0	735.1	735.1	22.15	750.1	750.2	750.2	750.3	750.4
21.71	735.2	735.3	735.3	735.4	735.5	22.16	750.4	750.5	750.6	750.6	750.7
21.72	735.5	735.6	735.7	735.7	735.8	22.17	750.8	750.8	750.9	751.0	751.0
21.73	735.9	735.9	736.0	736.1	736.1	22.18	751.1	751.2	751.2	751.3	751.4
21.74	736.2	736.3	736.3	736.4	736.5	22.19	751.4	751.5	751.6	751.6	751.7
21.75	736.5	736.6	736.7	736.7	736.8	22.20	751.8	751.8	751.9	752.0	752.1
21.76	736.9	736.9	737.0	737.1	737.2	22.21	752.1	752.2	752.3	752.3	752.4
21.77	737.2	737.3	737.4	737.4	737.5	22.22	752.5	752.5	752.6	752.7	752.7
21.78	737.6	737.6	737.7	737.8	737.8	22.23	752.8	752.9	752.9	753.0	753.1
21.79	737.9	738.0	738.0	738.1	738.2	22.24	753.1	753.2	753.3	753.3	753.4
21.80	738.2	738.3	738.4	738.4	738.5	22.25	753.5	753.5	753.6	753.7	753.7
21.81	738.6	738.6	738.7	738.8	738.8	22.26	753.8	753.9	753.9	754.0	754.1
21.82	738.9	739.0	739.0	739.1	739.2	22.27	754.2	754.2	754.3	754.4	754.4
21.83	739.3	739.3	739.4	739.5	739.5	22.28	754.5	754.6	754.6	754.7	754.8
21.84	739.6	739.7	739.7	739.8	739.9	22.29	754.8	754.9	755.0	755.0	755.1

Table III (cont'd)
INCHES OF MERCURY INTO MILLIBARS
1 Inch - 33.86395 mb.

Inches	0.000	0.002	0.004	0.006	0.008	Inches	0.000	0.002	0.004	0.006	0.008
22.30	755.2	755.2	755.3	755.4	755.4	22.75	770.4	770.5	770.5	770.6	770.7
22.31	755.5	755.6	755.6	755.7	755.8	22.76	770.7	770.8	770.9	770.9	771.0
22.32	755.8	755.9	756.0	756.0	756.1	22.77	771.1	771.1	771.2	771.3	771.4
22.33	756.2	756.2	756.3	756.4	756.5	22.78	771.4	771.5	771.6	771.6	771.7
22.34	756.5	756.6	756.7	756.7	756.8	22.79	771.8	771.8	771.9	772.0	772.0
22.35	756.9	756.9	757.0	757.1	757.1	22.80	772.1	772.2	772.2	772.3	772.4
22.36	757.2	757.3	757.3	757.4	757.5	22.81	772.4	772.5	772.6	772.6	772.7
22.37	757.5	757.6	757.7	757.7	757.8	22.82	772.8	772.8	772.9	773.0	773.0
22.38	757.9	757.9	758.0	758.1	758.1	22.83	773.1	773.2	773.2	773.3	773.4
22.39	758.2	758.3	758.3	758.4	758.5	22.84	773.5	773.5	773.6	773.7	773.7
22.40	758.6	758.6	758.7	758.8	758.8	22.85	773.8	773.9	773.9	774.0	774.1
22.41	758.9	759.0	759.0	759.1	759.2	22.86	774.1	774.2	774.3	774.3	774.4
22.42	759.2	759.3	759.4	759.4	759.5	22.87	774.5	774.5	774.6	774.7	774.7
22.43	759.6	759.6	759.7	759.8	759.8	22.88	774.8	774.9	774.9	775.0	775.1
22.44	759.9	760.0	760.0	760.1	760.2	22.89	775.1	775.2	775.3	775.3	775.4
22.45	760.2	760.3	760.4	760.4	760.5	22.90	775.5	775.6	775.6	775.7	775.8
22.46	760.6	760.7	760.7	760.8	760.9	22.91	775.8	775.9	776.0	776.0	776.1
22.47	760.9	761.0	761.1	761.1	761.2	22.92	776.2	776.2	776.3	776.4	776.4
22.48	761.3	761.3	761.4	761.5	761.5	22.93	776.5	776.6	776.6	776.7	776.8
22.49	761.6	761.7	761.7	761.8	761.9	22.94	776.8	776.9	777.0	777.0	777.1
22.50	761.9	762.0	762.1	762.1	762.2	22.95	777.2	777.2	777.3	777.4	777.4
22.51	762.3	762.3	762.4	762.5	762.5	22.96	777.5	777.6	777.7	777.7	777.8
22.52	762.6	762.7	762.8	762.8	762.9	22.97	777.9	777.9	778.0	778.1	778.1
22.53	763.0	763.0	763.1	763.2	763.2	22.98	778.2	778.3	778.3	778.4	778.5
22.54	763.3	763.4	763.4	763.5	763.6	22.99	778.5	778.6	778.7	778.7	778.8
22.55	763.6	763.7	763.8	763.8	763.9	23.00	778.9	778.9	779.0	779.1	779.1
22.56	764.0	764.0	764.1	764.2	764.2	23.01	779.2	779.3	779.3	779.4	779.5
22.57	764.3	764.4	764.4	764.5	764.6	23.02	779.5	779.6	779.7	779.8	779.8
22.58	764.6	764.7	764.8	764.9	764.9	23.03	779.9	780.0	780.0	780.1	780.2
22.59	765.0	765.1	765.1	765.2	765.3	23.04	780.2	780.3	780.4	780.4	780.5
22.60	765.3	765.4	765.5	765.5	765.6	23.05	780.6	780.6	780.7	780.8	780.8
22.61	765.7	765.7	765.8	765.9	765.9	23.06	780.9	781.0	781.0	781.1	781.2
22.62	766.0	766.1	766.1	766.2	766.3	23.07	781.2	781.3	781.4	781.4	781.5
22.63	766.3	766.4	766.5	766.5	766.6	23.08	781.6	781.6	781.7	781.8	781.9
22.64	766.7	766.7	766.8	766.9	767.0	23.09	781.9	782.0	782.1	782.1	782.2
22.65	767.0	767.1	767.2	767.2	767.3	23.10	782.3	782.3	782.4	782.5	782.5
22.66	767.4	767.4	767.5	767.6	767.6	23.11	782.6	782.7	782.7	782.8	782.9
22.67	767.7	767.8	767.8	767.9	768.0	23.12	782.9	783.0	783.1	783.1	783.2
22.68	768.0	768.1	768.2	768.2	768.3	23.13	783.3	783.3	783.4	783.5	783.5
22.69	768.4	768.4	768.5	768.6	768.6	23.14	783.6	783.7	783.7	783.8	783.9
22.70	768.7	768.8	768.8	768.9	769.0	23.15	784.0	784.0	784.1	784.2	784.2
22.71	769.1	769.1	769.2	769.3	769.3	23.16	784.3	784.4	784.4	784.5	784.6
22.72	769.4	769.5	769.5	769.6	769.7	23.17	784.6	784.7	784.8	784.8	784.9
22.73	769.7	769.8	769.9	769.9	770.0	23.18	785.0	785.0	785.1	785.2	785.2
22.74	770.1	770.1	770.2	770.3	770.3	23.19	785.3	785.4	785.4	785.5	785.6

Table III (cont'd)
INCHES OF MERCURY INTO MILLIBARS
1 Inch - 33.86395 mb.

Inches	0.000	0.002	0.004	0.006	0.008	Inches	0.000	0.002	0.004	0.006	0.008
23.20	785.6	785.7	785.8	785.8	785.9	23.65	800.9	801.0	801.0	801.1	801.2
23.21	786.0	786,1	786.1	786.2	786.3	23.66	801.2	801.3	801.4	801.4	801.5
23.22	786.3	786.4	786.5	786.5	786.6	23.67	801.6	801.6	801.7	801.8	801.8
23.23	786.7	786.7	786.8	786.9	786.9	23.68	801.9	802.0	802.0	802.1	802.2
23.24	787.0	787.1	787.1	787.2	787.3	23.69	802.2	802.3	802.4	802.4	802.5
23.25	787.3	787.4	787.5	787.5	787.6	23.70	802.6	802.6	802.7	802.8	802.8
23.26	787.7	787.7	787.8	787.9	787.9	23.71	802.9	803.0	803.0	803.1	803.2
23.27	788.0	788.1	788.1	788.2	788.3	23.72	803.3	803.3	803.4	803.5	803.5
23.28	788.4	788.4	788.5	788.6	788.6	23.73	803.6	803.7	803.7	803.8	803.9
23.29	788.7	788.8	788.8	788.9	789.0	23.74	803.9	804.0	804.1	804.1	804.2
23.30	789.0	789.1	789.2	789.2	789.3	23.75	804.3	804.3	804.4	804.5	804.5
23.31	789.4	789.4	789.5	789.6	789.6	23.76	804.6	804.7	804.7	804.8	804.9
23.32	789.7	789.8	789.8	789.9	790.0	23.77	804.9	805.0	805.1	805.1	805.2
23.33	790.0	790.1	790.2	790.2	790.3	23.78	805.3	805.4	805.4	805.5	805.6
23.34	790.4	790.5	790.5	790.6	790.7	23.79	805.6	805.7	805.8	805.8	805.9
23.35	790.7	790.8	790.9	790.9	791.0	23.80	806.0	806.0	806.1	806.2	806.2
23.36	791.1	791.1	791.2	791.3	791.3	23.81	806.3	806.4	806.4	806.5	806.6
23.37	791.4	791.5	791.5	791.6	791.7	23.82	806.6	806.7	806.8	806.8	806.9
23.38	791.7	791.8	791.9	791.9	792.0	23.83	807.0	807.0	807.1	807.2	807.2
23.39	792.1	792.1	792.2	792.3	792.3	23.84	807.3	807.4	807.5	807.5	807.6
23.40	792.4	792.5	792.6	792.6	792.7	23.85	807.7	807.7	807.8	807.9	807.9
23.41	292.8	792.8	792.9	793.0	793.0	23.86	808.0	808.1	808.1	808.2	808.3
23.42	793.1	793.2	793.2	793.3	793.4	23.87	808.3	808.4	808.5	808.5	808.6
23.43	793.4	793.5	793.6	793.6	793.7	23.88	808.7	808.7	808.8	808.9	808.9
23.44	793.8	793.8	793.9	794.0	794.0	23.89	809.0	809.1	809.1	809.2	809.3
23.45	794.1	794.2	794.2	794.3	794.4	23.90	809.3	809.4	809.5	809.6	809.6
23.46	794.4	794.5	794.6	794.7	794.7	23.91	809.7	809.8	809.8	809.9	810.0
23.47	794.8	794.9	794.9	795.0	795.1	23.92	810.0	810.1	810.2	810.2	810.3
23.48	795.1	795.2	795.3	795.3	795.4	23.93	810.4	810.4	810.5	810.6	810.6
23.49	795.5	795.5	795.6	795.7	795.7	23.94	810.7	810.8	810.8	810.9	811.0
23.50	795.8	795.9	795.9	796.0	796.1	23.95	811.0	811.1	811.2	811.2	811.3
23.51	796.1	796.2	796.3	796.3	796.4	23.96	811.4	811.4	811.5	811.6	811.7
23.52	796.5	796.5	796.6	796.7	796.8	23.97	811.7	811.8	811.9	811.9	812.0
23.53	796.8	796.9	797.0	797.0	797.1	23.98	812.1	812.1	812.2	812.3	812.3
23.54	797.2	797.2	797.3	797.4	797.4	23.99	812.4	812.5	812.5	812.6	812.7
23.55	797.5	797.6	797.6	797.7	797.8	24.00	812.7	812.8	812.9	812.9	813.0
23.56	797.8	797.9	798.0	798.0	798.1	24.01	813.1	813.1	813.2	813.3	813.3
23.57	798.2	798.2	798.3	798.4	798.4	24.02	813.4	813.5	813.5	813.6	813.7
23.58	798.5	798.6	798.6	798.7	798.8	24.03	813.8	813.8	813.9	814.0	814.0
23.59	798.9	798.9	799.0	799.1	799.1	24.04	814.1	814.2	814.2	814.3	814.4
23.60	799.2	799.3	799.3	799.4	799.5	24.05	814.4	814.5	814.6	814.6	814.7
23.61	799.5	799.6	799.7	799.7	799.8	24.06	814.8	814.8	814.9	815.0	815.0
23.62	799.9	799.9	800.0	800.1	800.1	24.07	815.1	815.2	815.2	815.3	815.4
23.63	800.2	800.3	800.3	800.4	800.5	24.08	815.4	815.5	815.6	815.6	815.7
23.64	800.5	800.6	800.7	800.7	800.8	24.09	815.8	815.9	815.9	816.0	816.1

Table III (cont'd)
INCHES OF MERCURY INTO MILLIBARS
1 Inch - 33.86395 mb.

Inches	0.000	0.002	0.004	0.006	0.008	Inches	0.000	0.002	0.004	0.006	0.008
24.10	816.1	816.2	816.3	816.3	816.4	24.55	831.4	831.4	831.5	831.6	831.6
24.11	816.5	816.5	816.6	816.7	816.7	24.56	831.7	831.8	831.8	831.9	832.0
24.12	816.8	816.9	816.9	817.0	817.1	24.57	832.0	832.1	832.2	832.2	832.3
24.13	817.1	817.2	817.3	817.3	817.4	24.58	832.4	832.4	832.5	832.6	832.6
2414	817.5	817.5	817.6	817.7	817.7	24.59	832.7	832.8	832.8	832.9	833.0
24.15	817.8	817.9	817.9	818.0	818.1	24.60	833.1	833.1	833.1	838.3	833.3
24.16	818.2	818.2	818.3	818.4	818.4	24.61	833.4	833.5	833.5	833.6	833.7
24.17	818.5	818.6	818.6	818.7	818.8	24.62	833.7	833.8	833.9	833.9	834.0
24.18	818.8	818.9	819.0	819.0	819.1	24.63	834.1	834.1	834.2	834.3	834.3
24.19	819.2	819.2	819.3	819.4	819.4	24.64	834.4	834.5	834.5	834.6	834.7
24.20	819.5	819.6	819.6	819.7	819.8	24.65	834.7	834.8	834.9	834.9	835.0
24.21	819.8	819.9	820.0	820.0	820.1	24.66	835.1	835.2	835.2	835.3	835.4
24.22	820.2	820.3	820.3	820.4	820.5	24.67	835.4	835.5	835.6	835.6	835.7
24.23	820.5	820.6	820.7	820.7	820.8	24.68	835.8	835.8	835.9	836.0	836.0
24.24	820.9	820.9	821.0	821.1	821.1	24.69	836.1	836.2	836.2	836.3	836.4
24.25	821.2	821.3	821.3	821.4	821.5	24.70	836.4	836.5	836.6	836.6	836.7
24.26	821.5	821.6	821.7	821.7	821.8	24.71	836.8	836.8	836.9	837.0	837.0
24.27	821.9	821.9	822.0	822.1	822.1	24.72	837.1	837.2	837.3	837.3	837.4
24.28	822.2	822.3	822.4	822.4	822.5	24.73	837.5	837.5	837.6	837.7	837.7
24.29	822.6	822.6	822.7	822.8	822.8	24.74	837.8	837.9	837.9	838.0	838.1
24.30	822.9	823.0	823.0	823.1	823.2	24.75	838.1	838.2	838.3	838.3	838.4
24.31	823.2	823.3	823.4	823.4	823.5	24.76	838.5	838.5	838.6	838.7	838.7
24.32	823.6	823.6	823.7	823.8	823.8	24.77	838.8	838.9	838.9	839.0	839.1
24.33	823.9	824.0	824.0	824.1	824.2	24.78	839.1	839.2	839.3	839.4	839.4
24.34	824.2	824.3	824.4	824.5	824.5	24.79	839.5	839.6	839.6	839.7	839.8
24.35	824.6	824.7	824.7	824.8	824.9	24.80	839.8	839.9	840.0	840.0	840.1
24.36	824.9	825.0	825.1	825.1	825.2	24.81	840.2	840.2	840.3	840.4	840.4
24.37	825.3	825.3	825.4	825.5	825.5	24.82	840.5	840.6	840.6	840.7	840.8
24.38	825.6	825.7	825.7	825.8	825.9	24.83	840.8	840.9	841.0	841.0	841.1
24.39	825.9	826.0	826.1	826.1	826.2	24.84	841.2	841.2	841.3	841.4	841.5
24.40	826.3	826.3	826.4	826.5	826.6	24.85	841.5	841.6	841.7	841.7	841.8
24.41	826.6	826.7	826.8	826.8	826.9	24.86	841.9	841.9	842.0	842.1	842.1
24.42	827.0	827.0	827.1	827.2	827.2	24.87	842.2	842.3	842.3	842.4	842.5
24.43	827.3	827.3	827.4	827.4	827.6	24.88	842.5	842.6	842.7	842.7	842.8
24.44	827.6	827.7	827.8	827.8	827.9	24.89	842.9	842.9	843.0	843.1	843.1
24.45	828.0	828.0	828.1	828.2	828.2	24.90	843.2	843.3	843.3	843.4	843.5
24.46	828.3	828.4	828.4	828.5	828.6	24.91	843.6	843.6	843.7	843.8	843.8
24.47	828.7	828.7	828.8	828.9	828.9	24.92	843.9	844.0	844.0	844.1	844.2
24.48	829.0	829.1	829.1	829.2	829.3	24.93	844.2	844.3	844.4	844.4	844.5
24.49	829.3	829.4	829.5	829.5	829.6	24.94	844.6	844.6	844.7	844.8	844.8
24.50	829.7	829.7	829.8	829.9	829.9	24.95	844.9	845.0	845.0	845.1	845.2
24.51	830.0	830.1	830.1	830.2	830.3	24.96	845.2	845.3	845.4	845.4	845.5
24.52	830.3	830.4	830.5	830.5	830.6	24.97	845.6	845.7	845.7	845.8	845.9
24.53	830.7	830.8	830.8	830.9	831.0	24.98	845.9	846.0	846.1	846.1	846.2
24.54	831.0	831.1	831.2	831.2	831.3	24.99	846.3	846.3	846.4	846.5	846.5

Table III (cont'd)
INCHES OF MERCURY INTO MILLIBARS
1 Inch - 33.86395 mb.

Inches	0.000	0.002	0.004	0.006	0.008	Inches	0.000	0.002	0.004	0.006	0.008
25.00	846.6	846.7	846.7	846.8	846.9	25.45	861.8	861.9	862.0	862.0	862.1
25.01	846.9	847.0	847.1	847.1	847.2	25.46	862.2	862.2	862.3	862.4	862.4
25.02	847.3	847.3	847.4	847.5	847.5	25.47	862.5	862.6	862.6	862.7	862.8
25.03	847.6	847.7	847.8	847.8	847.9	25.48	862.9	862.9	863.0	863.1	863.1
25.04	848.0	848.0	848.1	848.2	848.2	25.49	863.2	863.3	863.8	863.4	863.5
25.05	848.3	848.4	848.4	848.5	848.6	25.50	863.5	863.6	863.7	863.7	863.8
25.06	848.6	848.7	848.8	848.8	848.9	25.51	863.9	863.9	864.0	864.1	864.1
25.07	849.0	849.0	849.1	849.2	849.2	25.52	864.2	864.3	864.3	864.4	864.5
25.08	849.3	849.4	849.4	849.5	849.6	25.53	864.5	864.6	864.7	864.7	864.8
25.09	849.6	849.7	849.8	849.8	849.9	25.54	864.9	865.0	865.0	865.1	865.2
25.10	850.0	850.1	850.1	850.2	850.3	25.55	865.2	865.3	865.4	865.4	865.5
25.11	850.3	850.4	850.5	850.5	850.6	25.56	863.6	865.6	865.7	865.8	865.8
25.12	850.7	850.7	850.8	850.9	850.9	25.57	865.9	866.0	866.0	866.1	866.2
25.13	851.0	851.1	851.1	851.2	851.3	25.58	866.2	866.3	866.4	866.4	866.5
25.14	851.3	851.4	851.5	851.5	851.6	25.59	866.6	866.6	866.7	866.8	866.8
25.15	851.7	851.7	851.8	851.9	851.9	25.60	866.9	867.0	867.1	867.1	867.2
25.16	852.0	852.1	852.2	852.2	852.3	25.61	867.3	867.3	867.4	867.5	867.5
25.17	852.4	852.4	852.5	852.6	852.6	25.62	867.6	867.7	867.7	867.8	867.9
25.18	852.7	852.8	852.8	852.9	853.0	25.63	867.9	868.0	868.1	868.1	868.2
25.19	853.0	853.1	853.2	853.2	853.3	25.64	868.3	868.3	868.4	868.5	8685
25.20	853.4	853.4	853.5	853.6	853.6	25.65	868.6	868.7	868.7	868.8	868.9
25.21	853.7	853.8	853.8	853.9	854.0	25.66	868.9	869.0	869.1	869.2	869.2
25.22	854.0	854.1	854.2	854.3	854.3	25.67	869.3	869.4	869.4	869.5	869.6
25.23	854.4	854.5	854.5	854.6	854.7	25.68	869.6	869.7	869.8	869.8	869.9
25.24	854.7	854.8	854.9	854.9	855.0	25.69	870.0	870.0	870.1	870.2	870.2
25.25	855.1	855.1	855.2	855.3	855.3	25.70	870.3	870.4	870.4	870.5	870.6
25.26	855.4	855.5	855.5	855.6	855.7	25.71	870.6	870.7	870.8	870.8	870.9
25.27	855.7	855.8	855.9	855.9	856.0	25.72	871.0	871.0	871.1	871.2	871.3
25.28	856.1	856.1	856.2	856.3	856.4	25.73	871.3	871.4	871.5	871.5	871.6
25.29	856.4	856.5	856.6	856.6	856.7	25.74	871.7	871.7	871.8	871.9	871.9
25-30	856.8	856.8	856.9	857.0	857.0	25.75	872.0	872.1	872.1	872.2	872.3
25.31	857.1	857.2	857.2	857.3	857.4	25.76	872.3	872.4	872.5	872.5	872.6
25.32	857.4	857.5	857.6	857.6	857.7	25.77	872.7	872.7	872.8	872.9	872.9
25.33	857.8	857.8	857.9	858.0	858.0	25.78	873.0	873.1	873.1	873.2	873.3
25.34	858.1	858.2	858.2	858.3	858.4	25.79	873.4	873.4	873.5	873.6	873.6
25.35	858.5	858.5	858.6	858.7	858.7	25.80	873.7	873.8	873.8	873.9	874.0
25.36	858.8	858.9	858.9	859.0	859.1	25.81	874.0	874.1	874.2	874.2	874.3
25.37	859.1	859.2	859.3	859.3	859.4	25.82	874.4	874.4	874.5	874.6	874.6
25.38	859.5	859.5	859.6	859.7	859.7	25.83	874.7	874.8	874.8	874.9	875.0
25.39	859.8	859.9	859.9	860.0	860.1	25.84	875.0	875.1	875.2	875.2	875.3
25.40	860.1	860.2	860.3	860.3	860.4	25.85	875.4	875.5	875.5	875.6	875.7
25.41	860.5	860.6	860.6	860.7	860.8	25.86	875.7	875.8	875.9	875.9	876.0
25.42	860.8	860.9	861.0	861.0	861.1	25.87	876.1	876.1	876.2	876.3	876.3
25.43	861.2	861.2	861.3	861.4	861.4	25.88	876.4	876.5	876.5	876.6	876.7
25.44	861.5	861.6	861.6	861.7	861.8	25.89	876.7	876.8	876.9	876.9	877.0

Table III (cont'd)
INCHES OF MERCURY INTO MILLIBARS
1 Inch - 33.86395 mb.

Inches	0.000	0.002	0.004	0.006	0.008	Inches	0.000	0.002	0.004	0.006	0.008
25.90	877.1	877.1	877.2	877.3	877.3	26.35	892.3	892.4	892.5	892.5	892 6
25.91	877.4	877.5	877.6	877.6	877.7	26.36	892.7	892.7	892.8	892.9	892.9
25.92	877.8	877.8	877.9	878.0	878.0	26.37	893.0	893.1	893.1	893.2	893.3
25.93	878.1	878.2	878.2	878.3	878.4	26.38	893.3	893.4	893.5	893.5	893.6
25.94	878.4	878.5	878.6	878.6	878.7	26.39	893.7	893.7	893.8	893.9	893.9
25.95	878.8	878.8	878.9	879.0	879.0	26.40	894.0	894.1	894.1	894.2	894.3
25.96	879.1	879.2	879.2	879.3	879.4	26.41	894.3	894.4	894.5	894.6	894.6
25.97	879.4	879.5	879.6	879.6	879.7	26.42	894.7	894.8	894.8	894.9	895.0
25.98	879.8	879.9	879.9	880.0	880.1	26.43	895.0	895.1	895.2	895.2	895.3
25.99	880.1	880.2	880.3	880.3	880.4	26.44	895.4	895.4	895.5	895.6	895.6
26.00	880.5	880.5	880.6	880.7	880.7	26.45	895.7	895.8	895.8	895.9	896.0
26.01	880.8	880.9	880.9	881.0	881.1	26.46	896.0	896.1	896.2	896.2	896.3
26.02	881.1	881.2	881.3	881.3	881.4	26.47	896.4	896.4	896.5	896.6	896.6
26.03	881.5	881.5	881.6	881.7	881.7	26.48	896.7	896.8	896.9	896.9	897.0
26.04	881.8	881.9	882.0	882.0	882.1	26.49	897.1	897.1	897.2	897.3	897.3
26.05	882.2	882.2	882.3	882.4	882.4	26.50	987.4	897.5	897.5	897.6	897.7
26.06	882.5	882.6	882.6	882.7	882.8	26.51	897.7	897.8	897.9	897.9	898.0
26.07	882.8	882.9	883.0	883.0	883.1	26.52	898.1	898.1	898.2	898.3	898.3
26.08	883.2	883.2	883.3	883.4	883.4	26.53	898.4	898.5	898.5	898.6	898.7
26.09	883.5	883.6	883.6	883.7	883.8	26.54	898.7	898.8	898.9	899.0	899.0
26.10	883.8	883.9	884.0	884.1	884.1	26.55	899.1	899.2	899.2	899.3	899.4
26.11	884.2	884.3	884.3	884.4	884.5	26.56	099.4	899.5	899.6	899.6	899.7
26.12	884.5	884.6	884.7	884.7	884.8	26.57	899.8	899.8	899.9	900.0	900.0
26.13	884.9	884.9	885.0	885.1	885.1	26.58	900.1	900.2	900.2	900.3	900.4
26.14	885.2	885.3	885.3	885.4	885.5	26.59	900.4	900.5	900.6	900.6	900.7
26.15	885.5	885.6	885.7	885.7	885.8	26.60	900.8	900.8	900.9	901.0	901.1
26.16	885.9	885.9	886.0	886.1	886.2	26.61	901.1	901.2	901.3	901.3	901.4
26.17	886.2	886.3	886.4	886.4	886.5	26.62	901.5	901.5	901.6	901.7	901.7
26.18	886.6	886.6	886.7	886.8	886.8	26.63	901.8	901.9	901.9	902.0	902.1
26.19	886.9	887.0	887.0	887.1	887.2	26.64	902.1	902.2	902.3	902.3	902.4
26.20	887.2	887.3	887.4	887.4	887.5	26.65	902.5	902.5	902.6	902.7	902.7
26.21	887.6	887.6	887.7	887.8	887.8	26.66	902.8	902.9	902.9	903.0	903.1
26.22	887.9	888.0	888.0	888.1	888.2	26.67	903.2	903.2	903.3	903.4	903.4
26.23	888.3	888.3	888.4	888.5	888.5	26.68	903.5	903.6	903.6	903.7	903.8
26.24	888.6	888.7	888.7	888.8	888.9	26.69	903.8	903.9	904.0	904.0	904.1
26.25	888.9	889.0	889.1	889.1	889.2	26.70	904.2	904.2	904.3	904.4	904.4
26.26	889.3	889.3	889.4	889.5	889.5	26.71	904.5	904.6	904.6	904.7	904.8
26.27	889.6	889.7	889.7	889.8	889.9	26.72	904.8	904.9	905.0	905.0	905.1
26.28	889.9	890.0	890.1	890.1	890.2	26.73	905.2	905.3	905.3	905.4	905.5
26.29	890.3	890.4	890.4	890.5	890.6	26.74	905.5	905.6	905.7	905.7	905.8
26.30	890.6	890.7	890.8	890.8	890.9	26.75	905.9	905.9	906.0	906.1	906.1
26.31	891.0	891.0	891.1	891.2	891.2	26.76	906.2	906.3	906.3	906.4	906.5
26.32	891.3	891.4	891.4	891.5	891.6	26.77	906.5	906.6	906.7	906.7	906.8
26.33	891.6	891.7	891.8	891.8	891.9	26.78	906.9	906.9	907.0	907.1	907.1
26.34	892.0	892.0	892.1	892.2	892.2	26.79	907.2	907.3	907.4	907.4	907.5

Table III (cont'd)
INCHES OF MERCURY INTO MILLIBARS
1 Inch - 33.86395 mb.

Inches	0.000	0.002	0.004	0.006	0.008	Inches	0.000	0.002	0.004	0.006	0.008
26.80	907.6	907.6	907.7	907.8	907.8	27.25	922.8	922.9	922.9	923.0	923.1
26.81	907.9	908.0	908.0	908.1	908.2	27.26	923.1	923.2	923.3	923.3	923.4
26.82	908.2	908.3	908.4	908.4	908.5	27.27	923.5	923.5	923.6	923.7	923.7
26.83	908.6	908.6	908.7	908.8	908.8	27.28	923.8	923.9	923.9	924.0	924.1
26.84	908.9	909.0	909.0	909.1	909.2	27.29	924.1	924.2	924.3	924.4	924.4
26.85	909.2	909.3	909.4	909.5	909.5	27.30	924.5	924.6	924.6	924.7	924.8
26.86	909.6	909.7	909.7	909.8	909.9	27.31	924.8	924.9	925.0	925.0	925.1
26.87	909.9	910.0	910.1	910.1	910.2	27.32	925.2	925.2	925.3	925.4	925.4
26.88	910.3	910.3	910.4	910.5	910.5	27.33	925.5	925.6	925.6	925.7	925.8
26.89	910.6	910.7	910.7	910.8	910.9	27.34	925.8	925.9	926.0	926.0	926.1
26.90	910.9	911.0	911.1	911.1	911.2	27.35	926.2	926.2	926.3	926.4	926.4
26.91	911.3	911.3	911.4	911.5	911.5	27.36	926.5	926.6	926.7	926.7	926.8
26.92	911.6	911.7	911.8	911.8	911.9	27.37	926.9	926.9	927.0	927.1	927.1
26.93	912.0	912.0	912.1	912.2	912.2	27.38	927.2	927.3	927.3	927.4	927.5
26.94	912.3	912.4	912.4	912.5	912.6	27.39	927.5	927.6	927.7	927.7	927.8
26.95	912.6	912.7	912.8	912.8	912.9	27.40	927.9	927.9	928.0	928.1	928.1
26.96	913.0	913.0	913.1	913.2	913.2	27.41	928.2	928.3	928.3	928.4	928.5
26.97	913.3	913.4	913.4	913.5	913.6	27.42	928.5	928.6	928.7	928.8	928.8
26.98	913.6	913.7	913.8	913.9	913.9	27.43	928.9	929.0	929.0	929.1	929.2
26.99	914.0	914.1	914.1	914.2	914.3	27.44	929.2	929.3	929.4	929.4	929.5
27.00	914.3	914.4	914.5	914.5	914.6	27.45	929.6	929.6	929.7	929.8	929.8
27.01	914.7	914.7	914.8	914.9	914.9	27.46	929.9	930.0	930.0	930.1	930.2
27.02	915.0	915.1	915.1	915.2	915.3	27.47	930.2	930.3	930.4	930.4	930.5
27.03	915.3	915.4	915.5	915.5	915.6	27.48	930.6	930.6	930.7	930.8	930.9
27.04	915.7	915.7	915.8	915.9	916.0	27.49	930.9	931.0	931.1	931.1	931.2
27.05	916.0	916.1	916.2	916.2	916.3	27.50	931.3	931.3	931.4	931.5	931.5
27.06	916.4	916.4	916.5	916.6	916.6	27.51	931.6	931.7	931.7	931.8	931.9
27.07	916.7	916.8	916.8	916.9	917.0	27.52	931.9	932.0	932.1	932.1	932.2
27.08	917.0	917.1	917.2	917.2	917.3	27.53	932.3	932.3	932.4	932.5	932.5
27.09	917.4	917.4	917.5	917.6	917.6	27.54	932.6	932.7	932.7	932.8	932.9
27.10	917.7	917.8	917.8	917.9	918.0	27.55	933.0	933.0	933.1	933.2	933.2
27.11	918.1	918.1	918.2	918.3	918.3	27.56	933.3	933.4	933.4	933.5	933.6
27.12	918.4	918.5	918.5	918.6	918.7	27.57	933.6	933.7	933.8	933.8	933.9
27.13	918.7	918.8	918.9	918.9	919.0	27.58	934.0	934.0	934.1	934.2	934.2
27.14	919.1	919.1	919.2	919.3	919.3	27.59	934.3	934.4	934.5	934.5	934.6
27.15	919.4	919.5	919.5	919.6	919.7	27.60	934.6	934.7	934.8	934.8	934.9
27.16	919.7	919.8	919.9	919.9	920.0	27.61	935.0	935.1	935.1	935.2	935.3
27.17	920.1	920.2	920.2	920.3	920.4	27.62	935.3	935.4	935.5	935.5	935.6
27.18	920.4	920.5	920.6	920.6	920.7	27.63	935.7	935.7	935.8	935.9	935.9
27.19	920.8	920.8	920.9	921.0	921.0	27.64	936.0	936.1	936.1	936.2	936.3
27.20	921.1	921.2	921.2	921.3	921.4	27.63	936.3	936.4	936.5	936.5	936.6
27.21	921.4	921.5	921.6	921.6	821.7	27.66	936.7	936.7	936.8	936.9	936.9
27.22	921.8	921.8	921.9	922.0	922.0	27.67	937.0	937.1	937.2	937.2	937.3
27.23	922.1	922.2	922.3	922.3	922.4	27.68	937.4	937.4	937.5	937.6	937.6
27.24	922.5	922.5	922.6	922.7	922.7	27.69	937.7	937.8	937.8	937.9	938.0

Table III (cont'd)
INCHES OF MERCURY INTO MILLIBARS
1 Inch - 33.86395 mb.

Inches	0.000	0.002	0.004	0.006	0.008	Inches	0.000	0.002	0.004	0.006	0.008
27.70	938.0	938.1	938.2	938.2	938.3	28.15	953.3	953.3	953.4	953.5	953.3
27.71	938.4	938.4	938.5	938.6	938.6	28.16	953.6	953.7	953.7	953.8	953.9
27.72	938.7	938.8	938.8	938.9	939.0	28.17	953.9	954.0	954.1	954.2	954.2
27.73	939.0	939.1	939.2	939.3	939.3	28.18	954.3	954.4	954.4	954.5	954.6
27.74	939.4	939.5	939.5	939.6	939.7	28.19	954.6	954.7	954.8	954.8	954.9
27.75	939.7	939.8	939.9	939.9	940.0	28.20	955.0	955.0	955.1	955.2	955.2
27.76	940.1	940.1	940.2	940.3	940.3	28.21	955.3	955.4	955.4	955.5	955.6
27.77	940.4	940.5	940.5	940.6	940.7	28.22	955.6	955.7	955.8	955.8	955.9
27.78	940.7	940.8	940.9	940.9	941.0	28.23	956.0	956.0	956.1	956.2	956.3
27.79	941.1	941.1	941.2	941.3	941.4	28.24	956.3	956.4	956.5	956.5	956.6
27.80	941.4	941.5	941.6	941.6	941.7	28.25	956.7	956.7	956.8	956.9	956.9
27.81	941.8	941.8	941.9	942.0	942.0	28.26	957.0	957.1	957.1	957.2	957.3
27.82	942.1	942.2	942.2	942.3	942.4	28.27	957.3	957.4	957.5	957.5	957.6
27.83	942.4	942.5	942.6	942.6	942.7	28.28	957.7	957.7	957.8	957.9	957.9
27.84	942.8	942.8	942.9	943.0	943.0	28.29	958.0	958.1	958.1	958.2	958.3
27.85	943.1	943.2	943.2	943.3	943.4	28.30	958.3	958.4	958.5	958.6	958.6
27.86	943.4	943.5	943.6	943.7	943.7	28.31	958.7	958.8	958.8	958.9	959.0
27.87	943.8	943.9	943.9	944.0	944.1	28.32	959.0	959.1	959.2	959.2	959.3
27.88	944.1	944.2	944.3	944.3	944.4	28.33	959.4	959.4	959.5	959.6	959.6
27.89	944.5	944.5	944.6	944.7	944.7	28.34	959.7	959.8	959.8	959.9	960.0
27.90	944.8	944.9	944.9	945.0	945.1	28.35	960.0	960.1	960.2	960.2	960.3
27.91	945.1	945.2	945.3	945.3	945.4	28.36	960.4	960.4	960.5	960.6	960.7
27.92	945.5	945.5	945.6	945.7	945.8	28.37	960.7	960.8	960.9	960.9	961.0
27.93	945.8	945.9	946.0	946.0	946.1	28.38	961.1	961.1	961.2	961.3	961.3
27.94	946.2	946.2	946.3	946.4	946.4	28.39	961.4	961.5	961.5	961.6	961.7
27.95	946.5	946.6	946.6	946.7	946.8	28.40	961.7	961.8	961.9	961.9	962.0
27.96	946.8	946.9	947.0	947.0	947.1	28.41	962.1	962.1	962.2	962.3	962.3
27.97	947.2	947.2	947.3	947.4	947.4	28.42	962.4	962.5	962.5	962.6	962.7
27.98	947.5	947.6	947.6	947.7	947.8	28.43	962.8	962.8	962.9	963.0	963.0
27.99	947.9	947.9	948.0	948.1	948.1	28.44	963.1	963.2	963.2	963.3	963.4
28.00	948.2	948.3	948.3	948.4	948.5	28.45	963.4	963.5	963.6	963.6	963.7
28.01	948.5	948.6	948.7	948.7	948.8	28.46	963.8	963.8	963.9	964.0	964.0
28.02	948.9	948.9	949.0	949.1	949.1	28.47	964.1	964.2	964.2	964.3	964.4
28.03	949.2	949.3	949.3	949.4	949.5	28.48	964.4	964.5	964.6	964.6	964.7
28.04	949.5	949.6	949.7	949.7	949.8	28.49	964.8	964.9	964.9	965.0	965.1
28.05	949.9	950.0	950.0	950.1	950.2	28.50	965.1	965.2	965.3	965.3	965.4
28.06	950.2	950.3	950.4	950.4	950.5	28.51	965.5	965.5	965.6	965.7	965.7
28.07	950.6	950.6	950.7	950.8	950.8	28.52	965.8	965.9	965.9	966.0	966.1
28.08	950.9	951.0	951.0	951.1	951.2	28.53	966.1	966.2	966.3	966.3	966.4
28.09	951.2	951.3	951.4	951.4	951.5	28.54	966.5	966.5	966.6	966.7	966.7
28.10	951.6	951.6	951.7	951.8	951.8	28.55	966.8	966.9	967.0	967.0	967.1
28.11	951.9	952.0	952.1	952.1	952.2	28.56	967.2	867.2	967.3	967.4	967.4
28.12	952.3	952.9	952.4	952.5	952.5	28.57	967.5	967.6	967.6	967.7	967.8
28.13	952.6	952.7	952.7	952.8	952.9	28.58	967.8	967.9	968.0	968.0	968.1
28.14	952.9	953.0	953.1	953.1	953.2	28.59	968.2	968.2	968.3	968.4	968.4

Table III (cont'd)
INCHES OF MERCURY INTO MILLIBARS
1 Inch - 33.86395 mb.

Inches	0.000	0.002	0.004	0.006	0.008	Inches	0.000	0.002	0.004	0.006	0.008
28.60	968.5	968.6	968.6	968.7	968.8	29.05	983.7	983.8	983.9	984.0	984.0
28.61	968.8	968.9	969.0	969.1	969.1	29.06	984.1	984.2	984.2	984.3	984.4
28.62	969.2	969.3	969.3	969.4	969.5	29.07	984.4	984.5	984.6	984.6	984.7
28.63	969.5	969.6	969.7	969.7	969.8	29.08	984.8	984.8	984.9	985.0	985.0
28.64	969.9	969.9	970.0	970.1	970.1	29.09	985.1	985.2	985.2	985.3	985.4
28.65	970.2	970.3	970.3	970.4	970.5	29.10	985.4	985.5	985.6	985.6	985.7
28.66	970.5	970.6	970.7	970.7	970.8	29.11	985.8	985.8	985.9	986.0	986.1
28.67	970.9	970.9	971.0	971.1	971.2	29.12	986.1	986.2	986.3	986.3	986.4
28.68	971.2	971.3	971.4	971.4	971.5	29.13	986.5	986.5	986.6	986.7	986.7
28.69	971.6	971.6	971.7	971.8	971.8	29.14	986.8	986.9	986.9	987.0	987.1
28.70	971.9	972.0	972.0	972.1	972.2	29.14	987.1	987.2	987.3	987.3	987.4
27.71	972.2	972.3	972.4	972.4	972.5	29.16	987.5	987.5	987.6	987.7	987.7
28.72	972.6	972.6	972.7	972.8	972.8	29.17	987.8	987.9	987.9	988.0	988.1
28.73	972.9	973.0	973.0	973.1	973.2	29.18	988.2	988.2	988.3	988.4	988.4
28.74	973.2	973.3	973.4	973.5	973.5	29.19	988.5	988.6	988.6	988.7	988.8
28.75	973.6	973.7	973.7	973.8	973.9	29.20	988.8	988.9	989.0	989.0	989.1
28.76	973.9	974.0	974.1	974.1	974.2	29.21	989.2	989.2	989.3	989.4	989.4
28.77	974.3	974.3	974.4	974.5	974.5	29.22	989.5	989.6	989.6	989.7	989.8
28.78	874.6	974.7	974.7	974.8	974.9	29.23	989.8	989.9	990.0	990.0	990.1
28.79	974.9	975.0	975.1	975.1	975.2	29.24	990.2	990.2	990.3	990.4	990.5
28.80	975.3	975.3	975.4	975.5	975.6	29.25	990.5	990.6	990.7	990.7	990.8
28.81	975.6	975.7	975.8	975.8	975.9	29.26	990.9	990.9	991.0	991.1	991.1
28.82	976.0	976.0	976.1	976.2	976.2	29.27	991.2	991.3	991.3	991.4	991.5
28.83	976.3	976.4	976.4	976.5	976.6	29.28	991.5	991.6	991.7	991.7	991.8
28.84	976.6	976.7	976.8	976.8	976.9	29.29	991.9	991.9	992.0	992.1	992.1
28.85	977.0	977.0	977.1	977.2	977.2	29.30	992.2	992.3	992.3	992.4	992.5
28.86	977.3	977.4	977.4	977.5	977.6	29.31	992.6	992.6	992.7	992.8	992.8
28.87	977.7	977.7	977.8	977.9	977.9	29.32	992.9	993.0	993.0	993.1	993.2
28.88	978.0	978.1	978.1	978.2	978.3	29.33	993.2	993.3	993.4	993.4	993.5
28.89	978.3	978.4	978.5	978.5	978.6	29.34	993.6	993.6	993.7	993.8	993.8
28.90	978.7	978.7	978.8	978.9	978.9	29.35	993.9	994.0	994.0	994.1	994.2
28.91	979.0	979.1	979.1	979.2	979.3	29.36	994.2	994.3	994.4	994.4	994.5
28.92	979.3	979.4	979.5	979.5	979.6	29.37	994.6	994.7	994.7	994.8	994.9
28.83	979.7	979.8	979.8	979.9	980.0	29.38	994.9	995.0	995.1	995.1	995.2
28.94	980.0	980.1	980.2	980.2	980.3	29.39	995.3	995.3	995.4	995.5	995.5
28.95	980.4	980.4	980.5	980.6	980.6	29.40	995.6	995.7	995.7	995.8	995.9
28.96	980.7	980.8	980.8	980.9	981.0	29.41	995.9	996.0	996.1	996.1	996.2
28.97	981.0	981.1	981.2	981.2	981.3	29.42	996.3	996.3	996.4	996.5	996.5
28.98	981.4	981.4	981.5	981.6	981.6	29.43	996.6	996.7	996.8	996.8	996.9
28.99	981.7	981.8	981.9	981.9	982.0	29.44	997.0	997.0	997.1	997.2	997.2
29.00	982.1	982.1	982.2	982.3	982.3	29.45	997.3	997.4	997.4	997.5	997.6
29.01	982.4	982.5	982.5	982.6	982.7	29.46	997.6	997.7	997.8	997.8	997.9
29.02	982.7	982.8	982.9	982.9	983.0	29.47	998.0	998.0	998.1	998.2	998.2
29.03	983.1	983.1	983.2	983.3	983.3	29.48	998.3	998.4	998.4	998.5	998.6
29.04	983.4	983.5	983.5	983.6	983.7	29.48	998.6	998.7	998.8	998.9	998.9

Table III (cont'd)
INCHES OF MERCURY INTO MILLIBARS
1 Inch - 33.86395 mb.

Inches	0.000	0.002	0.004	0.006	0.008	Inches	0.000	0.002	0.004	0.006	0.008
29.50	999.0	999.1	999.1	999.2	999.3	29.95	1014.2	1014.3	1014.4	1014.4	1014.5
29.51	999.3	999.4	999.5	999.5	999.6	29.96	1014.6	1014.6	1014.7	1014.8	1014.8
29.52	999.7	999.7	999.8	999.9	999.9	29.97	1014.9	1015.0	1015.0	1015.1	1015.2
29.53	1000.0	1000.1	1000.1	1000.2	1000.3	29.98	1015.2	1015.3	1015.4	1015.4	1015.5
29.54	1000.3	1000.4	1000.5	1000.5	1006.6	29.99	1015.6	1015.6	1015.7	1015.8	1015.9
29.55	1000.7	1000.7	1000.8	1000.9	1001.0	30.00	1015.9	1016.0	1016.1	1016.1	1016.2
29.56	1001.0	1001.1	1001.2	1001.2	1001.3	30.01	1016.3	1016.3	1016.4	1016.5	1016.5
29.57	1001.4	1001.4	1001.5	1001.6	1001.6	30.02	1016.6	1016.7	1016.7	1016.8	1016.9
29.58	1001.7	1001.8	1001.8	1001.9	1002.0	30.03	1016.9	1017.0	1017.1	1017.1	1017.2
29.59	1002.0	10021	1002.2	1002.2	1002.3	30.04	1017.3	1017.3	1017.4	1017.5	1017.5
29.60	1002.4	1002.4	1002.5	1002.6	1002.6	30.05	1017.6	1017.7	1017.7	1017.8	1017.9
29.61	1002.7	1002.8	1002.8	1002.9	1003.0	30.06	1018.0	1018.0	1018.1	1018.2	1018.2
29.62	1003.1	1003.1	1003.2	1003.3	1003.3	30.07	1018.3	1018.4	1018.4	1018.5	1018.6
29.63	1003.4	1003.5	1003.5	1003.6	1003.7	30.08	1018.6	1018.7	1018.8	1018.8	1018.9
29.64	1003.7	1003.8	1003.9	1003.9	1004.0	30.09	1019.0	1019.0	1019.1	1019.2	1019.2
29.65	1004.1	1004.1	1004.2	1004.3	1004.3	30.10	1019.3	1019.4	1019.4	1019.5	1019.6
29.66	1004.4	1004.5	1004.5	1004.6	1004.7	30.11	1019.6	1019.7	1019.8	1019.8	1019.9
29.67	1004.7	1004.8	1004.9	1004.9	1005.0	30.12	1020.0	1020.0	1020.1	1020.2	1020.3
29.68	1005.1	1005.1	1005.2	1005.3	1005.4	30.13	1020.3	1020.4	1020.5	1020.5	1020.6
29.69	1005.4	1005.5	1005.6	1005.6	1005.7	30.14	1020.7	1020.7	1020.8	1020.9	1020.9
29.70	1005.8	1005.8	1005.9	1006.0	1006.0	30.15	1021.0	1021.1	1021.1	1021.2	1021.3
29.71	1006.1	1006.2	1006.2	1006.3	1006.4	30.16	1021.3	1021.4	1021.5	1021.5	1021.6
29.72	1006.4	1006.5	1006.6	1006.6	1006.7	30.17	1021.7	1021.7	1021.8	1021.9	1021.9
29.73	1006.8	1006.8	1006.9	1007.0	1007.0	30.18	1022.0	1022.1	1022.1	1022.2	1022.3
29.74	1007.1	1007.2	1007.2	1007.3	1007.4	30.19	1022.4	1022.4	1022.5	1022.6	1022.6
29.75	1007.5	1007.5	1007.6	1007.7	1007.7	30.20	1022.7	1022.8	1022.8	1022.9	1023.0
29.76	1007.8	1007.9	1007.9	1008.0	1008.1	30.21	1023.0	1023.1	1023.2	1023.2	1023.3
29.77	1008.1	1008.2	1008.3	1008.3	1008.4	30.22	1023.4	1023.4	1023.5	1023.6	1023.6
29.78	1008.5	1008.5	1008.6	1008.7	1008.7	30.23	1023.7	1023.8	1023.8	1023.9	1024.0
29.79	1008.8	1008.9	1008.9	1009.0	1009.1	30.24	1024.0	1024.1	1024.2	1024.2	1024.3
29.80	1009.1	1009.2	1009.3	1009.3	1009.4	30.25	1024.4	1024.5	1024.5	1024.6	1024.7
29.81	1009.5	1009.6	1009.6	1009.7	1009.8	30.26	1024.7	1024.8	1024.9	1024.9	1025.0
29.82	1009.8	1009.9	1010.0	1010.0	1010.1	30.27	1025.1	1025.1	1025.2	1025.3	1025.3
29.83	1010.2	1010.2	1010.3	1010.4	1010.4	30.28	1025.4	1025.5	1025.5	1025.6	1025.7
29.84	1010.5	1010.6	1010.6	1010.7	1010.8	30.29	1025.7	1025.8	1025.9	1025.9	1026.0
29.95	1010.8	1010.9	1011.0	1011.0	1011.1	30.30	1026.1	1026.1	1026.2	1026.3	1026.3
29.86	1011.2	1011.2	1011.3	1011.4	1011.4	30.31	1026.4	1026.5	1026.6	1026.6	1026.7
29.87	1011.5	1011.6	1011.7	1011.7	1011.8	30.32	1026.8	1026.8	1026.9	1027.0	1027.0
29.88	1011.9	1011.9	1012.0	1012.1	1012.1	30.33	1027.1	1027.2	1027.2	1027.3	1027.4
29.89	1012.2	1012.3	1012.3	1012.4	1012.5	30.34	1027.4	1027.5	1027.6	1027.6	1027.7
29.90	1012.5	1012.6	1012.7	1012.7	1012.8	30.35	1027.8	1027.8	1027.9	1028.0	1028.0
29.91	1012.9	1012.9	1013.0	1013.1	1013.1	30.36	1028.1	1028.2	1028.2	1028.3	1028.4
29.92	1013.2	1013.3	1013.3	1013.4	1013.5	30.37	1028.4	1028.5	1028.6	1028.7	1028.7
29.93	1013.5	1013.6	1013.7	1013.8	1013.8	30.38	1028.8	1028.9	1028.9	1029.0	1029.1
29.94	1013.9	1014.0	1014.0	1014.1	1014.2	30.39	1029.1	1029.2	1029.3	1029.3	1029.4

Table III (cont'd)
INCHES OF MERCURY INTO MILLIBARS
1 Inch - 33.86395 mb.

Inches	0.000	0.002	0.004	0.006	0.008	Inches	0.000	0.002	0.004	0.006	0.008
30.40	1029.5	1029.5	1029.6	1029.7	1029.7	30.70	1039.6	1039.7	1039.8	1039.8	1039.9
30.41	1029.8	1029.9	1029.9	1030.0	1030.1	30.71	1040.0	1040.0	1040.1	1040.2	1040.2
30.42	1030.1	1030.2	1030.3	1030.3	1030.4	30.72	1040.3	1040.4	1040.4	1040.5	1040.6
30.43	1030.5	1030.5	1030.6	1030.7	1030.8	30.73	1040.6	1040.7	1040.8	1040.8	1040.9
30.44	1030.8	1030.9	1031.0	1031.0	1031.1	30.74	1041.0	1041.0	1041.1	1041.2	1041.2
30.45	1031.2	1031.2	1031.3	1031.4	1031.4	30.75	1041.3	1041.4	1041.5	1041.5	1041.6
30.46	1031.5	1031.6	1031.6	1031.7	1031.8	30.76	1041.7	1041.7	1041.8	1041.9	1041.9
30.47	1031.8	1031.9	1032.0	1032.0	1032.1	30.77	1042.0	1042.1	1042.1	1042.2	1042.3
30.48	1032.2	1032.2	1032.3	1032.4	1032.4	30.78	1042.3	1042.4	1042.5	1042.5	1042.6
30.49	1032.5	1032.6	1032.6	1032.7	1032.8	30.79	1042.7	1042.7	1042.8	1042.9	1042.9
30.50	1032.9	1032.9	1033.0	1033.1	1033.1	30.80	1043.0	1043.1	1043.1	1043.2	1043.3
30.51	1033.2	1033.3	1033.3	1033.4	1033.5	30.81	1043.3	1043.4	1043.5	1048.6	1043.6
30.52	1033.5	1033.6	1033.7	1033.7	1033.8	30.82	1043.7	1043.8	1043.8	1043.9	1044.0
30.53	1033.9	1033.9	1034.0	1034.1	1034.1	30.83	1044.0	1044.1	1044.2	1044.2	1044.3
30.54	1034.2	1034.3	1034.3	1034.4	1034.5	30.84	1044.4	1044.4	1044.5	1044.6	1044.6
30.55	1034.5	1034.6	1034.7	1034.7	1034.8	30.85	1044.7	1044.8	1044.8	1044.9	1045.0
30.56	1034.9	1035.0	1035.0	1035.1	1035.2	30.86	1045.0	1045.1	1045.2	1045.2	1045.3
30.57	1035.2	1035.3	1035.4	1035.4	1035.5	30.87	1045.4	1045.4	1045.5	1045.6	1045.7
3058	1035.6	1035.6	1035.7	1035.8	1035.8	30.88	1045.7	1045.8	1045.9	1045.9	1046.0
30.59	1035.9	1036.0	1036.0	1036.1	1036.2	30.89	1046.1	1046.1	1046.2	1046.3	1046.3
30.60	1036.2	1036.3	1036.4	1036.4	1036.5	30.90	1046.4	1046.5	1046.5	1046.6	1046.7
30.61	1036.6	1036.6	1036.7	1036.8	1036.8	30.91	1046.7	1046.8	1046.9	1046.9	1047.0
30.62	1036.9	1037.0	1037.0	1037.1	1037.2	30.92	1047.1	1047.1	1047.2	1047.3	1047.3
30.63	1037.3	1037.3	1037.4	1037.5	1037.5	30.93	1047.4	1047.5	1047.5	1047.6	1047.7
30.64	1037.6	1037.7	1037.7	1037.8	1037.9	30.94	1047.8	1047.8	1047.9	1048.0	1048.0
30.65	1037.9	1038.0	1038.1	1038.1	1038.2	30.95	1048.1	1049.2	1048.2	1048.3	1048.4
30.66	1038.3	1038.3	1038.4	1038.5	1038.5	30.96	1048.4	1048.5	1048.6	1048.6	1048.7
30.67	1038.6	1038.7	1038.7	1038.8	1038.9	30.97	1048.8	1048.8	1048.9	1049.0	1049.0
30.68	1038.9	1039.0	1039.1	1039.1	1039.2	30.98	1049.1	1049.2	1049.2	1049.3	1049.4
30.69	1039.3	1039.4	1039.4	1039.5	1039.6	30.99	1049.4	1049.5	1049.6	1049.6	1049.7
						31.00	1049.8	1049.9	1049.9	1050.0	1050.1

Table IV
MILLIBARS INTO INCHES OF MERCURY
1 mb = .029529928 Inch

Mb	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
540	15.946	15.949	15.952	15.955	15.958	15.961	15.964	15.967	15.970	15.973
541	15.976	15.979	15.982	15.985	15.988	15.990	15.993	15.996	15.999	16.002
542	16.005	16.008	16.011	16.014	16.017	16.020	16.023	16.026	16.029	16.032
543	16.035	16.038	16.041	16.044	16.047	16.050	16.052	16.055	16.058	16.061
544	16.064	16.067	16.070	16.073	16.076	16.079	16.082	16.085	16.088	16.091
545	16.094	16.097	16.100	16.103	16.106	16.109	16.112	16.114	16.117	16.120
546	16.123	16.126	16.129	16.132	16.135	16.138	16.141	16.144	16.147	16.150
547	16.153	16.156	16.159	16.162	16.165	16.168	16.171	16.174	16.176	16.179
548	16.182	16.185	16.188	16.191	16.194	16.197	16.200	16.203	16.206	16.209
549	16.212	16.215	16.218	16.221	16.224	16.227	16.230	16.233	16.236	16.239
550	16.241	16.244	16.247	16.250	16.253	16.256	16259	16.262	16.265	16.268
551	16.271	16.274	16.277	16.280	16.283	16.286	16.289	16.292	16.295	16.298
552	16.301	16.303	16.306	16.309	16.312	16.315	16.318	16.321	16.324	16.327
553	16.330	16.333	16.336	16.339	16.342	16.345	16.348	16.351	16.354	16.357
554	16.360	16.363	16.365	16.368	16.371	16.374	16.377	16.380	16.383	16.386
555	16.389	16.392	16.395	16.398	16.401	16.404	16.407	16.410	16.413	16.416
556	16.419	16.422	16.425	16.427	16.430	16.433	16.436	16.439	16.442	16.445
557	16.448	16.451	16.454	16.457	16.460	16.463	16.466	16.469	16.472	16.475
558	16.478	16.481	16.484	16.487	16.490	16.492	16.495	16.498	16.501	16.504
559	16.507	16.510	16.513	16.516	16.519	16.522	16.525	16.528	16.531	16.534
560	16.537	16.540	16.543	16.546	16.549	16.552	16.554	16.557	16.560	16.563
561	16.566	16.569	16.572	16.575	16.578	16.581	16.584	16.587	16.590	16.593
562	16.596	16.599	16.602	16.605	16.608	16.611	16.614	16.616	16.619	16.622
563	16.625	16.628	16.631	16.634	16.637	16.640	16.643	16.646	16.649	16.652
564	16.655	16.658	16.661	16.664	16.667	16.670	16.673	16.676	16.679	16.681
565	16.684	16.687	16.690	16.693	16.696	16.699	16.702	16.705	16.708	16.711
566	16.714	16.717	16.720	16.723	16.726	16.729	16.732	16.735	16.738	16.741
567	16.743	16.746	16.749	16.752	16.755	16.758	16.761	16.764	16.767	16.770
568	16.773	16.776	16.779	16.782	16.785	16.788	16.791	16.794	16.797	16.800
569	16.803	16.805	16.808	16.811	16.814	16.817	16.820	16.823	16.826	16.829
570	16.832	16.835	16.838	16.841	16.844	16.847	16.850	16.853	16.856	16.859
571	16.862	16.865	16.867	16.870	16.873	16.876	16.879	16.882	16.885	16.888
572	16.891	16.894	16.897	16.900	16.903	16.906	16.909	16.912	16.915	16.918
573	16.921	16.924	16.927	16.930	16.932	16.935	16.938	16.941	16.944	16.947
574	16.950	16.953	16.956	16.959	16.962	16.965	16.968	16.971	16.974	16.977

Table IV (cont'd)
MILLIBARS INTO INCHES OF MERCURY
1 mb = .029529928 Inch

Mb	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
575	16.980	16.983	16.986	16.989	16.992	16.994	16.997	17.000	17.003	17.006
576	17.009	17.012	17.015	17.018	17.021	17.024	17.027	17.030	17.033	17.036
577	17.039	17.042	17.045	17.048	17.051	17.054	17.056	17.059	17.062	17.065
578	17.068	17.071	17.074	17.077	17.080	17.083	17.086	17.089	17.092	17.095
579	17.098	17.101	17.104	17.107	17.110	17.113	17.116	17.118	17.121	17.124
580	17.127	17.130	17.133	17.136	17.139	17.142	17.145	17.148	17.151	17.154
581	17.157	17.160	17.163	17.166	17.169	17.172	17.175	17.178	17.181	17.183
582	17.186	17.189	17.192	17.195	17.198	17.201	17.204	17.207	17.210	17.213
583	17.216	17.219	17.222	17.223	17.228	17.231	17.234	17.237	17.240	17.243
584	17.245	17.248	17.251	17.254	17.257	17.260	17.263	17.266	17.269	17.272
585	17.275	17.278	17.281	17.284	17.287	17.290	17.293	17.296	17.299	17.302
586	17.305	17.307	17.310	17.313	17.316	17.319	17.322	17.325	17.328	17.331
587	17.334	17.337	17.340	17.343	17.346	17.349	17.352	17.355	17.358	17.361
588	17.364	17.367	17.370	17.372	17.375	17.378	17.381	17.384	17.387	17.390
589	17.393	17.396	17.399	17.402	17.405	17.408	17.411	17.414	17.417	17.420
590	17.423	17.426	17.429	17.432	17.434	17.437	17.440	17.443	17.446	17.449
591	17.452	17.455	17.458	17.461	17.464	17.467	17.470	17.473	17.476	17.479
592	17.482	17.485	17.488	17.491	17.494	17.496	17.499	17.502	17.505	17.508
593	17.511	17.514	17.517	17.520	17.523	17.526	17.529	17.532	17.535	17.538
594	17.541	17.544	17.547	17.550	17.553	17.556	17.558	17.561	17.564	17.567
595	17.570	17.573	17.576	17.579	17.582	17.585	17.588	17.591	17.594	17.597
596	17.600	17.603	17.606	17.609	17.612	17.615	17.618	17.621	17.623	17.626
597	17.629	17.632	17.635	17.638	17.641	17.644	17.647	17.650	17.653	17.656
598	17.659	17.662	17.665	17.668	17.671	17.674	17.677	17.680	17.683	17.685
599	17.688	17.691	17.694	17.697	17.700	17.703	17.706	17.709	17.712	17.715
600	17.718	17.721	17.724	17.727	17.730	17.733	17.736	17.739	17.742	17.745
601	17.747	17.750	17.753	17.756	17.759	17.762	17.765	17.768	17.771	17.774
602	17.777	17.780	17.783	17.786	17.789	17.792	17.795	17.798	17.801	17.804
603	17.807	17.809	17.812	17.815	17.818	17.821	17.824	17.827	17.830	17.833
604	17.836	17.839	17.842	17.845	17.848	17.851	17.854	17.857	17.860	17.863
605	17.866	17.869	17.872	17.874	17.877	17.880	17.883	17.886	17.889	17.892
606	17.895	17.898	17.901	17.904	17.907	17.910	17.913	17.916	17.919	17.922
607	17.925	17.928	17.931	17.934	17.936	17.939	17.942	17.945	17.948	17.951
608	17.954	17.957	17.960	17.963	17.966	17.969	17.972	17.975	17.978	17.981
609	17.984	17.987	17.990	17.993	17.996	17.998	18.001	18.004	18.007	18.010

Table IV (cont'd)
MILLIBARS INTO INCHES OF MERCURY
1 mb = .029529928 Inch

Mb	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
610	18.013	18.016	18.019	18.022	18.025	18.028	18.031	18.034	18.037	18.040
611	18.043	18.046	18.049	18.052	18.055	18.058	18.061	18.063	18.066	18.069
612	18.072	18.075	18.078	18.081	18.084	18.087	18.090	18.093	18.096	18.099
613	18.102	18.105	18.108	18.111	18.114	18.117	18.120	18.123	18.125	18.128
614	18.131	18.134	18.137	18.140	18.143	18.146	18.149	18.152	18.155	18.158
615	18.161	18.164	18.167	18.170	18.173	18.176	18.179	18.182	18.185	18.187
616	18.190	18.193	18.196	18.199	18.202	18.205	18.208	18.211	18.214	18.217
617	18.220	18.223	18.226	18.229	18.232	18.235	18.238	18.241	18.244	18.247
618	18.249	18.252	18.255	18.258	18.261	18.264	18.267	18.270	18.273	18.276
619	18.279	18.282	18.285	18.288	18.291	18.294	18.297	18.300	18.303	18.306
620	18.309	18.312	18.314	18.317	18.320	18.323	18.326	18.329	18.332	18.335
621	18.338	18.341	18.344	18.347	18.350	18.353	18.356	18.359	18.362	18.365
622	18.368	18.371	18.374	18.376	18.379	18.382	18.385	18.388	18.391	18.394
623	18.397	18.400	18.403	18.406	18.409	18.412	18.415	18.418	18.421	18.424
624	18.427	18.430	18.433	18.436	18.438	18.441	18.444	18.447	18.450	18.453
625	18.456	18.459	18.462	18.465	18.468	18.471	18.474	18.477	18.480	18.483
626	18.486	18.489	18.492	18.495	18.498	18.500	18.503	18.406	18.509	18.512
627	18.515	18.518	18.521	18.524	18.527	18.530	18.533	18.536	18.539	18.542
628	18.545	18.548	18.551	18.554	18.557	18.560	18.563	18.565	18.568	18.571
629	18.574	18.577	18.580	18.583	18.586	18.589	18.592	18.595	18.598	18.601
630	18.604	18.607	18.610	18.613	18.616	18.619	18.622	18.625	18.627	18.630
631	18.633	18.636	18.639	18.642	18.645	18.648	18.651	18.654	18.657	18.660
632	18.663	18.666	18.669	18.672	18.675	18.678	18.681	18.684	18.687	18.689
633	18.692	18.695	18.698	18.701	18.704	18.707	18.710	18.713	18.716	18.719
634	18.722	18.725	18.728	18.731	18.734	18.737	18.740	18.743	18.746	18.749
635	18.752	18.754	18.757	18.760	18.763	18.766	18.769	18.772	18.775	18.778
636	18.781	18.784	18.787	18.790	18.793	18.796	18.799	18.802	18.805	18.808
637	18.811	18.814	18.816	18.819	18.822	18.825	18.828	18.831	18.834	18.837
638	18.840	18.843	18.846	18.849	18.852	18.855	18.858	18.861	18.864	18.867
639	18.870	18.873	18.876	18.878	18.881	18.884	18.887	18.890	18.893	18.896
640	18.899	18.902	18.905	18.908	18.911	18.914	18.917	18.920	18.923	18.926
641	18.929	18.932	18.935	18.938	18.940	18.943	18.946	18.949	18.952	18.955
642	18.958	18.961	18.964	18.967	18.970	18.973	18.976	18.979	18.982	18.985
643	18.988	18.991	18.994	18.997	19.000	19.003	19.005	19.008	19.011	19.014
644	19.017	19.020	19.023	19.026	19.029	19.032	19.035	19.038	19.041	19.044

Table IV (cont'd)
MILLIBARS INTO INCHES OF MERCURY
1 mb = .029529928 Inch

Mb	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
645	19.047	19.050	19.053	19.056	19.059	19.062	19.065	19.067	19.070	19.073
646	19.076	19.079	19.082	19.085	19.088	19.091	19.094	19.097	19.100	19.103
647	19.106	19.109	19.112	19.115	19.118	18.121	19.124	19.127	19.129	19.132
648	19.135	19.138	19.141	19.144	19.147	19.150	19.153	19.156	19.159	19.162
649	19.165	19.168	19.171	19.174	19.177	19.180	19.183	19.186	19.189	19.192
650	19.194	19.197	19.200	19.203	19.206	19.209	19.212	19.215	19.218	19.221
651	19.224	19.227	19.230	19.233	19.236	19.239	19.242	19.245	19.248	19.251
652	19.254	19.256	19.259	19.262	19.265	19.268	19.271	19.274	19.277	19.280
653	19.283	19.286	19.289	19.292	19.295	19.298	19.301	19.304	19.307	19.310
654	19.313	19.316	19.318	19.321	19.324	19.327	19.330	19.333	19.336	19.339
655	19.342	19.345	19.348	19.351	19.354	19.357	19.360	19.363	19.366	19.369
656	19.372	19.375	19.378	19.380	19.383	19.386	19.389	19.392	19.395	19.398
657	19.401	19.404	19.407	19.410	19.413	19.416	19.419	19.422	19.425	19.428
658	19.431	19.434	19.437	19.440	19.443	19.445	19.448	19.451	19.454	19.457
659	19.460	19.463	19.466	19.469	19.472	19.475	19.478	19.481	19.484	19.487
660	19.490	19.493	19.496	16.499	19.502	19.505	19.507	19.510	19.513	19.516
661	19.519	19.522	19.525	19.528	19.531	19.534	19.537	19.540	19.543	19.546
662	19.549	19.552	19.555	19.558	19.561	19.564	19.567	19.569	19.572	19.575
663	19.578	19.581	19.584	19.587	19.590	19.593	19.596	19.599	19.602	19.605
664	19.608	19.611	19.614	19.617	19.620	19.623	19.626	19.629	19.631	19.634
665	19.637	19.640	19.643	19.646	19.649	19.652	19.655	19.658	19.661	19.664
666	19.667	19.670	19.673	19.676	19.679	19.682	19.685	19.688	19.691	19.694
667	19.696	19.699	19.702	19.705	19.708	19.711	19.714	19.717	19.720	19.723
668	19.726	19.729	19.732	19.735	19.738	19.741	19.744	19.747	19.750	19.753
669	19.756	19.758	19.761	19.764	19.767	19.770	19.773	19.776	19.779	19.782
670	19.785	19.788	19.791	19.794	19.797	19.800	19.803	19.806	19.809	19.812
671	19.815	19.818	19.820	19.823	19.826	19.829	19.832	19.835	19.838	19.841
672	19.844	19.847	19.850	19.853	19.856	19.859	19.862	19.865	19.868	19.871
673	19.874	19.877	19.880	19.883	19.885	19.888	19.891	19.894	19.897	19.900
674	19.903	19.906	19.909	19.912	19.915	19.918	19.921	19.924	19.927	19.930
675	19.933	19.936	19.939	19.942	19.945	19.947	19.950	19.953	19.956	19.959
676	19.962	19.965	19.968	19.971	19.974	19.977	19.980	19.983	19.986	19.989
677	19.992	19.995	19.998	20.001	20.004	20.007	20.009	20.012	20.015	20.018
678	20.021	20.024	20.027	20.030	20.033	20.036	20.039	20.042	20.045	20.048
679	20.051	20.054	20.057	20.060	20.063	20.066	20.069	20.071	20.074	20.077

Table IV (cont'd)
MILLIBARS INTO INCHES OF MERCURY
1 mb = .029529928 Inch

Mb	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
680	20.080	20.083	20.086	20.089	20.092	20.095	20.098	20.101	20.104	20.107
681	20.110	20.113	20.116	20.119	20.122	20.125	20.128	20.131	20.134	20.136
682	20.139	20.142	20.145	20.148	20.151	20.154	20.157	20.160	20.163	20.166
683	20.169	20.172	20.175	20.178	20.181	20.184	20.187	20.190	20.193	20.196
684	20.198	20201	20.204	20.207	20.210	20.210	20.216	20.219	20.222	20.225
685	20.228	20.231	20.234	20.237	20.240	20.243	20.246	20.249	20.252	20.255
686	20.258	20.260	20.263	20.266	20.269	20.272	20.275	20.278	20.281	20284
687	20.287	20.290	20.293	20.296	20.299	20.302	20.305	20.308	20.311	20.314
688	20.317	20.320	20.322	20.325	20.328	20.331	20.334	20.337	20.340	20.343
689	20.346	20.349	20.352	20.355	20.358	20.361	20.364	20.367	20.370	20.373
690	20.376	20.379	20.382	20.385	20.387	20.390	20.393	20.396	20.399	20.402
691	20.405	20.408	20.411	20.414	20.417	20.420	20.423	20.426	20.429	20.432
692	20.435	20.438	20.441	20.444	20.447	20.449	20.452	20.455	20.458	20.461
693	20.464	20.467	20.470	20.473	20.476	20.479	20.482	20.485	20.488	20.491
694	20.494	20.497	20.500	20.503	20.506	20.509	20.511	20.514	20.517	20.520
695	20.523	20.526	20.529	20.532	20.535	20.538	20.541	20.544	20.547	20.550
696	20.553	20.556	20.559	20.562	20.565	20.568	20.571	20.574	20.576	20.579
697	20.582	20.585	20.588	20.591	20.594	20.597	20.600	20.603	20.606	20.609
698	20.612	20.615	20.618	20.621	20.624	20.627	20.630	20.633	20.636	20.638
699	20.641	20.644	20.647	20.650	20.653	20.656	20.659	20.662	20.665	20.668
700	20.671	20.674	20.677	20.680	20.683	20.686	20.689	20.692	20.695	20.698
701	20.700	20.703	20.706	20.709	20.712	20.715	20.718	20.721	20.724	20.727
702	20.730	20.733	20.736	20.739	20.742	20.745	20.748	20.751	20.754	20.757
703	20.760	20.762	20.765	20.768	20.771	20.774	20.777	20.780	20.783	20.786
704	20.789	20.792	20.795	20.798	20.801	20.804	20.807	20.810	20.813	20.816
705	20.819	20.822	20.825	20.827	20.830	20.833	20.836	20.839	20.842	20.845
706	20.848	20.851	20.854	20.857	20.860	20.863	20.866	20.869	20.872	20.875
707	20.878	20.881	20.884	20.887	20.889	20.892	20.895	20.898	20.901	20.904
708	20.907	20.910	20.913	20.916	20.919	20.922	20.925	20.928	20.931	20.934
709	20.937	20.940	20.943	20.946	20.949	20.951	20.954	20.957	20.960	20.963
710	20.966	20.969	20.972	20.975	20.978	20.981	20.984	20.987	20.990	20.993
711	20.996	20.999	21.002	21.005	21.008	21.011	21.013	21.016	21.019	21.022
712	21.025	21.028	21.031	21.034	21.037	21.040	21.043	21.046	21.049	21.052
713	21.055	21.058	21.061	21.064	21.067	21.070	21.073	21.076	21.078	21.081
714	21.084	21.087	21.090	21.093	21.096	21.099	21.102	21.105	21.108	21.111

Table IV (cont'd)
MILLIBARS INTO INCHES OF MERCURY
1 mb = .029529928 Inch

Mb	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
715	21.114	21.117	21.120	21.123	21.126	21.129	21.132	21.135	21.138	21.140
716	21.143	21.146	21.149	21.152	21.155	21.158	21.161	21.164	21.167	21.170
717	21.173	21.176	21.179	21.182	21.185	21.188	21.191	21.194	21.197	21.200
718	21.202	21.205	21.208	21.211	21.214	21.217	21.220	21.223	21.226	21.229
719	21.232	21.235	21.238	21.241	21.244	21.247	21.250	21.253	21.256	21.259
720	21.262	21.265	21.267	21.270	21.273	21.276	21.279	21.282	21.285	21.288
721	21.291	21.294	21.297	21.300	21.303	21.306	21.309	21.312	21.315	21.318
722	21.321	21.324	21.327	21.329	21.332	21.335	21.338	21.341	21.344	21.347
723	21.350	21.353	21.356	21.359	21.362	21.365	21.368	21.371	21.374	21.377
724	21.380	21.383	21.386	21.389	21.391	21.394	21.397	21.400	21.403	21.406
725	21.409	21.412	21.415	21.418	21.421	21.424	21.427	21.430	21.433	21.436
726	21.439	21.442	21.445	21.448	21.451	21.453	21.456	21.459	21.462	21.465
727	21.468	21.471	21.474	21.477	21.480	21.483	21.486	21.489	21.492	21.495
728	21.498	21.501	21.504	21.507	21.510	21.513	21.516	21.518	21.521	21.524
729	21.527	21.530	21.533	21.536	21.539	21.542	21.545	21.548	21.551	21.554
730	21.557	21.560	21.563	21.566	21.569	21.572	21.575	21.578	21.580	21.583
731	21.586	21.589	21.592	21.595	21.598	21.601	21.604	21.607	21.610	21.613
732	21.616	21.619	21.622	21.625	21.628	21.631	21.634	21.637	21.640	21.642
733	21.645	21.648	21.651	21.654	21.657	21.660	21.663	21.666	21.669	21.672
734	21.675	21.678	21.681	21.684	21.687	21.690	21.693	21.696	21.699	21.702
735	21.704	21.707	21.710	21.713	21.716	21.719	21.722	21.725	21.728	21.731
736	21.734	21.737	21.740	21.743	21.746	21.749	21.752	21.755	21.758	21.761
737	21.764	21.767	21.769	21.772	21.775	21.778	21.781	21.784	21.787	21.790
738	21.793	21.796	21.799	21.802	21.805	21.808	21.811	21.814	21.817	21.820
739	21.823	21.826	21.829	21.831	21.834	21.837	21.840	21.843	21.846	21.849
740	21.852	21.855	21.858	21.861	21.864	21.867	21.870	21.873	21.876	21.879
741	21.882	21.885	21.888	21.891	21.893	21.896	21.899	21.902	21.905	21.908
742	21.911	21.914	21.917	21.920	21.923	21.926	21.929	21.932	21.935	21.938
743	21.941	21.944	21.947	21.950	21.953	21.956	21.958	21.961	21.964	21.967
744	21.970	21.973	21.976	21.979	21.982	21.985	21.988	21.991	21.994	21.997
745	22.000	22.003	22.006	22.009	22.012	22.015	22.018	22.020	22.023	22.026
746	22.029	22.032	22.035	22.038	22.041	22.044	22.047	22.050	22.053	22.056
747	22.059	22.062	22.065	22.068	22.071	22.074	22.077	22.080	22.082	22.085
748	22.088	22.091	22.094	22.097	22.100	22.103	22.106	22.109	22.112	22.115
749	22.118	22.121	22.124	22.127	22.130	22.133	22.136	22.139	22.142	22.144

Table IV (cont'd)
MILLIBARS INTO INCHES OF MERCURY
1 mb = .029529928 Inch

Mb	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
750	22.147	22.150	22.153	22.156	22.159	22.162	22.165	22.168	22.171	22.174
751	22.177	22.180	22.183	22.186	22.189	22.192	22.195	22.198	22.201	22.204
752	22.207	22.209	22.212	22.215	22.218	22.221	22.224	22227	22.230	22.233
753	22.236	22.239	22.242	22.245	22.248	22.251	22.254	22.257	22.260	22.263
754	22.266	22.269	22.271	22.274	22.277	22.280	22.283	22.286	22.289	22.292
755	22.295	22.298	22.301	22.304	22.307	22.310	22.313	22.316	22.319	22.322
756	22.325	22.328	22.331	22.333	22.336	22.339	22.342	22.345	22.348	22.351
757	22.354	22.357	22.360	22.363	22.366	22.369	22.372	22.375	22.378	22.381
758	22.384	22.387	22.390	22.393	22.395	22.398	22.401	22.404	22.407	22.410
759	22.413	22.416	22.419	22.422	22.425	22.428	22.431	22.434	22.437	22.440
760	22.443	22.446	22.449	22.452	22.455	22.458	22.460	22.463	22.466	22.469
761	22.472	22.475	22.478	22.481	22.484	22.487	22.490	22.493	22.496	22.499
762	22.502	22.505	22.508	22.511	22.514	22.517	22.520	22.522	22.525	22.528
763	22.531	22.534	22.537	22.540	22.543	22.546	22.549	22.552	22.555	22.558
764	22.561	22.564	22.567	22.570	22.573	22.576	22.579	22.582	22.584	22.587
765	22.590	22.593	22.596	22.599	22.602	22.605	22.608	22.611	22.614	22.617
766	22.620	22.623	22.626	22.629	22.632	22.635	22.638	22.641	22.644	22.647
767	22.649	22.652	22.655	22.658	22.661	22.664	22.667	22.670	22.673	22.676
768	22.679	22.682	22.685	22.688	22.691	22.694	22.697	22.700	22.703	22.706
769	22.709	22.711	22.714	22.717	22.720	22.723	22.726	22.729	22.732	22.735
770	22.738	22.741	22.744	22.747	22.750	22.753	22.756	22.759	22.762	22.765
771	22.768	22.771	22.773	22.776	22.779	22.782	22.785	22.788	22.791	22.794
772	22.797	22.800	22.803	22.806	22.809	22.812	22.815	22.818	22.821	22.824
773	22.827	22.830	22.833	22.835	22.838	22.841	22.844	22.847	22.850	22.853
774	22.856	22.859	22.862	22.865	22.868	22.871	22.874	22.877	22.880	22.883
775	22.886	22.889	22.892	22.895	22.898	22.900	22.903	22.906	22.909	22.912
776	22.915	22.918	22.921	22.924	22.927	22.930	22.933	22.936	22.939	22.942
777	22.945	22.948	22.951	22.954	22.957	22.960	22.962	22.965	22.968	22.971
778	22.974	22.977	22.980	22.983	22.986	22.989	22.992	22.995	22.998	23.001
779	23.004	23.007	23.010	23.013	23.016	23.019	23.022	23.024	23.027	23.030
780	23.033	23.036	23.039	23.042	23.045	23.048	23.051	23.054	23.057	23.060
781	23.063	23.066	23.069	23.072	23.075	23.078	23.081	23.084	23.086	23.089
782	23.092	23.095	23.098	23.101	23.104	23.107	23.110	23.113	23.116	23.119
783	23.122	23.125	23.128	23.131	23.134	23.137	23.140	23.143	23.146	23.149
784	23.151	23.154	23.157	23.160	23.163	23.166	23.169	23.172	23.175	23.178

Table IV (cont'd)
MILLIBARS INTO INCHES OF MERCURY
1 mb = .029529928 Inch

Mb	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
785	23.181	23.184	13.187	23.190	23.193	23.196	23.199	23.202	23205	23.208
786	23.211	23.213	23.216	23.219	23.222	23.225	23.228	23.231	23.234	23.237
787	23.240	23.243	23.246	23.249	23.252	23.255	23.258	23.261	23.264	23.267
788	23.270	23.273	23.275	23.278	23.281	23.284	23.287	23.290	23.293	23.296
789	23.299	23.302	23.305	23.308	23.311	23.314	23.317	23.320	23.323	23.326
790	23.329	23.332	23.335	23.338	23.340	23.343	23.346	23.349	23.352	23.355
791	23.358	23.361	23.364	23.367	23.370	23.373	23.376	23.379	23.382	23.385
792	23.388	23.391	23.394	23.397	23.400	23.402	23.405	23.408	23.411	23.414
793	23.417	23.420	23.423	23.426	23.429	23.432	23.435	23.438	23.441	23.444
794	23.447	23.450	23.453	23.456	23.459	23.462	23.464	23.467	23.470	23.473
795	23.476	23.479	23.482	23.485	23.488	23.491	23.494	23.497	23.500	23.503
796	23.506	23.509	23.512	23.515	23.518	23.521	23.524	23.526	23.529	23.532
797	23.535	23.538	23.541	23.544	23.547	23.550	23.553	23.556	23.559	23.562
798	23.565	23.568	23.571	23.574	23.577	23.580	23.583	23.586	23.589	23.591
799	23.594	23.597	23.600	23.603	23.606	23.609	23.612	23.615	23.618	23.621
800	23.624	23.627	23.630	23.633	23.636	23.639	23.642	23.645	23.648	23.651
801	23.653	23.656	23.659	23.662	23.665	23.668	23.671	23.674	23.677	23.680
802	23.683	23.686	23.689	23.692	23.695	23.698	23.701	23.704	23.707	23.710
803	23.713	23.715	23.718	23.721	23.724	23.727	23.730	23.733	23.736	23.739
804	23.742	23.745	23.748	23.751	23.754	23.757	23.760	23.763	23.766	23.769
805	23.772	23.775	23.777	23.780	23.783	23.786	23.789	23.792	23.795	23.798
806	23.801	23.804	23.807	23.810	23.813	23.816	23.819	23.822	23.825	23.828
807	23.831	23.834	23.837	23.840	23.842	23.845	23.848	23.851	23.854	23.857
808	23.860	23.863	23.866	23.869	23.872	23.875	23.878	23.881	23.884	23.887
809	23.890	23.893	23.896	23.899	23.902	23.904	23.907	23.910	23.913	23.916
810	23.919	23.922	23.925	23.928	23.931	23.934	23.937	23.940	23.943	23.946
811	23.949	23.952	23.955	23.958	23.961	23.964	23.966	23.969	23.972	23.975
812	23.978	23.981	23.984	23.987	23.990	23.993	23.996	23.999	24.002	24.005
813	24.008	24.011	24.014	24.017	24.020	24.023	24.026	24.029	24.031	24.034
814	24.037	24.040	24.043	24.046	24.049	24.052	24.055	24.058	24.061	24.064
815	24.067	24.070	24.073	24.076	24.079	24.082	24.085	24.088	24.091	24.093
816	24.096	24.099	24.102	24.105	24.108	24.111	24.114	24.117	24.120	24.123
817	24.126	24.129	24.132	24.135	24.138	24.141	24.144	24.147	24.150	24.153
818	24.155	24.158	24.161	24.164	24.167	24.170	24.173	24.176	24.179	24.182
819	24.185	24.188	24.191	24.194	24.197	24.200	24.203	24.206	24.209	24.212
820	24.215	24.217	24.220	24.223	24.226	24.229	24.232	24.235	24.238	24.241

Table IV (cont'd)
MILLIBARS INTO INCHES OF MERCURY
1 mb = .029529928 Inch

Mb	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
821	24.244	24.247	24.250	24.253	24.256	24.259	24.262	24.265	24.268	24.271
822	24.274	24.277	24.280	24.282	24.285	24.288	24.291	24.294	24.297	24.300
823	24.303	24.306	24.209	24.312	24.315	24.318	24.321	24.324	24.327	24.330
824	24.333	24.336	24.339	24.342	24.344	24.347	24.350	24.353	24.356	24.359
825	24.362	24.365	24.368	24.371	24.374	24.377	24.380	24.383	24.386	24.389
826	24.392	24.395	24.398	24.401	24.404	24.406	24.409	24.412	24.415	24.418
827	24.421	24.424	24.427	24.430	24.433	24.436	24.439	24.442	24.445	24.488
828	24.451	24.454	24.457	24.460	24.463	24.466	24.468	24.471	24.474	24.477
829	24.480	24.483	24.486	24.489	24.492	24.495	24.498	24.501	24.504	24.407
830	24.510	24.513	24.516	24.519	24.522	24.525	24.528	24.531	24.533	24.536
831	24.539	24.542	24.545	24.548	24.551	24.553	24.557	24.560	24.563	24.566
832	24.569	24.572	24.575	24.578	24.581	24.584	24.587	24.590	24.593	24.595
833	24.598	24.601	24.604	24.607	24.610	24.613	24.616	24.619	24.622	24.625
834	24.628	24.631	24.634	24.637	24.640	24.643	24.646	24.649	24.652	24.655
835	24.657	24.660	24.663	24.666	24.669	24.672	24.675	24.678	24.681	24.684
836	24.687	24.690	24.693	24.696	24.699	24.702	24.705	24.708	24.711	24.714
837	24.717	24.720	24.722	24.725	24.728	24.731	24.734	24.737	24.740	24.743
838	24.746	24.749	24.752	24.755	24.758	24.761	24.764	24.767	24.770	24.773
839	24.776	24.779	24.782	24.784	24.787	24.790	24.793	24.796	24.799	24.802
840	24.805	24.808	24.811	24.814	24.817	24.820	24.823	24.826	24.829	24.832
841	24.835	24.838	24.841	24.844	24.846	24.849	24.852	24.855	24.858	24.861
842	24.864	24.867	24.870	24.873	24.876	24.879	24.882	24.885	24.888	24.891
843	24.894	24.897	24.900	24.903	24.906	24.908	24.911	24.914	24.917	24.920
844	24.923	24.926	24.929	24.932	24.935	24.938	24.941	24.944	24.947	24.950
845	24.953	24.956	24.959	24.962	24.965	24.968	24.971	24.973	24.976	24.979
846	24.982	24.985	24.988	24.991	24.994	24.997	25.000	25.003	25.006	25.009
847	25.012	25.015	25.018	25.021	25.024	25.027	25.030	25.033	25.035	25.038
848	25.041	25.044	25.047	25.050	25.053	25.056	25.059	25.062	25.065	25.068
849	25.071	25.074	25.077	25.080	25.083	25.086	25.089	25.092	25.095	25.097
850	25.100	25.103	25.106	25.109	25.112	25.115	25.118	25.121	25.124	25.127
851	25.130	25.133	25.136	25.139	25.142	25.145	25.148	25.151	25.154	25.157
852	25.159	25.162	25.165	25.168	25.171	25.174	25.177	25.180	25.183	25.186
853	25.189	25.192	25.195	25.198	25.201	25.204	25.207	25.210	25.213	25.216
854	25.219	25.222	25.224	25.227	25.230	25.233	25.236	25.239	25.242	25.245
855	25.248	25.251	25.254	25.257	25.260	25.263	25.266	25.269	25.272	25.275

Table IV (cont'd)
MILLIBARS INTO INCHES OF MERCURY
1 mb = .029529928 Inch

Mb	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
856	25.278	25.281	25.284	25.286	25.289	25.292	25.295	25.298	25.301	25.304
857	25.307	25.310	25.313	25.316	25.319	25.322	25.325	25.328	25.331	25.334
858	25.337	25.340	25.343	25.346	25.348	25.351	25.354	25.357	25.360	25.363
859	25.366	25.369	25.372	25.375	25.378	25.381	25.384	25.387	25.390	25.393
860	25.396	25.399	25.402	25.405	25.408	25.411	25.413	25.416	25.419	25.422
861	25.425	25.428	25.431	25.434	25.437	25.440	25.443	25.446	25.449	25.452
862	25.455	25.458	25.461	25.464	25.467	25.470	25.474	25.475	25.478	25.481
863	25.484	25.487	25.490	25.493	25.496	25.499	25.502	25.505	25.508	25.511
864	25.514	25.517	25.520	25.523	25.526	25.529	25.532	25.535	25.537	25.540
865	25.543	25.546	25.549	25.552	25.555	25.558	25.561	25.564	25.567	25.570
866	25.573	25.576	25.579	25.582	25.585	25.588	25.591	25.594	25.597	25.599
867	25.602	25.605	25.608	25.611	25.614	25.617	25.620	25.623	25.626	25.629
868	25.362	25.635	25.638	25.641	25.644	25.647	25.650	25.653	25.656	25.659
869	25.662	25.664	25.667	25.670	25.673	25.676	25.679	25.682	25.685	25.688
870	25.691	25.694	25.697	25.700	25.703	25.706	25.709	25.712	25.715	25.718
871	25.721	25.724	25.726	25.729	25.732	25.735	25.738	25.741	25.744	25.747
872	25.750	25.753	25.756	25.759	25.762	25.765	25.768	25.771	25.774	25.777
873	25.780	25.783	25.786	25.788	25.791	25.794	25.797	25.800	25.803	25.806
874	25.809	25.812	25.815	25.818	25.821	25.824	25.827	25.830	25.833	25.836
875	25.839	25.842	25.845	25.848	25.850	25.853	25.856	25.859	25.862	25.865
876	25.868	25.871	25.874	25.877	25.880	25.883	25.886	25.889	25.892	25.895
877	25.898	25.901	25.904	25.907	25.910	25.913	25.915	25.918	25.921	25.924
878	25.927	25.930	25.933	25.936	25.939	25.942	25.945	25.948	25.951	25.954
879	25.957	25.960	25.963	25.966	25.969	25.972	25.975	25.977	25.980	25.983
880	25.986	25.989	25.992	25.995	25.998	26.001	26.004	26.007	26.010	26.013
881	26.016	26.019	26.022	26.025	26.028	26.031	26.034	26.037	26.039	26.042
882	26.045	26.048	26.051	26.054	26.057	26.060	26.063	26.066	26.069	26.072
883	26.075	26.078	26.081	26.084	26.087	26.090	26.093	26.096	26.099	26.102
884	26.104	26.107	26.110	26.113	26.116	26.119	26.122	26.125	26.128	26.131
885	26.134	26.137	26.140	26.143	26.146	26.149	26.152	26.155	26.158	26.161
886	26.164	26.166	26.169	26.172	26.175	26.178	26.181	26.184	26.187	26.190
887	26.193	26.196	26.199	26.202	26.205	26.208	26.211	26.214	26.217	26.220
888	26.223	26.226	26.228	26.231	26.234	26.237	26.240	26.243	26.246	26.249
889	26.252	26.255	26.258	26.261	26.264	26.267	26.270	26.273	26.276	26.279
890	26.282	26.285	26.288	26.290	26.293	26.296	26.299	26.302	26.305	26.308

Table IV (cont'd)
MILLIBARS INTO INCHES OF MERCURY
1 mb = .029529928 Inch

Mb	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
891	26.311	26.314	26.317	26.320	26.323	26.326	26.329	26.332	26.335	26.338
892	26.341	26.344	26.347	26.350	26.353	26.355	26.358	26.361	26.364	26.367
893	26.370	26.373	26.376	26.379	26.382	26.385	26.388	26.391	26.394	26.397
894	26.400	26.403	26.406	26.409	26.412	26.415	26.417	26.420	26.423	26.426
895	26.429	26.432	26.435	26.438	26.441	26.444	26.447	26.450	26.453	26.456
896	26.459	26.462	26.465	26.468	26.471	26.474	26.477	26.479	26.482	26.485
897	26.488	26.491	26.494	26.497	26.500	26.503	26.506	26.509	26.512	26.515
898	26.518	26.521	26.524	26.527	26.530	26.533	26.536	26.539	26.541	26.544
899	26.547	26.550	26.553	26.556	26.559	26.562	26.565	26.568	26.571	26.574
900	26.577	26.580	26.583	26.586	26.589	26.592	26.595	26.598	26.601	26.604
901	26.606	26.609	26.612	26.615	26.618	26.621	26.624	26.627	26.630	26.633
902	26.636	26.639	26.642	26.645	26.648	26.651	26.654	26.657	26.660	26.663
903	26.666	26.668	26.671	26.674	26.677	26.680	26.683	26.686	26.689	26.692
904	26.695	26.698	26.701	26.704	26.707	26.710	26.713	26.716	26.719	26.722
905	26.725	26.728	26.730	26.733	26.736	26.739	26.742	26.745	26.748	26.751
906	26.754	26.757	26.760	26.763	26.766	26.769	26.772	26.775	26.778	26.781
907	26.784	26.787	26.790	26.793	26.795	26.798	26.801	26.804	26.807	26.810
908	26.813	26.816	26.819	26.822	26.825	26.828	26.831	26.834	26.837	26.840
909	26.843	26.846	26.849	26.852	26.855	26.857	26.860	26.863	26.866	26.869
910	26.872	26.875	26.878	26.881	26.884	26.887	26.890	26.893	26.896	26.899
911	26.902	26.905	26.908	26.911	26.914	26.917	26.919	26.922	26.925	26.928
912	26.931	26.934	26.937	26.940	26.943	26.946	26.949	26.952	26.955	26.958
913	26.961	26.964	26.967	26.970	26.973	26.976	26.979	26.981	26.984	26.987
914	26.990	26.993	26.996	26.999	27.002	27.005	27.008	27.011	27.014	27.017
915	27.020	27.023	27.026	27.029	27.032	27.035	27.038	27.041	27.044	27.046
916	27.049	27.052	27.055	27.058	27.061	27.064	27.067	27.070	27.073	27.076
917	27.079	27.082	27.085	27.088	27.091	27.094	27.097	27.100	27.103	27.106
918	27.108	27.111	27.114	27.117	27.120	27.123	27.126	27.129	27.132	27.135
919	27.138	27.141	27.144	27.147	27.150	27.153	27.156	27.159	27.162	27.165
920	27.168	27.170	27.173	27.176	27.179	27.182	27.185	27.188	27.191	27.194
921	27.197	27.200	27.203	27.206	27.209	27.212	27.215	27.218	27.221	27.224
922	27.227	27.230	27.232	27.235	27.238	27.241	27.244	27.247	27.250	27.253
923	27.256	27.259	27.262	27.265	27.268	27.271	27.274	27.277	27.280	27.283
924	27.286	27.289	27.292	27.295	27.297	27.300	27.303	27.306	27.309	27.312
925	27.315	27.318	27.321	27.324	27.327	27.330	27.333	27.336	27.339	27.342

Table IV (cont'd)
MILLIBARS INTO INCHES OF MERCURY
1 mb = .029529928 Inch

Mb	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
926	27.345	27.348	27.351	27.354	27.357	27.359	27.362	27.365	27.368	27.371
927	27.374	27.377	27.380	27.383	27.386	27.389	27.392	27.395	27.398	27.401
928	27.404	27.407	27.410	27.413	27.416	27.419	27.421	27.424	27.427	27.430
929	27.433	27.436	27.439	27.442	27.445	27.448	27.451	27.454	27.457	27.460
930	27.463	27.466	27.469	27.472	27.475	27.478	27.481	27.484	27.486	27.489
931	27.492	27.495	27.498	27.501	27.504	27.507	27.510	27.513	27.516	27.519
932	27.522	27.525	27.528	27.531	27.534	27.537	27.540	27.543	27.546	27.548
933	27.551	27.554	27.557	27.560	27.563	27.566	27.569	27.572	27.575	27.578
934	27.581	27.584	27.587	27.590	27.593	27.596	27.599	27.602	27.605	27.608
935	27.610	27.613	27.616	27.619	27.622	27.625	27.628	27.631	27.634	27.637
936	27.640	27.643	27.646	27.649	27.652	27:655	27.658	27.661	27.664	27.667
937	27.670	27.672	27.675	27.678	27.681	27.684	27.687	27.690	27.693	27.696
938	27.699	27.702	27.705	27.708	27.711	27.714	27.717	27.720	27.723	27.726
939	27.729	27.732	27.735	27.737	27.740	27.743	27.746	27.749	27.752	27.755
940	27.758	27.761	27.764	27.767	27.770	27.773	27.776	27.779	27.782	27.785
941	27.788	27.791	27.794	27.797	27.799	27.802	27.805	27.808	27.811	27.814
942	27.817	27.820	27.823	27.826	27.829	27.832	27.835	27.838	27.841	27.844
943	27.847	27.850	27.853	27.856	27.859	27.861	27.864	27.867	27.870	27.873
944	27.876	27.879	27.882	27.885	27.888	27.891	27.894	27.897	27.900	27.903
945	27.906	27.909	27.912	27.915	27.918	27.921	27.923	27.926	27.929	27.932
946	27.935	27.938	27.941	27.944	27.947	27.950	27.953	27.956	27.959	27.962
947	27.965	27.968	27.971	27.974	27.977	27.980	27.983	27.986	27.988	27.991
948	27.994	27.997	28.000	28.003	28.006	28.009	28.012	28.015	28.018	28.021
949	28.024	28.027	28.030	28.033	28.036	28.039	28.042	28.045	28.048	28.050
950	28.053	28.056	28.059	28.062	28.065	28.068	28.071	28.074	28.077	28.080
951	28.083	28.086	28.089	28.092	28.095	28.098	28.101	28.104	28.107	28.110
952	28.112	28.115	28.118	28.121	28.124	28.127	28.130	28.133	28.136	28.139
953	28.142	28.145	28.148	28.151	28.154	28.157	28.160	28.163	28.166	28.169
954	27.172	28.175	28.177	28.180	28.183	28.186	28.189	28.192	28.195	28.198
955	28.201	28.204	28.207	28.210	28.213	28.216	28.219	28.222	28.225	28.228
956	28.231	28.234	28.237	28.239	28.242	28.245	28.248	28.251	28.254	28.257
957	28.260	28.263	28.266	28.269	28.272	28.275	28.278	28.281	28.284	28.287
958	28.290	28.293	28.296	28.299	28.301	28.304	28.307	28.310	28.313	28.316
959	28.319	28.322	28.325	28.328	28.331	28.334	28.337	28.340	28.343	28.346
960	28.349	28.352	28.355	28.358	28.361	28.363	28.366	28.369	28.372	28.375
961	28.378	28.381	28.384	28.387	28.390	28.393	28.396	28.399	28.402	28.405

Table IV (cont'd)
MILLIBARS INTO INCHES OF MERCURY
1 mb = .029529928 Inch

Mb	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
962	18.408	28.411	28.414	28.417	28.420	28.423	28.426	28.428	28.431	28.434
963	28.437	28.440	28.443	28.446	28.449	28.452	28.455	28.458	28.461	28.464
964	28.467	28.470	28.473	28.476	28.479	28.482	28.485	28.488	28.490	28.493
965	28.496	28.499	28.502	28.505	28.508	28.511	28.514	28.517	28.520	28.523
966	28.526	28.529	28.532	28.535	28.538	28.541	28.544	28.547	28.550	28.553
967	28.555	28.558	28.561	28.561	28.567	28.570	28.573	28.576	28.579	28.582
968	28.585	28.588	28.591	28.594	28.597	28.600	28.603	28.606	28.609	28.612
969	28.615	28.617	28.620	28.623	28.626	28.629	28.632	28.635	28.638	28.641
970	28.644	28.647	28.650	28.653	28.656	28.659	28.662	28.665	28.668	28.671
971	28.674	28.677	28.679	28.682	28.685	28.688	28.691	28.694	28.697	28.700
972	28.703	28.706	28.709	28.712	28.715	28.718	28.721	28.724	28.727	28.730
973	28.733	28.736	28.739	28.741	28.744	28.747	28.750	28.753	28.756	28.759
974	28.762	28.765	28.768	28.771	28.774	28.777	28.780	28.783	28.786	28.789
975	28.792	28.795	28.798	28.801	28.803	28.806	28.809	28.812	28.815	28.818
976	28.821	28.824	28.827	28.830	28.833	28.836	28.839	28.842	28.845	28.848
977	28.851	28.854	28.857	28.860	28.863	28.866	28.868	28.871	28.874	28.877
978	28.880	28.883	28.886	28.889	28.892	28.895	28.898	28.901	28.904	28.907
979	28.910	28.913	28.916	28.919	28.922	28.825	28.928	28.930	28.933	28.936
980	28.939	28.942	28.945	28.948	28.951	28.954	28.957	28.960	28.963	28.966
981	28.969	28.972	28.975	28.978	28.981	28.984	28.987	28.990	28.992	28.995
982	28.998	29.001	29.004	29.007	29.010	29.013	29.016	29.019	29.022	29.025
983	29.028	29.031	29.034	29.037	29.040	29.043	29.046	29.049	29.052	29.054
984	29.057	29.060	29.063	29.066	29.069	29.072	29.075	29.078	29.081	29.084
985	29.087	29.090	29.093	29.096	29.099	29.102	29.105	29.108	29.111	29.114
986	29.117	29.119	29.122	29.125	29.128	29.131	29.134	29.137	29140	29.143
987	29.146	29.149	29.152	29.155	29.158	29.161	29.164	29.167	29.170	29.173
988	29.176	29.179	29.181	29.184	29.187	29.190	29.193	29.196	29.199	29.202
989	29.205	29.208	29.211	29.214	29.217	29.220	29.223	29.226	29.229	29.232
990	29.235	29.238	29.241	29.243	29.246	29.249	29.252	29.255	29.258	29.261
991	29.264	29.267	29.270	29.273	29.276	29.279	29.282	29.285	29.288	29.291
992	29.294	29.297	29.300	29.303	29.306	29.308	29.311	29.314	29.317	29.320
993	29.323	29.326	29.329	29.332	29.335	29.338	29.341	29.344	29.347	29.350
994	29.353	29.356	29.359	29.362	29.365	29.368	29.370	29.373	29.376	29.379
995	29.382	29.385	29.388	29.391	29.394	29.397	29.400	29.403	29.406	29.409
996	29.412	29.415	29.418	29.421	29.424	29.427	29.430	29.432	29.435	29.438

Table IV (cont'd)
MILLIBARS INTO INCHES OF MERCURY
1 mb = .029529928 Inch

Mb	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
997	29.441	29.444	29.447	29.450	29.453	29.456	29.459	29.462	29.465	29.468
998	29.471	29.474	29.477	29.480	29.483	29.486	29.489	29.492	29.494	29.497
999	29.500	29.503	29.506	29.509	29.512	29.515	29.518	29.521	29.524	29.527
1000	29.530	29.533	29.536	29.539	29.542	29.545	29.548	29.551	29.554	29.557
1001	29.559	29.562	29.565	29.568	29.571	29.574	29.577	29.580	29.583	29.586
1002	29.589	29.592	29.595	29.598	29.601	29.604	29.607	29.610	29.613	29.616
1003	29.619	29.621	29.624	29.627	29.630	29.633	29.636	29.639	29.642	29.645
1004	29.648	29.651	29.654	29.657	29.660	29.663	29.666	29.669	29.672	29.675
1005	29.678	29.681	29.683	29.686	29.689	29.692	29.695	29.698	29.701	29.704
1006	29.707	29.710	29.713	29.716	29.719	29.722	29.725	29.728	29.731	29.734
1007	29.737	29.740	29.743	29.745	29.748	29.751	29.754	29.757	29.760	29.763
1008	29.766	29.769	29.772	29.775	29.778	29.781	29.784	29.787	29.790	29.793
1009	29.796	29.799	29.802	29.805	29.808	29.810	29.813	29.816	29.819	29.822
1010	29.825	29.828	29.831	29.834	29.837	29.840	29.843	29.846	29.849	29.852
1011	29.855	29.858	29.861	29.864	29.867	29.870	29.872	29.875	29.878	29.881
1012	29.884	29.887	29.890	29.893	29.896	29.899	29.902	29.905	29.908	29.911
1013	29.914	29.917	29.920	29.923	29.926	29.929	29.932	29.934	29.937	29.940
1014	29.943	29.946	29.949	29.952	29.955	29.958	29.961	29.964	29.967	29.970
1015	29.973	29.976	29.979	29.982	29.985	29.988	29.991	29.994	29.997	29.999
1016	30.002	30.005	30.008	30.011	30.014	30.017	30.020	30.023	30.026	30.029
1017	30.032	30.035	30.038	30.041	30.044	30.047	30.050	30.052	30.056	30.059
1018	30.061	30.064	30.067	30.070	30.073	30.076	30.079	30.083	30.085	30.088
1019	30.091	30.094	30.097	30.100	30.103	30.106	30.109	30.112	30.115	30.118
1020	30.121	30.123	30.126	30.129	30.132	30.135	30.138	30.141	30.144	30.147
1021	30.150	30.153	30.156	30.159	30.162	30.165	30.168	30.171	30.174	30.177
1022	30.180	30.183	30.185	30.188	30.191	30.194	30.197	30.200	30.203	30.206
1023	30.209	30.212	30.215	30.218	30.221	30.224	30.227	30.230	30.233	30.236
1024	30.239	30.242	30.245	30.248	30.250	30.253	30.256	30.259	30.262	30.265
1025	30.268	30.271	30.274	30.277	30.280	30.283	30.286	30.289	30.292	30.295
1026	30.298	30.301	30.304	30.307	30.310	30.312	30.315	30.318	30.321	30.324
1027	30.327	30.330	30.333	30.336	30.339	30.342	30.345	30.348	30.351	30.354
1028	30.357	30.360	30.365	30.366	30.369	30.372	30.374	30.377	30.380	30.383
1029	30.386	30.389	30.392	30.395	30.398	30.401	30.404	30.407	30.410	30.413
1030	30.416	30.419	30.422	30.425	30.428	30.431	30.434	30.436	30.439	30.442
1031	30.445	30.448	30.451	30.454	30.457	30.460	30.463	30.466	30.469	30.472

Table IV (cont'd)
MILLIBARS INTO INCHES OF MERCURY
1 mb = .029529928 Inch

Mb	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
1032	30.475	30.478	40.481	30.484	30.487	30.490	30.493	30.496	30.499	30.501
1033	30.504	30.507	30.510	30.513	30.516	30.519	30.522	30.525	30.528	30.531
1034	30.534	30.537	30.540	30.543	30.546	30.549	30.552	30.555	30.558	30.561
1035	30.563	30.566	30.569	30.572	30.575	30.578	30.581	30.584	30.587	30.590
1036	30.593	30.596	30.599	30.602	30.605	30.608	30.611	30.614	30.617	30.620
1037	30.623	30.625	30.628	30.631	30.634	30.637	30.640	30.643	30.646	30.649
1038	30.652	30.655	30.658	30.661	30.664	30.667	30.670	30.673	30.676	30.679
1039	30.682	30.685	30.688	30.690	30.693	30.696	30.699	30.702	30.705	30.708
1040	30.711	30.714	30.717	30.720	30.723	30.726	30.729	30.732	30.735	30.738
1041	30.741	30.744	30.747	30.750	30.752	30.755	30.758	30.761	30.764	30.767
1042	30.770	30.773	30.776	30.779	30.782	30.785	30.788	30.791	30.794	30.797
1043	30.800	30.803	30.806	30.809	30.812	30.814	30.817	30.820	30.823	30.826
1044	30.829	30.832	30.835	30.838	30.841	30.844	30.847	30.850	30.853	30.856
1045	30.859	30.862	30.865	30.868	30.871	30.874	30.876	30.879	30.882	30.885
1046	30.888	30.891	30.894	30.897	30.900	30.903	30.906	30.909	30.912	30.915
1047	30.918	30.921	30.924	30.927	30.930	30.933	30.936	30.939	30.941	30.944
1048	30.947	30.950	30.953	30.956	30.959	30.962	30.965	30.968	30.971	30.974
1049	30.977	30.980	30.983	30.986	30.989	30.992	30.995	30.998	31.001	31.003
1050	31.006	31.009	31.012	31.015	31.018	31.021	31.024	31.027	31.030	31.033
1051	31.036	31.039	31.042	31.045	31.048	31.051	31.054	31.057	31.060	31.063
1052	31.065	31.068	31.071	31.074	31.077	31.080	31.083	31.086	31.089	31.092
1053	31.095	31.098	31.101	31.104	31.107	31.110	31.113	31.116	31.119	31.122
1054	31.125	31.127	31.130	31.133	31.136	31.139	31.142	31.145	31.148	31.151
1055	31.154	31.157	31.160	31.163	31.166	31.169	31.172	31.175	31.178	31.181
1056	31.184	31.187	31.190	31.192	31.195	31.198	31.201	31.204	31.207	31.210
1057	31.213	31.216	31.219	31.222	31.225	31.228	31.231	31.234	31.237	31.240
1058	31.243	31.246	31.249	31.252	31.254	31.257	31.260	31.263	31.266	31.269
1059	31.272	31.275	31.278	31.281	31.284	31.287	31.290	31.293	31.296	31.299.
1060	31.302	31.305	31.308	31.311	31.314	31.316	31.319	31.322	31.325	31.328

WAR DEPARTMENT
WASHINGTON 25, D.C., 27 November 1945

TM 11-2421, War Department Technical Manual, Barometers ML-330/FM, ML-331/TM, ML-332/TM, and ML-333/TM, is published for the information and guidance of all concerned.

[AG 300.5 (45)]

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G. C. MARSHALL
Chief of Staff

OFFICIAL:

EDWARD F. WITSELL
Major General
Acting The Adjutant General

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THE METRIC SYSTEM AND EQUIVALENTS

'NEAR MEASURE

. Centimeter = 10 Millimeters = 0.01 Meters = 0.3937 Inches
1 Meter = 100 Centimeters = 1000 Millimeters = 39.37 Inches
1 Kilometer = 1000 Meters = 0.621 Miles

'VEIGHTS

Gram = 0.001 Kilograms = 1000 Milligrams = 0.035 Ounces
1 Kilogram = 1000 Grams = 2.2 lb.
1 Metric Ton = 1000 Kilograms = 1 Megagram = 1.1 Short Tons

LIQUID MEASURE

1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces
1 Liter = 1000 Milliliters = 33.82 Fluid Ounces

SQUARE MEASURE

1 Sq. Centimeter = 100 Sq. Millimeters = 0.155 Sq. Inches
1 Sq. Meter = 10,000 Sq. Centimeters = 10.76 Sq. Feet
1 Sq. Kilometer = 1,000,000 Sq. Meters = 0.386 Sq. Miles

CUBIC MEASURE

1 Cu. Centimeter = 1000 Cu. Millimeters = 0.06 Cu. Inches
1 Cu. Meter = 1,000,000 Cu. Centimeters = 35.31 Cu. Feet

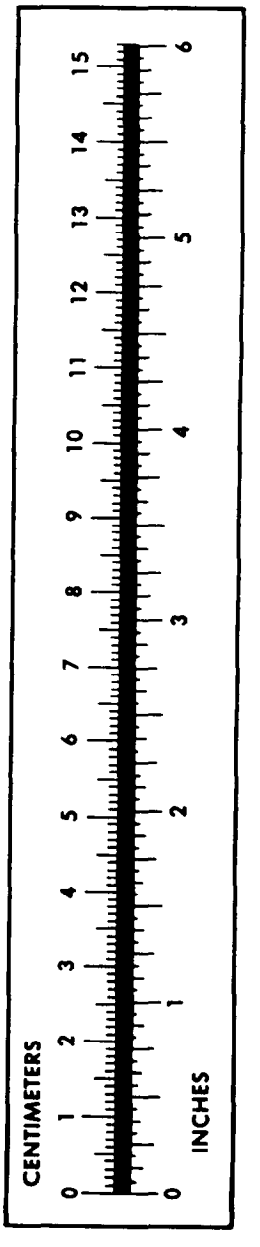
TEMPERATURE

5/9(°F - 32) = °C
212° Fahrenheit is evuivalent to 100° Celsius
90° Fahrenheit is equivalent to 32.2° Celsius
32° Fahrenheit is equivalent to 0° Celsius
9/5C° + 32 =°F

APPROXIMATE CONVERSION FACTORS

TO CHANGE	TO	MULTIPLY BY
Inches	Centimeters	2.540
Feet	Meters	0.305
Yards	Meters	0.914
Miles	Kilometers	1.609
Square Inches	Square Centimeters	6.451
Square Feet	Square Meters	0.093
Square Yards	Square Meters	0.836
Square Miles	Square Kilometers	2.590
Acres	Square Hectometers	0.405
Cubic Feet	Cubic Meters	0.028
Cubic Yards	Cubic Meters	0.765
Fluid Ounces	Milliliters	29.573
ıts	Liters	0.473
arts	Liters	0.946
allons	Liters	3.785
Ounces	Grams	28.349
Pounds	Kilograms	0.454
Short Tons	Metric Tons	0.907
Pound-Feet	Newton-Meters	1.356
Pounds per Square Inch	Kilopascals	6.895
Miles per Gallon	Kilometers per Liter	0.425
Miles per Hour	Kilometers per Hour	1.609

TO CHANGE	TO	MULTIPLY BY
Centimeters	Inches	0.394
Meters	Feet	3.280
Meters	Yards	1.094
Kilometers	Miles	0.621
Square Centimeters	Square Inches	0.155
Square Meters	Square Feet	10.764
Square Meters	Square Yards	1.196
Square Kilometers	Square Miles	0.386
Square Hectometers	Acres	2.471
Cubic Meters	Cubic Feet	35.315
Cubic Meters	Cubic Yards	1.308
Milliliters	Fluid Ounces	0.034
Liters	Pints	2.113
Liters	Quarts	1.057
ers	Gallons	0.264
ms	Ounces	0.035
ograms	Pounds	2.205
Metric Tons	Short Tons	1.102
Newton-Meters	Pounds-Feet	0.738
Kilopascals	Pounds per Square Inch	0.145
lometers per Liter	Miles per Gallon	2.354
meters per Hour	Miles per Hour	0.621



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