TM 11-428

WAR DEPARTMENT TECHNICAL MANUAL

BAROMETERS

ML-2 THROUGH ML-2-F

CASES

ML-48 THROUGH ML-48-E

RESTRICTED. *DISSEMINATION OF RESTRICTED MATTER.*—The information contained in restricted documents and the essential characteristics of restricted material may be given to any person known to be in the service of the United States and to persons of undoubted loyalty and discretion who are cooperating in Government work, but will not be communicated to the public or to the press except by authorized military public relations agencies. (See also par. 23*b*, AR 380–5, 15 Mar 1944.)

WAR DEPARTMENT • 17 OCTOBER 1944

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WAR DEPARTMENT,
WASHINGTON 25, D. C., 17 October 1944.

TM 11-428, Barometers ML-2 through ML-2-F, Cases ML-48 through ML-48-E, is published for the information and guidance of all concerned.

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IC 44; T/O & E 44-316.

For explanation of symbols, see FM 21-6.

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SECTION I

DESCRIPTION

1. General

a. Purpose. (1) Barometers ML–2 through ML–2–F are instruments utilizing a column of mercury to measure the pressure of the atmosphere.

(2) Cases ML–48 through ML–48–E are designed for safe and convenient installation of Barometers ML–2 through ML–2–F.

b. Nomenclature. (1) Throughout this manual, Barometer ML–2–(*) refers to Barometers ML–2, ML–2–A, ML–2–B, ML–2–C, ML–2–D, ML–2–E, and ML–2–F, or any one of them.

(2) Case ML–48–(*) refers to cases ML–48, ML–48–A, ML–48–B, ML–48–C, ML–48–D, and ML–48–E, or any one of them.

2. Components (fig. 1)

1 Barometer ML–2–(*), approximately 40 inches long which includes—

- 1 brass tube casing with scales and attached cistern.
- 1 glass tube containing mercury.
- 1 thermometer.

1 Case ML–48–(*), 44 inches long, 3¾ inches wide and 3½ inches deep which includes—

- 2 mounting brackets.

3. Differences in Barometers ML–2–(*)

a. Scales. All models of Barometer ML–2–(*) have a measuring scale graduated in inches, and later models have a millibar scale in addition. There are differences in the range of the inch scale on different models, as follows:

(1) *Barometers ML–2 and ML–2–A.* The inch scale on these models covers a range from 24 to 32 inches. Originally these models had no millibar scale, but such a scale is being added when these early models are returned to the Signal Corps depot for repair.

(2) *Barometers ML–2–B, ML–2–C, and ML–2–E.* These models have millibar scales in addition to the inch scale, which covers a range from 24 to 32 inches.

(3) *Barometer ML–2–D.* The inch scale on some of these models

covers a range from 19 to 32 inches. The inch scale of the others extends from 24 to 32 inches. All have a millibar scale.

(4) *Barometer ML–2–F*. The inch scale of this model covers a range from 22 to 32 inches. It has a millibar scale.

Note. The scale ranges given above are the nearest integral inch graduation appearing on the scales. Actually, because of the length of the vernier used with the scales, the maximum value that can be read on the inch scales is approximately 31.3 inches, and on the millibar scale, 1060 millibars. The minimum value that can be read on the scales nominally designated as 24-inch minimum is approximately 23.6 inches or 800 millibars. The corresponding values for the 22-inch scales are approximately 21.7 inches and 735 millibars.

b. THERMOMETERS. The Fahrenheit thermometer supplied on Barometer ML–2–(*) is being replaced by a thermometer graduated on the left side in degrees Fahrenheit and on the right side in degrees Centigrade. (See par. 4*d*.) All future models will be supplied with this thermometer. Instruments already in use are having the double-scale thermometer added when they are returned to the Signal Corps depot for repairs. Replacement thermometers are available in the Signal Corps depot. Stations having barometers with millibar scales and Fahrenheit thermometers may obtain replacement thermometers having both Fahrenheit and Centigrade scales by requisition on the depot. The Signal Corps stock number of this thermometer is 7A302B/T1.

4. Barometer ML–2–(*) (fig. 1)

a. GENERAL. (1) Barometer ML–2–(2) consists of a glass tube, 34 to 35 inches long and about 0.25 inch in internal diameter, inclosing a column of mercury. The top of the glass tube is sealed, while the bottom end is open and is immersed in a reservoir of mercury contained in a cistern attached to the lower end of the brass casing. The glass is clear and free from optical flaws, and is filled with a column of mercury except at its upper end. The space above the mercury is evacuated.

(2) The glass tube is supported vertically in the center of a tubular brass casing. The top of this casing is provided with a brass swivel ring by which the instrument is supported in use. Other purposes served by the casing are—

(*a*) It incloses, supports, and protects the glass tube.

(*b*) It carries the scales (*b* below) by which the height of the mercury column is determined.

(*c*) It provides a track for the movable vernier (*c* below), and incloses the rack and pinion mechanism by which the vernier is adjusted.

(*d*) It carries the thermometer (*d* below) which indicates the temperature of the instrument.

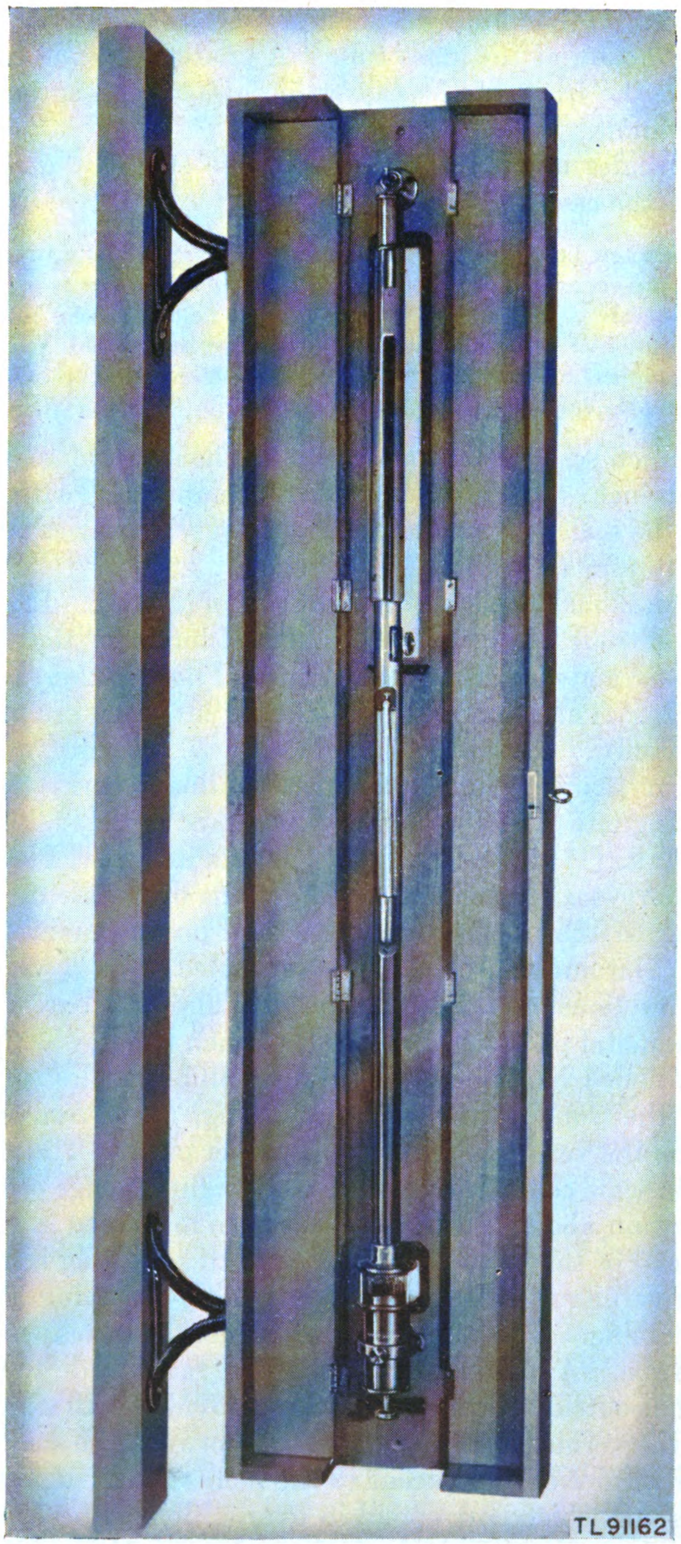


Figure 2. Barometer ML–2–(*) installed in Case ML–48–(*).

b. SCALES. (1) The brass casing is slotted front and back to expose the upper portion of the glass tube. A graduated scale or scales are attached to the front of the casing for measuring the height of the mercury column.

(2) The scales are engraved on separate strips of metal and are attached to the casing by small screws.

Note. The screw holes on the scale are slotted longitudinally to permit setting the scale at the correct vertical position with relation to the ivory point in the cistern. The scale is set before being sent to the field and *must not* be changed, except in Army Air Forces weather stations by authorized Weather Region inspectors equipped with special inspection barometers for checking the accuracy of Barometer ML–2–(*).

(3) The inch scale is on the left side of the slot and is graduated in $\frac{1}{20}$th's of an inch. Each integral inch is numbered with figures engraved on the scale. The range of the inch scale varies for different models of Barometer ML–2–(*). (See par. 3.)

(4) The millibar scale is on the right side of the slot. It is graduated from 735 (or 800) to 1110 whole millibars, but only the 100-millibar graduations are given a complete numerical designation; for example, 700, 800, 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, for instance, actually designate 910, 920, and 930 millibars.

c. VERNIER. (1) A vernier, named for its inventor, Pierre Vernier, is 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. Barometer ML–2–(*) is provided with a vernier which measures fractions of the adjacent inch and millibar scales. The vernier is a metal plate approximately $\frac{7}{16}$ inch wide by $1\frac{1}{2}$ inches long and is positioned between the inch and millibar scales so it covers a portion of the front slot in the brass casing. The vernier scales are engraved on the vertical edges of this vernier plate. The zero graduation of each scale coincides with the lower sighting edge of the vernier. An indentation about $\frac{1}{4}$ inch wide has been machined in the center of the lower end of the vernier plate to form this sighting edge.

(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 of 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 5th, 10th, 15th, 20th, and 25th graduations are marked with the numerals 1, 2, 3, 4, and 5, respectively. The inch vernier permits measurements to $\frac{1}{500}$ (0.002) 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 10th and 20th divisions are marked with the numerals 5 and 10, respectively. The millibar vernier permits measurements to $\frac{1}{20}$ (0.05) millibar.

d. THERMOMETER. (1) The thermometer of Barometer ML–2–(*) consists of a glass thermometer tube mounted in a metal frame which is screwed to the outside of the 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 brass casing. Thus, the bulb is shielded from temperature variations in the air circulating around the barometer and more nearly represents the true temperature of the mercury and brass casing.

(2) The standard thermometer for Barometer ML–2–(*) is provided with both Fahrenheit and Centigrade scales; whole degree Fahrenheit graduations on the left side from 10° to 120°, and ½° Centigrade graduations on the right side over an equivalent range.

(3) Originally Barometer ML–2–(*) was provided with a thermometer graduated in Fahrenheit degrees only. As note in paragraph 3*b*, these are being replaced with the standard thermometer.

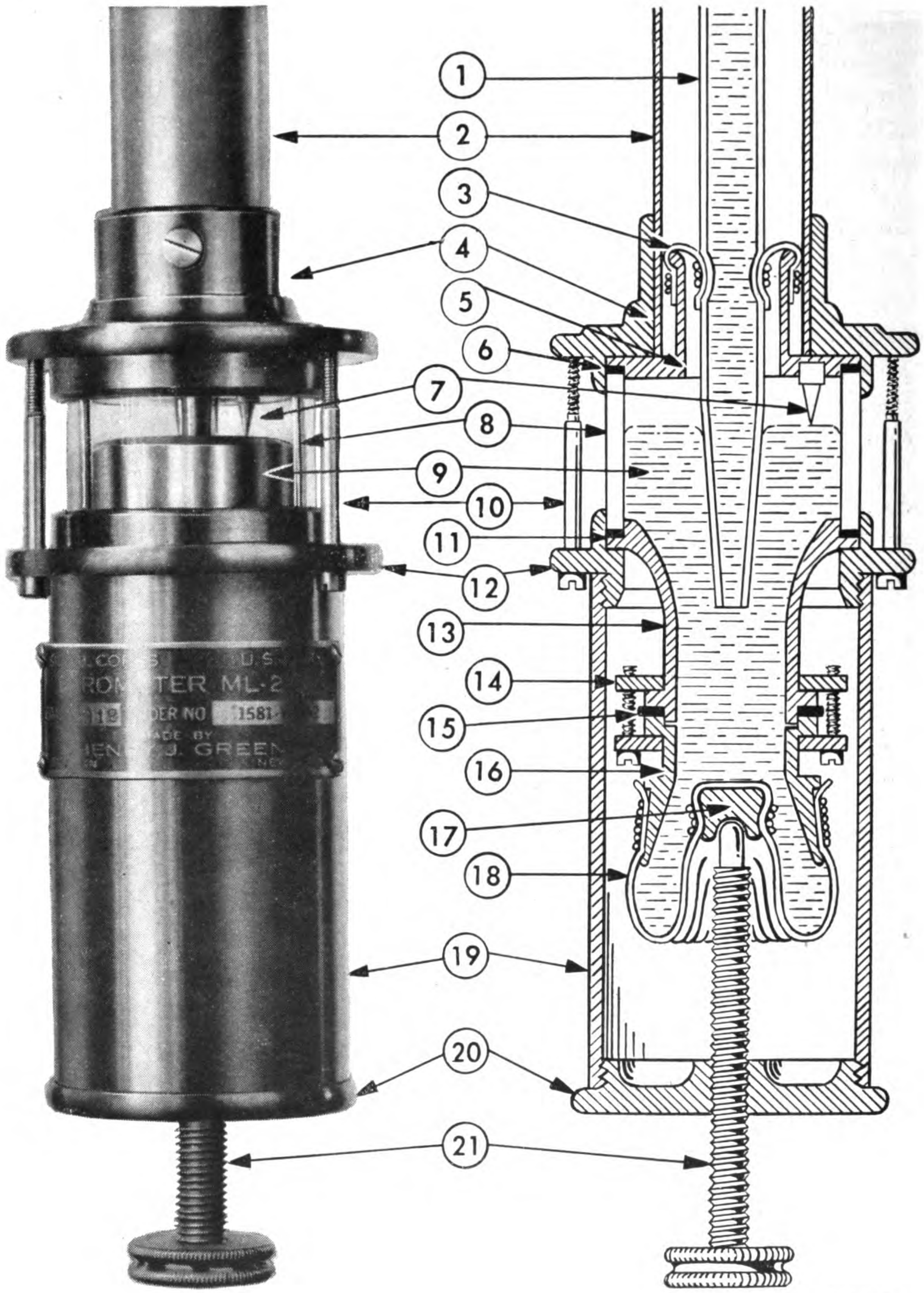
e. CISTERN (fig. 3). (1) The cistern of Barometer ML–2–(*) consists of a small flanged boxwood cylinder ⑤, a short glass cylinder ⑧, two curved cylinders ⑬ and ⑯ made of boxwood, and a kid leather bag ⑱. These parts are assembled with gaskets ⑥, ⑪, and ⑮, and split-ring clamps ⑭, and are inclosed in 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 are porous to air but impervious to mercury. This permits the air pressure inside the cistern to be identical with that outside, yet prevents mercury from leaking from the cistern at these points.



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

Figure 3. Barometer ML–2–(*), cistern, showing exterior and cross-section Views.

(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 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.

5. Case ML–48–(*) (fig. 1)

a. Case ML–48–(*) is a rectangular box of mahogany or plywood. The front of this case is split longitudinally through the center and each side is hinged to the back. This provides a deep cover which, when opened, completely exposes Barometer ML–2–(*) so that all parts are accessible and adjustments can be made easily. The cover is provided with hooks near each end and with a keylock in the center.

b. The inside back of the case has a metal hanger near the top and a centering ring near the bottom. These provide means for suspending Barometer ML–2–(*) and for steadying it properly in a vertical position.

c. Two openings in the back of the case are fitted with white opal glass located so that they are behind the scales and cistern of Barometer ML–2–(*) when it is in place.

d. Two iron brackets are provided for mounting Case ML–48–(*) on a wall, post, or other substantial vertical surface.

SECTION II
INSTALLATION AND OPERATION

Caution: Do not unpack Barometer ML–2–(*) until provision has been made for hanging it. Handle the packing box with care; never jolt or tilt it suddenly.

6. Location

a. GENERAL. Install Barometer ML–2–(*) indoors. Install it in Case ML–48–(*) (par. 7), although in emergencies the barometer may be hung from a separate nail or bracket.

b. PROTECTION. Choose a location for the barometer where neither it nor its case will be exposed to sun or rain, and where it will be submitted to a minimum of wind or vibration. Avoid drafts or air currents such as might be caused by a door, a chimney opening, or a ventilator. Such currents, if of high and variable velocity, may produce a suction action or "pumping" which will cause fluctuations in the height of the mercury column. This effect also will be noticed when high, gusty winds are blowing. It will often be difficult under such conditions to adjust the vernier accurately to the top of the mercury column.

c. TEMPERATURE. (1) The barometer must not be subjected to sudden changes in temperature. When rapid temperature changes occur, the thermometer and the brass case will respond more quickly than will the mercury; thus the temperature corrections (par. 16) to be applied to the barometer reading will be in error.

(2) It is advisable to install the barometer where it will not be subjected to extremes of heat or cold. While the instrument will not be damaged by high or low temperatures, extremes of temperature are generally accompanied by larger or more rapid fluctuations.

(3) Install the barometer in a room where the temperature remains as constant as possible. Avoid placing 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.

d. LIGHTING. (1) Choose a position for the barometer where good lighting is assured. When the mounting brackets provided with Case ML–48–(*) are properly attached to the case and mounted on a wall, the case stands out from the wall. Note that there are two opal glass windows in the back of the case. This makes it possible to place a light behind the case and illuminate the top of the mercury column and the cistern through the opal glass. This method of lighting is superior to placing a light in front of the barometer and *reflecting* it from the glass windows. It is also necessary for the front of the barometer to be well lighted so that the scales may be read accurately.

(2) The barometer should be lighted with artificial light rather than daylight. If the lighting used radiates an appreciable amount of heat, place the light far enough behind the case so that it will not affect the temperature of the barometer. Fluorescent lighting is very satisfactory for this purpose.

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

7. Installing Case ML–48–(*)

a. When a proper location on a wall or other suitable vertical surface has been chosen for the barometer, mount Case ML–48–(*). The walls of buildings are frequently subject to vibration, either from people moving in the building or from the wind, and it is difficult to read a barometer accurately under such conditions. If the walls of the room in which the barometer is to be installed vibrate easily, and if the floor is of concrete or provides a similar firm foundation, it is advisable to build a vertical rack from the floor and mount the barometer on it. In cases where both the wall and the floor are subject to vibration, it is recommended that a concrete pier be constructed and a rack for mounting Case ML–48–(*) be attached to the pier. This pier should not be in contact with any part of the building.

b. To insure vertical mounting of Case ML–48–(*), use a plumb line or a piece of cord attached to a stone.

c. Screw the iron brackets into the wall at the correct height.

d. Screw Case ML–48–(*) to the brackets.

e. Test again with the plumb line to be sure the case is vertical.

f. Open Case ML–48–(*) and unscrew the three screws in the centering ring until the ends are flush with the inside circumference of the ring. Remove the vertical screw in the hanger.

8. Installing Barometer ML–2–(*)

a. UNPACKING. The packing box containing Barometer ML–2–(*) is a specially built box, tilted at a slight angle so that the cistern of the barometer is somewhat elevated. A box that places the instrument in a horizontal position may also be used for packing Barometer ML–2–(*).

(1) Remove the screws that hold the lid and remove the lid.

(2) Remove the barometer and wrappings from the packing box, place the barometer on a horizontal surface, and carefully remove the wrappings.

(3) Turn the barometer upright *very carefully* until it is in a vertical position with the cistern down.

b. Hanging Barometer (fig. 2). (1) Pass the cistern end of the barometer down through the centering ring near the bottom of Case ML–48–(*). Put the swivel ring at the top of the barometer over the hanger near the top of Case ML–48–(*).

(2) Replace the vertical screw in the hanger.

(3) 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 they just touch the barometer cistern. Tighten all three screws against the cistern wall without moving the barometer from its vertical position.

(4) Turn the adjusting screw at the bottom of the cistern until the mercury level is about ⅛-inch below the ivory point.

c. Forms. (1) Each Barometer ML–2–(*) carries a tag, W. D., S. C. Form No. 81, on which are recorded the serial number, order number, and correction for scale error and capillarity of the instrument. The corrections are determined before the barometer is shipped to the station where it is to be used.

(2) Transfer the information on this tag to W. D., S. C. Form No. 79. *Do not destroy Form No. 81.* Mount it inside the barometer, or tie it to the tube of the barometer so that it will be available if the barometer must be reshipped.

Note. "Total instrument corrections" required on Form No. 79 is the same as "Correction for scale error and capillarity of the instrument" on Form No. 81. This figure is the sum of the errors mentioned in paragraph 16.

(3) Complete Form No. 79. The correction for *local gravity* is obtained from tables I and II. See paragraph 25 for an explanation of these tables. (Pressure values used in determining this correction should be the mean annual pressure of the station.)

(*a*) *Altitude* correction is obtained from table I. Record the correction as minus (—).

(*b*) *Latitude* correction is obtained from table II. If the station latitude is between 0° and 45°, record the correction as minus (—). If the station latitude is between 45° and 90°, record the correction as plus (+).

(4) Record the algebraic sum of the "total instrumental corrections" and the "correction for local gravity" on Form No. 79.

Caution: Be careful to obtain the *algebraic* sum of the corrections on Form No. 79. All corrections with a minus sign are to be subtracted; all corrections with a plus sign are to be added. The total correction, entered on the last line of this form with the proper plus or minus sign, must be applied to each reading of the barometer.

(5) The corrections as given in the tables are in inches. To convert inch corrections into millibar corrections, multiply the total inch correction by 33.86395. (A pressure of 1 inch of mercury equals 33.86395 millibars.) When the inch corrections have been converted to their equivalent values in millibars, enter the correction in the space provided on Form No. 79.

(6) Mount W. D., S. C. Form No. 79 inside the barometer case with thumb tacks.

d. Packing Box. (1) Replace the wrappings and packing material in the empty packing box. If the packing material consists of sheets of rubberized hair, be particularly careful to save it as this is the best material available for packing barometers.

(2) Screw the lid back on and put the box away for future use. (See par. 9.)

9. Repacking Barometer

a. If it is necessary to ship the barometer, be sure to read paragraph 21 before removing the instrument from the case. Wrap and pack the barometer in the packing box in the same manner in which it was shipped originally. (See par. 8*a*.)

b. If the original packing box is not available, obtain a strong wooden box, 4 feet long and at least 6 inches in cross-section. Nail or screw triangular extensions on each end of the box so that it cannot be stood on end.

c. Pack the barometer as follows:

(1) Wrap the barometer in soft paper, then in a thick layer of cotton batting or soft felt, and in an outer wrapping of heavy paper.

(2) Place the instrument on a bed of thick excelsior, cotton, or similar packing material inside the packing case and pack it well around all sides, particularly at the ends.

(3) *Screw* down the lid to the box; *do not nail.*

(4) Attach a handle to the box so that it may be carried in a horizontal position.

10. Procedure in Reading Barometer

Reading the barometer consists of measuring accurately the height of the mercury column above the surface of the mercury in the cistern when this surface is at the level of the ivory point.

a. The first step is to read the *thermometer* and determine the temperature of the mercury column before the heat of the observer's body can affect the indication.

b. The second step is to adjust *zero level*. This consists of adjusting the level of the mercury in the cistern to the tip of the ivory point, which is the zero graduation end of the barometer scales.

c. The third step is to adjust the *vernier*. This consists of aligning the zero mark of the vernier scale with the top of the meniscus of the mercury column. (The meniscus is the convex summit of the mercury within the tube.)

d. The fourth step is to determine the height of the mercury column above the ivory point by reading one of the *scales* attached to the metal tube. If it is desired to read the height in inches, the inch scale and vernier on the left are used. If the reading is taken directly in millibars, the right-hand scale and vernier are used.

Note. The readings on the inch and millibar scales are not mutually convertible until after the appropriate temperature correction has been applied (par. 16*d* (2) and (3)).

e. The fifth and final step is to *correct* the observed reading for instrumental errors, local gravity, and temperature.

11. Reading Thermometer

a. Stand directly in front of the thermometer and take the reading to the nearest ½° Fahrenheit or ¼° Centigrade. The line of sight should be perpendicular to the thermometer at the height of the top of the mercury thread. Do not read the thermometer from a position either above or below the mercury thread. Such positions can cause errors of several tenths of a degree.

b. Read the Fahrenheit scale if the barometer reading is to be taken in inches.

c. Read the Centigrade scale if the barometer reading is to be taken in millibars.

12. Adjusting Zero Level

a. PRELIMINARY. (1) Arrange a light behind the opal glass windows, and partly close the doors of the case to throw the front of the cistern in a shadow.

(2) Lightly tap the glass cylinder of the cistern so the mercury will be level.

(3) With the eyes on a level with the ivory point, use one of the following methods to adjust the mercury in the cistern.

b. PROCEDURE (fig. 3). (1) *First method*. This is the best method for adjusting zero level since it can be used with new barometers having bright mercury as well as with older instruments in which the mercury is oxidized.

(*a*) Turn adjusting screw 21 at the bottom of the cistern to lower the mercury until there is ¼ to ⅛ inch between ivory point 7 and the mercury surface.

(*b*) Slowly raise the mercury until only the slightest thread of light that can be detected appears between the ivory point and the mercury. In doing this, it is particularly important that the eye be on a level with the top of the mercury surface. To check this, slightly raise and lower the eye above and below this surface at frequent intervals while the adjustment is being made.

(*c*) Continue to turn the adjusting screw very carefully until the thread of light just disappears.

(2) *Second method (for use only with clean mercury)*. (*a*) Lower the mercury in the cistern until a space of ¼ to ⅛ inch separates the mercury surface from the ivory point.

(*b*) Raise the mercury until a slight indentation is made in it by the ivory point.

(*c*) Lower the mercury very carefully until the indentation just disappears.

Note. Do not use this method, even with clean mercury, if the mercury shows any tendency to cling to the ivory point. This sometimes happens if the ivory is newly cut.

(3) *Third method (for use only with clean bright mercury)*. (*a*) Lower the mercury ¼ to ⅛ inch from the ivory point.

(*b*) Then slowly raise it toward the point, watching closely until the reflected image of the ivory point coincides with the point itself.

Caution: It is not a good practice to lower the mercury more than a very slight amount (approximately 0.002 inch) as a last operation after it is once raised. This changes the convexity of the meniscus of the mercury column and causes an error due to capillarity (par. 16*b*(1)) that cannot be corrected. If the mercury is raised too much, lower it until it is entirely free from the ivory point and begin again.

13. Adjusting Vernier

a. First get the eyes exactly on a level with the top of the mercury in the glass tube.

b. 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).

c. Turn the knurled thumbscrew (figs. 3 or 4) to raise the vernier *above* the top of the mercury.

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

Note. The "front lower edge" of the vernier is the edge formed by the indentation cut in the lower end of the vernier plate that marks the zero of the vernier scale. The vernier plate actually extends down approximately 1/16 inch beyond this edge on each side. These extensions are very narrow and could not be used for aligning the vernier. In reading the vernier scale, do not mistake these extensions for the zero mark of the scale.

e. 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.

f. Adjust the vernier until this slit is so narrow it can just 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. When the slit appears to be the widest, the observer's eye is at the proper level.

g. 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. The vernier is now properly adjusted and the scales may be read.

14. Reading Inch Scale (fig. 4)

a. VALUE OF SCALE DIVISIONS. (1) The inch scale is graduated in 1/20th's of an inch. Expressed decimally, this is 0.05 inch.

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

(*a*) This makes the height of the inch vernier scale (24×0.05) 1.20 inches.

(*b*) Since the inch vernier scale has 25 divisions, each division is equal to ($1.20 \div 25$) 0.048 inch.

(3) Thus, the difference between a division on the inch scale and a division on the inch vernier scale is ($0.050 - 0.048$) 0.002 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 0.002 inch below the next inch scale graduation, the second vernier graduation above the zero line will be 0.004 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 0.002 the zero line is from the nearest inch scale graduation.

(6) For convenience in reading the vernier, the 5th graduation above the zero line is marked with the number 1, indicating (5×0.002) 0.01 inch; the 10th graduation is marked with the number 2, indicating (10×0.002) 0.02 inch; the 15th graduation 3, indicating (15×0.002)

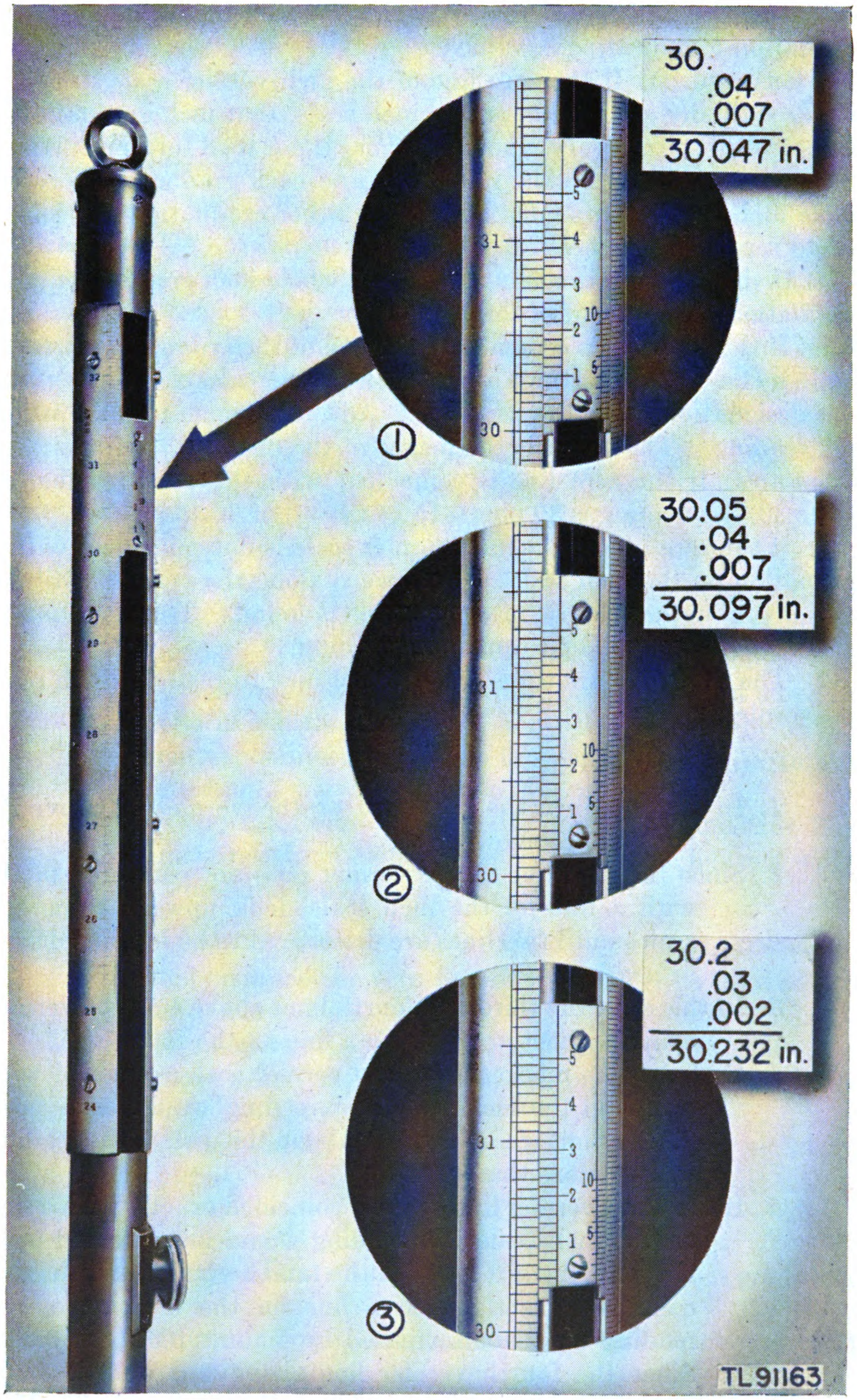

Figure 4. Barometer readings, inch scale and vernier.

0.03 inch; the 20th graduation 4, indicating 0.04 inch; and the 25th graduation 5, indicating 0.05 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. Whole inches are numbered on the inch scale and each graduation between whole inches represents 0.05 inch; every other graduation is a longer line to represent 0.1 inch.

(*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 the whole inch designation *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 graduation above 30, the reading is 30 plus 0.15 (3 x 0.05) 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. 4 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 0.04. Since coincidence is above this point, the reading will be more than 0.04.

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 0.002, or 0.006. If the fourth vernier line above 4 coincided exactly with a line on the inch scale, the reading would be increased by 4 times 0.002, or 0.008. 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 approximated reading is 0.007 more than 0.04.

6. This makes the total reading 30 inches, plus 0.04, plus 0.007, a total of 30.047 inches.

(*b*) *Example 2* (fig. 4②).

1. This example illustrates an important point in reading the barometer. The reading from the inch scale is 30 inches, plus 0.05 (30.05).

Caution: Do not forget to add 0.05 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 value. Whenever the zero of the vernier is above a 0.05 graduation and below the next 0.10 graduation on the inch scale, the 0.05 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 0.002, or 0.006. If the fourth line above 4 were in coincidence, the amount to be added would be 0.008. But since the one is a little above and the other a little below the corresponding lines on the inch scale, the approximated reading is between the two, and is 0.007.

3. Thus the total reading is 30.05, plus 0.04 (since the lines most nearly in coincidence are above the figure 4 which represents 0.04), plus 0.007, or 30.097.

(*c*) *Example 3* (fig. 4 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 0.03, plus 0.002, or 30.232 inches.

15. Reading Millibar Scale (fig 5)

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 $\frac{1}{20}$ of a millibar or 0.05 mb. Every other line on the vernier scale is longer and represents $\frac{1}{10}$ (0.1) millibar.

(4) For convenience in reading the millibar vernier, the middle of the scale is marked with the number 5 which denotes (0.5) 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 $\frac{1}{20}$ millibar (0.05) lower than the next millibar scale graduation, the second vernier graduation above the zero line will be $\frac{1}{10}$ (0.1) 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 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. 5 ①).

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 0.5 to the reading, and the first line above 5 adds 0.05. The final reading is therefore 1017.55 millibars.

(*b*) *Example 2* (fig. 5 ②). In this illustration the zero line of the vernier coincides exactly with the second line above 1000.00, making the reading 1002.00 millibars.

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

16. Correcting Observed Reading

a. PURPOSE. (1) The observed reading of Barometer ML–2–(*) 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.

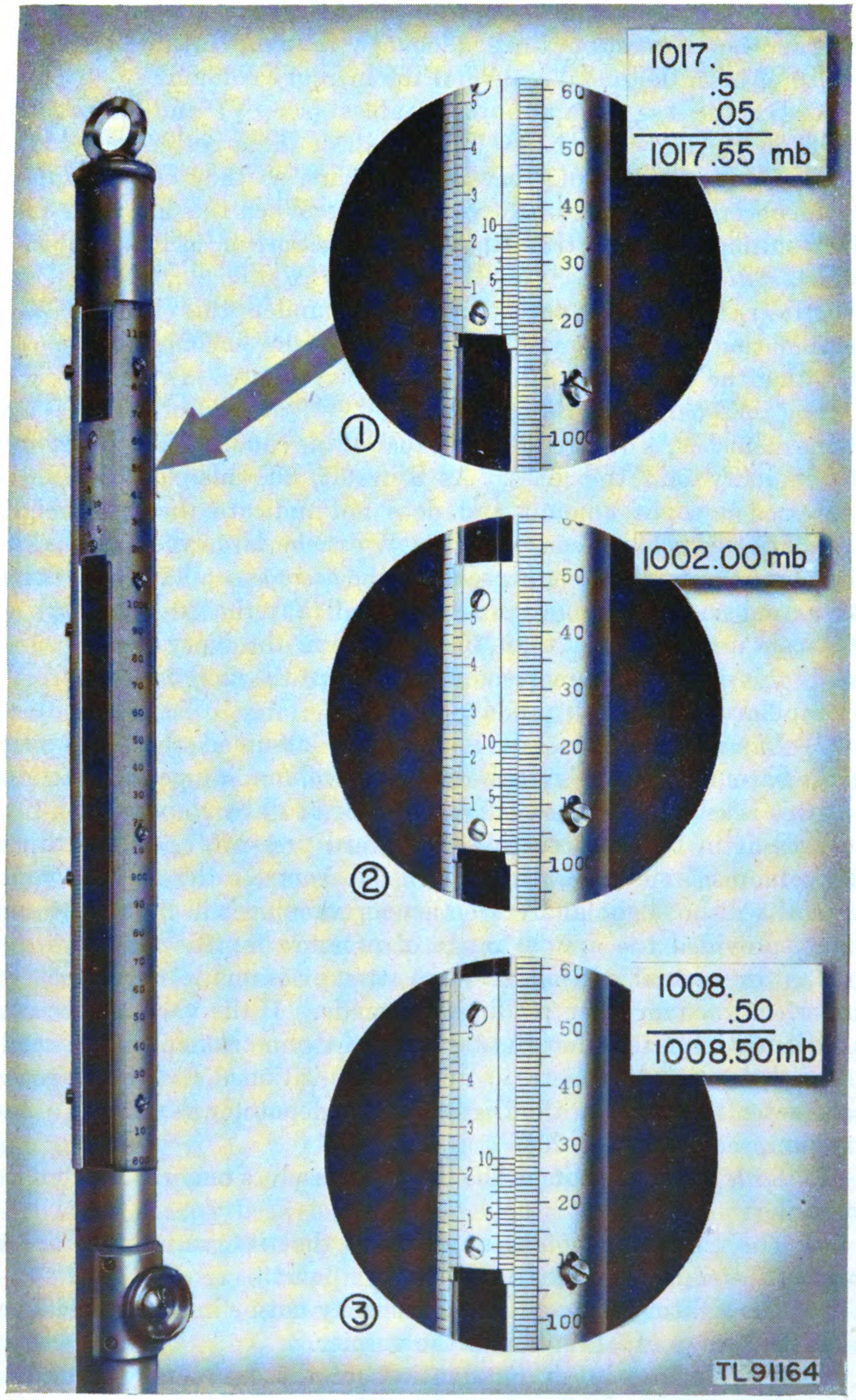

Figure 5. Barometer readings, millibar scale and vernier.

(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 (sec. V) and information given on W. D., S. C. Form No. 79, all of these corrections can be determined, in terms of inches or millibars, so they can be applied to the observed reading of the barometer. When this has been done, the resulting reading is true atmospheric pressure or, as it is frequently called, *station pressure*.

b. INSTRUMENTAL ERRORS. Included under this heading is a combination of mechanical and natural errors encountered in constructing the instrument. Among these errors are—

(1) *Capillarity*. In Barometer ML–2–(*) the top of the mercury, or the meniscus, is quite convex because of the capillary action between the mercury and the glass. As a result, the mercury column is depressed a slight amount and does not indicate the true height. Capillarity is seldom constant, but it can be largely eliminated by adjusting the scale to compensate for the *average* capillary depression. By actual measurement, it will be found that the 30-inch mark on the scale usually is less than 30 inches from the ivory point. Ordinarily this discrepancy represents the amount the mercury is depressed by capillarity.

(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 normal station use, no attempt is made to correct for imperfect vacuum when readings are made. If the vacuum becomes sufficiently imperfect that the accuracy of the instrument is materially affected, another barometer should be requisitioned and the defective barometer returned to the Signal Corps depot for repair. To test vacuum, see paragraph 20*b*.

(3) *Scale error*. Errors in the scales themselves may result from the following:

(*a*) The scale may not be adjusted so that its graduations are at exactly the right distance from the ivory point.

(*b*) The sighting edges of the vernier may not be in true coincidence with the zero graduation line of the vernier.

(*c*) Irregularities in the graduations of the scales may introduce errors from point to point along the scale.

(*4*) *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 *sum* of the correction is marked on W. D., S. C. Form No. 81 which is attached to the barometer at the depot. No attempt should be made by using personnel to redetermine the instrumental correction or readjust the scales.

c. GRAVITY CORRECTIONS. The height of the barometer is a measure of correct air pressure only when the instrument is located at sea level and 45½° latitude, where gravity has the standard value. At all other locations, corrections for variations in the local value of gravity must be applied. As noted in paragraph 8*c*, the correction for gravity consists of a correction for both altitude and latitude. The altitude correction can be obtained from table I. Latitude corrections are given in table II. If W. D., S. C. Form No. 79 has been completed in accordance with the instructions in paragraph 8*c* (3), the gravity correction for the particular station will have already been determined. This correction must be applied to each reading of the barometer.

Note. Each time the station location is changed, a new gravity correction must be determined.

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 temperatures 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 freezing temperature and the pressure remains the same.

(*c*) 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 mercury is that of melting ice, 0° C. or 32° F.

(*b*) The standard temperature for the millibar scale is the same as that for mercury.

(*c*) The standard temperature for the inch scale is 62° F. Thus there is a disparity between the temperature at which the inch scale and the millibar scale are at standard length.

(3) When observed readings are obtained at temperatures other than the standard, corrections must be applied. The corrected reading is that which would have been obtained had the observed reading been taken at the standard temperature.

Note. Since the standard temperature for the inch and millibar scales differ, separate temperature corrections must be applied before inches can be converted into millibars, or vice versa.

e. APPLICATION OF CORRECTIONS. The following two corrections must be applied to every reading of the barometer:

(1) The sum of the *instrumental* and *gravimetric corrections*, recorded on W. D., S. C. Form No. 79. (See par. 8*c*.)

(2) The *correction for temperature*, to be determined from tables III and IV.

(*a*) The temperature correction when the barometer is read in *inches* is found in table III.

(*b*) The temperature correction when the barometer is read in *millibars* is found in table IV.

(*c*) For temperatures above 28.5° F. or 0° C., the corrections are subtracted; for temperatures below these values, the corrections are added.

(3) Temperature corrections given in tables III and IV may also be found in W. D., S. C. Form No. 80 which is a more convenient form for repeated use. It should be noted, however, that editions of Form No. 80 published before March 1944 do not contain all of the information available in tables III and IV.

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. (1) True station pressure is obtained only after the corrections mentioned in *e* above have been applied to the observed reading.

(2) It is frequently necessary to reduce station pressure to sea level pressure, but the procedure for this is beyond the scope of this manual. Instructions may be found in TM 1–235, The Weather Observer.

SECTION III
FUNCTIONING OF PARTS

17. 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 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 wind, temperature, water vapor content, and other factors.

18. 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 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 with mercury. He covered the open end and inverted the tube over a vessel containing mercury. 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.

19. 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–2–(*) 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 one million 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 $\frac{1}{1000}$ 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 measure of length, as a measure of air pressure. Air pressure (par. 18*a*) 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 (par. 16*c*, *d*, and *e*), variable values in density and gravity may be reduced to their equivalent 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.

SECTION IV
MAINTENANCE

Note. Failure or unsatisfactory performance of equipment will be reported on W. D., A. G. O. Form No. 468. If this form is not available, see TM 38–250.

20. Care of Barometer

a. GENERAL. (1) The best care that Barometer ML–2–(*) can have is to be protected from dust and *left alone*. Do not handle the instrument any more than is necessary to take the required readings.

(2) Keep the doors to Case ML–48–(*) closed and fastened except when readings are being taken.

(3) Never subject the instrument to jolts, vibrations, or sudden changes in position.

b. TEST FOR VACUUM. Check the degree of vacuum in the glass tube as follows:

(1) Remove the barometer from the case.

(2) Remove the three small screws at the top of the brass casing which are used to attach the swivel ring.

(3) Carefully remove the cork gasket beneath this ring. This exposes the top of the glass tube.

(4) Rest the cistern of the barometer on the floor and 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.

(5) Very slowly continue to tilt the top of the instrument until the top of the tube has been lowered vertically a distance of 1 inch below the point at which the tube was filled. A small bubble will be noticed near the end of the tube. This bubble contains the air and water vapor which was in the tube above the mercury column.

(6) Measure the diameter of this bubble. If its diameter is $\frac{1}{8}$ inch or less, the error in reading the barometer will be sufficiently small that it may be ignored. If the bubble is appreciably larger than $\frac{1}{8}$ inch, the accuracy of the instrument will be affected. In the latter case, requisition another barometer and return the defective instrument to the Signal Corps depot for repair.

c. SCALES. The scales of the barometer are usually silver-plated over brass, and lacquered. They should never be polished merely for the sake of appearance, since the use of a commercial preparation will remove the lacquer and possibly the graduation marks and cause the metal to tarnish. The scales may be kept in good condition by wiping occasionally with a soft clean cloth and oiling very lightly with a high grade clock or instrument oil (Oil, clock and watch, U. S. Army Spec. No. 2–47B). Do not use any pressure in wiping the scales since there is danger of shifting their position, thus causing erroneous readings. If the scales should become so discolored or tarnished it is impossible to make an accurate reading, return the barometer to the Signal Corps depot and requisition a new one.

21. Transporting Barometer

a. Position. Whenever it is necessary to move Barometer ML–2–(*), do not carry it in an upright position. Always turn it slowly to a horizontal position or completely invert it. The latter position is better.

b. Inverting. (1) Never remove the barometer from its support while the mercury column is at or near its normal height.

(2) 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.

Caution: *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) When the mercury is near the top of the tube, 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.

Caution: The barometer must be handled carefully when inverting. If it is turned too quickly, the shock of the mercury striking the top of the tube can break the glass.

(4) When the barometer is nearly horizontal, watch the cistern for an air bubble showing there is a small free space within. If the mercury has been raised to the right height before inverting the tube, the air bubble will be about the size of a dime. If necessary, loosen the adjusting screw a turn or two to make the bubble the correct size.

(5) The barometer now can be carried in the horizontal position, or better yet, turned until the cistern end is up.

22. Cleaning Cistern and Mercury (fig. 6)

a. Necessity. After several years of continued use, the mercury in the cistern of the barometer may lose its brilliance and accumulate a considerable amount of flaky oxide on its upper surface. While this

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does not impair the accuracy of the barometer, it makes the reading more difficult.

b. Precautions. (1) It is necessary to disassemble the cistern of Barometer ML–2–(*) and to remove the mercury in order to clean it. *This must not be done more often than is absolutely necessary and then only by personnel who have had special and thorough training in the construction of Barometer ML–2–(*).*

(2) Ordinarily, only depot repair personnel will disassemble the cistern of Barometer ML–2–(*) and clean the mercury. *Operating personnel in the field must not attempt it except in extreme emergency.*

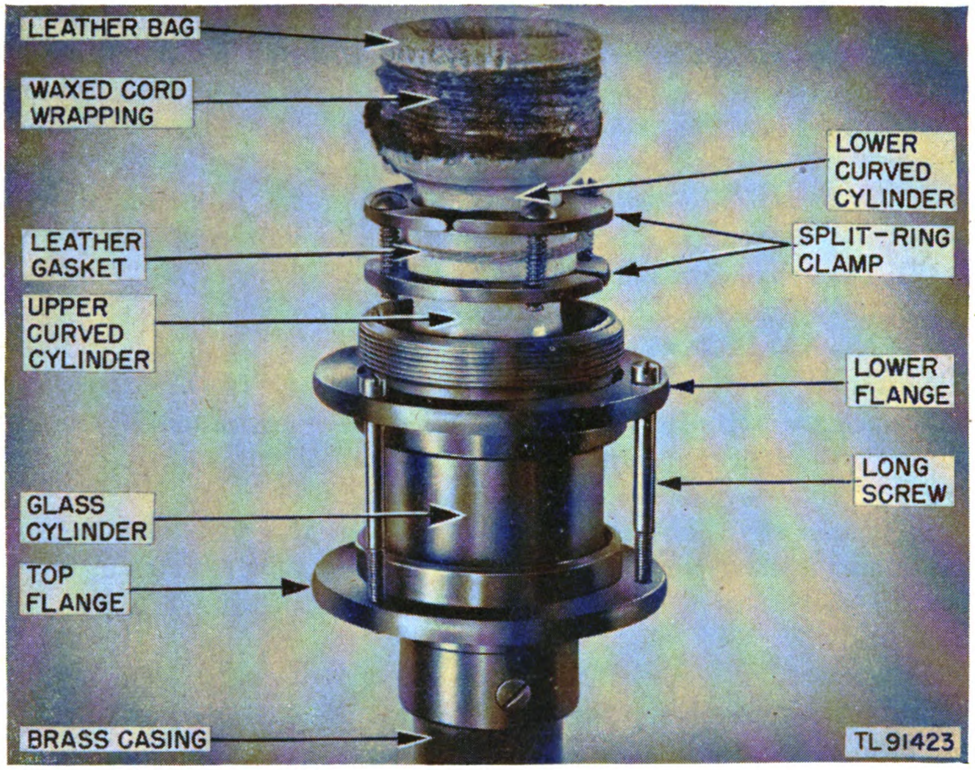

Figure 6. Barometer ML–2–(*), construction of cistern, inverted view.

If a substitute barometer can be secured by requisition, this should be done in preference to attempting to clean the mercury. At best, the cleaning operation described in the succeeding paragraphs is ineffective in producing a really bright mercury surface. Replacement of dirty barometers with new ones obtained on requisition is by far the most satisfactory solution.

c. Preparation. (1) Obtain two porcelain or glass cups large enough to hold the mercury. *Never use a metal utensil.* Wash the cups in soap and water, rinse thoroughly, dry with a clean cloth, and polish with tissue paper. Do not use damp or unclean cups.

(2) Provide several pieces of soft, clean, lint-free cloth or cleansing tissue and several sheets of tissue paper for polishing the glass parts.

(3) Provide several sheets of clean white paper 6 to 8 inches square for cleaning the mercury.

(4) Remove the barometer from its case and invert it. (See par. 21*b*.)

(5) Sit down and rest the top end (the swivel hook) of the instrument on the floor. Support it in the upright position (cistern end up) with the knees, or securely in the corner provided by a desk and one of its opened drawers.

d. DISASSEMBLY (fig. 3). (1) Hold the instrument by flange ⑫ and unscrew cistern housing ⑲ to expose the cistern.

(2) Loosen each of the four screws of split-ring clamp ⑭ a little in turn. This is done to avoid throwing an uneven strain on one portion of curve cylinder ⑬. Sometimes it may be necessary to remove a second screw before the clamp can be removed.

(3) Lift off lower curved cylinder ⑯ to which leather bag ⑱ is tied. Lift the cylinder straight up to avoid spilling the mercury in upper curved cylinder ⑬. Take care not to wrinkle or crease leather gasket ⑮.

(4) Hold the cup (*c*(1) above) close under the flange of cylinder ⑬; carefully tilt the barometer and pour mercury from the cistern *until the tip of the glass tube is just exposed.*

(5) Hold a finger over the end of the glass tube to retain the mercury in the tube, and tilt the barometer to pour out *all* of the mercury from the cistern. When the cistern is empty, carefully return the barometer to the inverted position so that the mercury in the glass tube will not spill.

(6) Loosen each screw ⑩ a little in turn to prevent chipping or cracking glass cylinder ⑧. Scratch aligning marks on flanges ④ and ⑫ so that they can be replaced in the same relative positions.

(7) Remove each screw ⑩ and then remove flange ⑫.

(8) Lift off cylinder ⑬, taking care not to wrinkle or crease leather gasket ⑪.

(9) Hold glass cylinder ⑧ in place, stop up tube ① with the finger, carefully tilt the barometer, and pour into the cup any residue of mercury in the cistern. Return the barometer to the inverted position.

(10) Lift off glass cylinder ⑧, taking care not to wrinkle or crease leather gasket ⑥.

e. CLEANING CISTERN PARTS. The inside surfaces of the cistern parts usually are covered with oxide of mercury which must be removed.

(1) Use cloth or cleansing tissue (*c* (2) above) wound on the end of a slender stick. Do not touch inside surfaces of cistern parts with the hands.

(2) Hold the inverted barometer between the knees and carefully wipe the inside of flanged cylinder ⑤.

(3) Wipe ivory point ⑦ carefully.

(4) Wipe the inside of upper curved cylinder ⑬.

(5) Wipe out lower curved cylinder ⑯ and attached leather bag ⑱. Push the bag inside out as much as possible and wipe it carefully. Hold lower curved cylinder ⑯ upside down, and knock gently against a firm surface to dislodge any particles of mercury or foreign matter.

(6) Wash glass cylinder ⑧ with soap and water. Rinse thoroughly, dry with a clean cloth, and polish with tissue.

Caution: *Do not touch the inside surfaces of any of the parts after cleaning.*

f. Cleaning Mercury. (1) Take a piece of clean white paper (*c* (3) above) and fold it twice to provide four thicknesses approximately 3 or 4 inches square.

(*a*) Open this into a conical shape with the inner closed corner of the fold forming the point of the cone.

(*b*) Make a pinhole at the apex of the cone.

(2) Hold the cone over an empty clean cup. Partly fill the cone with mercury, which will flow slowly through the small opening, leaving the impurities of lead and oxide of mercury deposited along the sides of the paper.

(3) Do not allow the very last of the mercury to pass through the opening as it contains many impurities. Save it in another container.

(4) Use fresh paper cones and clean cups and repeat the process (each time emptying the very last drop into the separate container) until the mercury is bright and clean.

(5) If new mercury is not available to replace the dirty mercury removed and saved in the separate container, use clean cones and cups to clean as much of this dirty mercury as possible. If the last two or three drops of mercury cannot be cleaned properly, reassemble the cistern without replacing them. There is enough range in the cistern adjusting screw to compensate for a *slight* loss in mercury.

g. Reassembling and Refilling (fig. 3). (1) Put glass cylinder ⑧ back in place on flanged cylinder ⑤ with leather gasket ⑥ between them.

(2) Put upper curved cylinder ⑬ back on glass cylinder ⑧ with leather gasket ⑪ between them.

(3) Put lower flange ⑫ on upper curved cylinder ⑬, taking care that the alignment marks (*d* (6) above) on flanges ⑫ and ④ coincide. Insert screws ⑩ and tighten slightly.

(4) Grasp lower flange ⑫ and twist gently back and forth to seat the leather gaskets and joints firmly together. Then tighten screws ⑩, each one only a little at a time, until they hold flanges ⑫ and ④ and the intermediate parts tightly together with *uniform pressure.*

Caution: In handling the leather gaskets, be careful not to wrinkle, crease, or get them out of shape. Leakage of the mercury is likely to occur if they are not replaced exactly as they were.

(5) Use a clean cone (*f* (1) above) and pour the cleaned mercury through it into the cistern, directing the stream of mercury against the wall of the glass cylinder to avoid trapping air in the end of the tube should the stream of mercury strike it.

(6) Fill curved cylinder ⑬ with the mercury. The mercury should fill the inverted cistern to the brim of cylinder ⑬.

(7) Fit lower curved cylinder ⑯ in place on upper curved cylinder ⑬ with leather gasket ⑮ between them and assembly marks aligned. Twist cylinder ⑯ slightly to make certain it is seated well.

(8) Replace split-ring clamp ⑭, taking care to unite it precisely as it was before removal. Sometimes all the screws in the clamp will need to be loosened further to adjust the empty screw holes so that the removed screw can be replaced. Then tighten each screw a little in turn until the clamp fits closely, and holds the two cylinders together with a uniformly tight joint.

(9) Push the end of leather bag ⑱ up into cylinder ⑯ with a finger. Firmly hold the bag in that position; carefully and gradually turn the barometer right side up. Watch for leaks of mercury through the cistern joints, and be certain to keep leather bag ⑱ pushed up into the cistern. *Under no circumstances should the mercury be lowered at this time.*

(10) Carefully invert the barometer again. If a leak occurred, it probably was due to uneven tightening of the two cylinder joints. Loosen the whole joint and shift it a little before tightening again. Take care to tighten each screw a little in turn until all are uniformly tight.

(11) Screw cistern housing ⑲ back on flange ⑫, and make certain the tip of adjusting screw ㉑ is in contact with wooden bearing ⑰. The barometer now can be turned safely right side up. (See par. 8*a*(3).)

23. Lubrication

Barometer ML-2-(*) does not require lubrication.

24. Moistureproofing and Fungiproofing

Moistureproofing and fungiproofing are not required for Barometer ML-2-(*).

SECTION V
SUPPLEMENTARY DATA

25. 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. A gravity correction for the barometer must be computed for each separate station on the basis of the average annual pressure. (See par. 8*c*.) This correction is entered on W. D., S. C. Form No. 79 and is applied to each barometer reading. (See par. 16.) Once this correction is determined for a particular station, the same correction must be applied to all barometer readings at that station. 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. The gravity correction should be recomputed whenever the station is moved.

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. So 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.

Note. Before proceeding any further, read paragraph 26*b* on interpolation.

(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:

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

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 21.06 inches mean pressure is $.0145+.0011=.0156$. Reducing to the nearest thousandth inch, the correction is .016 inch.

Note. In reducing decimals, drop the last figure if less than five, increase the preceding figure by one if the last figure is over five. When the last figure is five, drop it if the preceding figure is even, increase the preceding figure by one if the preceding figure is odd.

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 45½° 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 45½° latitude, a mercury column will be higher than it should be at all latitudes below 45½° since the value of the acceleration of gravity is lower than the standard value in these latitudes. Conversely, for latitudes above 45½°, 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 45½° and a correction subtracted when it is in latitudes below 45½°.

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, as explained in paragraph 26*b*.

26. Explanation of Table III, 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—

$$C = -B\frac{m(t-32°)-l(t-62°)}{1+m(t-32°)}$$

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.

$l=.0000102$, the linear expansion of brass per degree Fahrenheit.

It will be seen that the cubical expansion of mercury is approximately ten times as great as the linear expansion of brass.

b. INTERPOLATION. (1) *Purpose.* (*a*) Table III 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 table III, the temperature correction must be derived by interpolation—that is, by obtaining an intermediate term between two values given in the table.

1. Table III lists 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 ½°. Table III lists half-degree temperatures from 60° to 95°, the average range in which Barometer ML–2–(*) will be used. Temperatures below 60° and above 96°, however, are given in table III in whole degrees, so that it is necessary to interpolate when the thermometer reading involves an intermediate half-degree temperature within those ranges.

(*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.*

Note. The data given in table III is also given in W. D., S. C. Form No. 80 (revised edition of March 1944).

(2) *Single Interpolation.* (*a*) *Thermometer reading.* When the thermometer reading is not listed in table III but the barometer reading is, find the correction values for the whole-degree temperature immediately above and below the observed reading. The value midway 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 table III 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 column 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 end of table III. 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 table III 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 is in parentheses.*)

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

$$\begin{array}{r} .158 \\ -.155 \\ \hline .003 \end{array}$$

In the first column of the interpolation table of table III, 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.

$$\begin{array}{r} 30.297 \\ -.157 \\ \hline 30.140 \end{array}$$

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 table III, 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 in order to maintain uniformity with other services in the method of obtaining corrections. 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:

1. *Example 1.* Thermometer reading: 52.5° F., observed barometer reading: 30.297 inches. Interpolate first for temperature by taking the midvalue between the barometer reading at 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	. 066		. 067

(*Interpolated values are in parentheses.*)

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

$$\begin{array}{r} .066 \\ -.065 \\ \hline .001 \end{array}$$

This leaves .001. Find this value in the first column of the interpolation table of table III, 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.

$$\begin{array}{r} .065 \\ +.001 \\ \hline .066 \end{array}$$

Subtracting this value from the observed reading:

30. 297 inches
—. 066

30. 231 inches is the pressure reading corrected for temperature.

2. *Example 2.* Thermometer reading: 115.5° F.; observed barometer reading: 29.834 inches.

° 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 value, .2305, from the greater, .2345. The remainder is .004. This is the last line in the interpolation table of table III. 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.

$$\begin{array}{r} .2305 \\ +.003 \\ \hline .2335 \end{array}$$

When the value obtained by interpolation contains four digits in the decimal, it must be reduced to three according to the rules given in (*b*) above. 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.

3. *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 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 muse be obtained. 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 pressure, 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 Table III, English Measures. (1) In table III 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*) Subtract pressures and corresponding temperature correction for pressure 20.0 inches at 65° F., and the correction is −.066.

27. Explanation of Table IV, Correction of Mercurial Barometer for Temperature, Dynamic Measures

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

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

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 millibars only, the tabulated temperature corrections have been rounded off to this order of accuracy.

b. Interpolation. (1) *Thermometer reading.* Since temperatures on the Centigrade scale of the thermometer are to be read to the nearest ¼° Centigrade (par. 11*a*) and the tables list corrections for only whole and half-degree intervals, it will be necessary to interpolate to obtain corrections for temperature values ending in either ¼° or ¾°. It will be noted from the tables that the differences in correction between half degrees are always either .05 or .10 millibars. 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. Therefore, when the difference between adjacent corrections listed in the table is .05 millibar, do not interpolate; use the lower value listed. When the difference between adjacent corrections is .10 millibar and the temperature has either a ¼° or ¾° value, add .05 millibar to the correction for the next lowest temperature listed.

(2) *Barometer reading.* The interpolation table at the bottom of table IV is similar in construction and principle to the interpolation table for English measures. (See par. 26.) It should be used in the same way except as noted below.

Example: Observed barometer reading: 753.65 millibars; temperature: 37.5° C. Obtain the two correction values from table IV 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.

$$\begin{array}{r@{\ }l} 753.65 & \text{millibars} \\ -4.60 & \\ \hline 749.05 & \text{millibars} \end{array}$$

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 of table III and table IV are used. In table III, the decimal part of the observed reading was used in entering the interpolation table. In table IV, the difierence 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 in table III 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 of table III. 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 TABLE IV, DYNAMIC MEASURES. In table IV 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 25*c* 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 980- 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, and the correction is —2.45 millibars.

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28. Maintenance Parts List for Barometers ML–2 Through ML–2–F

Ref. figure	Signal Corps stock No.	Name of part and description	Quan per unit	Running spares	Orgn stock	3d ech	4th ech	5th ech	Depot stock	†Station stock	†Region stock
Fig. 3 ㉑	6L4724–40F	SCREW: adjusting; brass; knurled FH; 0.2745–26 thread; H. J. Green Co.; dwg. S. C. D. Met A–338; (part of Barometer ML–2–B, C, D, E, and F).	1	------	------	------	------	(*)	(*)	------	(*)
Fig. 3 ㉑	7A302A/4	SCREW: adjustable; brass; thumb; knurled; $\frac{5}{16}''$–27 thread; National Fine; W. M. Welch Co. PC 1374; (part of Barometer ML–2–A).	1	------	------	------	------	(*)	(*)	------	(*)
Fig. 1	7A302B/T1	THERMOMETER: double-scale; H. J. Green Co.; (part of Barometer ML–2–A, B, C, D, E, and F).	1	------	------	------	------	(*)	(*)	(*)	(*)
	7A450	CASE: packing	1	------	------	------	------	(*)	(*)	------	(*)

† Parts not stocked in station or region stock are carried in depot stock.
* Indicates stock available.

29. Maintenance Parts List for Cases ML–48 Through ML–48–E

Ref. figure	Signal Corps stock No.	Name of part and description	Quan per unit	Running spares	Orgn stock	3d ech	4th ech	5th ech	Depot stock	†Station stock	†Region stock
Fig. 1	7A448/H1	HOOK: steel	1	------	------	------	------	(*)	(*)	------	(*)
Fig. 1	6L6356–8.1P	SCREW: adjusting	3	------	------	------	------	(*)	(*)	------	(*)
Fig. 1	6L6836–7–1P	SCREW: stud; machine	1	------	------	------	------	(*)	(*)	------	(*)

† Parts not stocked in station or region stock are carried in depot stock.
* Indicates stock available.

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. 015	. 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	.006	.006	.006	.007	.007	.007	.008	.008	.008	.009	.009	.009	.010	.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—Continued

[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	.034	.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. *Correction of mercurial barometer for temperature, English measures*

[W. D. S. C. Form No. 80, Revised March 1944]

HEIGHT OF BAROMETER IN INCHES

°F	10.0	22.0	22.5	23.0	23.5	24.0	24.5	25.0	25.5	26.0	26.5	27.0	27.5	28.0	28.5	29.0	29.5	30.0	30.5	31.0	31.5	°F
				Inches							Add					Inches						
0....	0.026	0.057	0.059	0.060	0.061	0.063	0.064	0.065	0.067	0.068	0.069	0.070	0.072	0.073	0.074	0.076	0.077	0.078	0.080	0.081	0.082	0
1....	.025	.055	.057	.058	.059	.060	.062	.063	.064	.065	.067	.068	.069	.070	.072	.073	.074	.076	.077	.078	.079	1
2....	.024	.053	.055	.056	.057	.058	.059	.061	.062	.063	.064	.065	.067	.068	.069	.070	.072	.073	.074	.075	.076	2
3....	.023	.051	.053	.054	.055	.046	.057	.058	.060	.061	.062	.063	.064	.065	.067	.068	.069	.070	.071	.072	.074	3
4....	.022	.049	.050	.052	.053	.054	.055	.056	.057	.058	.059	.061	.062	.063	.064	.065	.066	.067	.068	.070	.071	4
5....	.022	.047	.048	.049	.051	.052	.053	.054	.055	.056	.057	.058	.059	.060	.061	.062	.063	.065	.066	.067	.068	5
6....	.021	.045	.046	.047	.048	.049	.050	.052	.053	.054	.055	.056	.057	.058	.059	.060	.061	.062	.063	.064	.065	6
7....	.020	.043	.044	.045	.046	.047	.048	.049	.050	.051	.052	.053	.054	.055	.056	.057	.058	.059	.060	.061	.062	7
8....	.019	.041	.042	.043	.044	.045	.046	.047	.048	.049	.050	.051	.052	.053	.054	.054	.055	.056	.057	.058	.059	8
9....	.018	.039	.040	.041	.042	.043	.044	.045	.046	.046	.047	.048	.049	.050	.051	.052	.053	.054	.054	.055	.056	9
10....	.017	.037	.038	.039	.040	.041	.042	.042	.043	.044	.045	.046	.047	.047	.048	.049	.050	.051	.052	.053	.053	10
11....	.016	.035	.036	.037	.038	.039	.039	.040	.041	.042	.043	.043	.044	.045	.046	.047	.047	.048	.049	.050	.051	11
12....	.015	.033	.034	.035	.036	.036	.037	.038	.039	.039	.040	.041	.042	.042	.043	.044	.045	.045	.046	.047	.048	12
13....	.014	.031	.032	.033	.033	.034	.035	.036	.036	.037	.038	.038	.039	.040	.041	.041	.042	.043	.043	.044	.045	13
14....	.013	.029	.030	.031	.031	.032	.033	.033	.034	.035	.035	.036	.037	.037	.038	.039	.039	.040	.041	.041	.042	14
15....	.012	.027	.028	.029	.029	.030	.030	.031	.032	.032	.033	.033	.034	.035	.035	.036	.037	.037	.038	.038	.039	15
16....	.011	.025	.026	.026	.027	.028	.028	.029	.029	.030	.030	.031	.032	.032	.033	.033	.034	.034	.035	.036	.036	16
17....	.011	.023	.024	.024	.025	.025	.026	.026	.027	.027	.028	.029	.029	.030	.030	.031	.031	.032	.032	.033	.033	17
18....	.010	.021	.022	.022	.023	.023	.024	.024	.025	.025	.026	.026	.027	.027	.028	.028	.029	.029	.029	.030	.030	18
19....	.009	.019	.020	.020	.021	.021	.021	.022	.022	.023	.023	.024	.024	.025	.025	.025	.026	.026	.027	.027	.028	19
20....	.008	.017	.018	.018	.018	.019	.019	.020	.020	.020	.021	.021	.022	.022	.022	.023	.023	.024	.024	.024	.025	20
21....	.007	.015	.016	.016	.016	.017	.017	.017	.018	.018	.018	.019	.019	.019	.020	.020	.020	.021	.021	.022	.022	21
22....	.006	.013	.014	.014	.014	.014	.015	.015	.015	.016	.016	.016	.017	.017	.017	.017	.018	.018	.018	.019	.019	22
23....	.005	.011	.012	.012	.012	.012	.013	.013	.013	.013	.014	.014	.014	.014	.015	.015	.015	.015	.016	.016	.016	23
24....	.004	.009	.010	010	.010	.010	.010	.011	.011	.011	.011	.011	.012	.012	.012	.012	.012	.013	.013	.013	.013	24

25....	.003	.007	.008	.008	.008	.008	.008	.008	.008	.009	.009	.009	.009	.009	.009	.010	.010	.010	.010	.010	.010	25
26....	.002	.005	.005	.005	.006	.006	.006	.006	.006	.006	.006	.006	.007	.007	.007	.007	.007	.007	.007	.007	.008	26
27....	.001	.003	.003	.003	.003	.004	.004	.004	.004	.004	.004	.004	.004	.004	.004	.004	004	.004	.005	.005	.005	27
28....	.001	.001	.001	.001	.001	.001	.001	.001	.001	.001	.002	.002	.002	.002	.002	.002	.002	.002	.002	.002	.002	28
29....	.000	.001	.001	.001	.001	.001	.001	.001	.001	.001	.001	.001	.001	.001	.001	.001	.001	.001	.001	.001	.001	29
30....	.001	.003	.003	.003	.003	.003	.003	.003	.003	.003	.003	.003	.003	.003	.004	.004	.004	.004	.004	.004	.004	30
31....	.002	.005	.005	.005	.005	.005	.005	.005	.005	.006	.006	.006	.006	.006	.006	.006	.006	.006	.007	.007	.007	31
32....	.003	.007	.007	.007	.007	.007	.007	.008	.008	.008	.008	.008	.008	.009	.009	.009	.009	.009	.009	.009	.010	32
33....	.004	.009	.009	.009	.009	.010	.010	.010	.010	.010	.011	.011	.011	.011	.011	.012	.012	.012	.012	.012	.012	33
34....	.005	.011	.011	.011	.011	.012	.012	.012	.012	.013	.013	.013	.013	.014	.014	.014	.014	.015	.015	.015	.015	34
35....	.006	.013	.013	.013	.014	.014	.014	.014	.015	.015	.015	.016	.016	.016	.016	.017	.017	.017	.018	.018	.018	35
36....	.007	.015	.015	.015	.016	.016	.016	.017	.017	.017	.018	.018	.019	.019	.019	.019	.020	.020	.020	.021	.021	36
37....	.008	.017	.017	.017	.018	.018	.019	.019	.019	.020	.021	.021	.021	.022	.022	.022	.022	.023	.023	.024	.024	37
38....	.009	.019	.019	.020	.020	.020	.021	.021	.022	.022	.023	.023	.023	.024	.024	.025	.025	.026	.026	.026	.027	38
39....	.009	.021	.021	.022	.022	.023	.023	.024	.024	.025	.025	.026	.026	.027	.027	.027	.028	.928	.029	.029	.030	39
40....	.010	.023	.023	.024	.024	.025	.025	.026	.026	.027	.027	.028	.028	.029	.029	.030	.030	.031	.031	.032	.032	40
41....	.011	.025	.025	.026	.026	.027	.027	.028	.029	.029	.030	.039	.031	.032	.033	.033	.034	.034	.034	.035	.035	41
42....	.012	.027	.027	.028	.029	.029	.030	.030	.031	.032	.032	.033	.033	.034	.035	.035	.036	.037	.037	.038	.038	42
43....	.013	.029	.029	.030	.031	.031	.032	.033	.033	.034	.035	.035	.036	.036	.037	.038	.038	.039	.040	.040	.041	43
44....	.014	.031	.031	.032	.033	.033	.034	.035	.036	.036	.037	.038	.038	.039	.040	.040	.041	.042	.043	.013	.044	44
45....	.015	.033	.033	.034	.035	.036	.036	.037	.038	.039	.039	.040	.041	.042	.042	.043	.044	.045	.045	.046	.047	45
46....	.016	.035	.035	.036	.037	.038	.039	.039	.040	.041	.042	.043	.043	.044	.045	.046	.046	.047	.048	.049	.050	46
47....	.017	.037	.037	.038	.039	.040	.041	.042	.042	.043	.044	.045	.046	.047	.047	.048	.049	.050	.051	.052	.052	47
48....	.018	.039	.040	.040	.041	.042	.043	.044	.045	.046	.047	.047	.048	.049	.050	.051	.052	.053	.054	.054	.055	48
49....	.018	.041	.042	.042	.043	.044	.045	.046	.047	.048	.049	.050	.051	.052	.053	.054	.055	.056	.057	.058	.058	49

Table III. Correction of mercurial barometer for temperature, English measures—Continued

°F	10.0	22.0	22.5	23.0	23.5	24.0	24.5	25.0	25.5	26.0	26.5	27.0	27.5	28.0	28.5	29.0	29.5	30.0	30.5	31.0	31.5	°F
	Inches									Subtract						Inches						
50	0.019	0.043	0.044	0.045	0.046	0.046	0.047	0.048	0.049	0.050	0.051	0.052	0.053	0.054	0.055	0.056	0.057	0.058	0.059	0.060	0.061	50
51	.020	.045	.046	.047	.048	.049	.050	.051	.052	.053	.054	.055	.056	.057	.058	.059	.060	.061	.062	.063	.064	51
52	.021	.047	.048	.049	.050	.051	.052	.053	.054	.055	.056	.057	.058	.059	.060	.061	.062	.064	.065	.066	.067	52
53	.022	.049	.050	.051	.052	.053	.054	.055	.056	.057	.059	.060	.061	.062	.063	.064	.065	.066	.067	.068	.070	53
54	.023	.051	.052	.053	.054	.055	.056	.057	.059	.060	.061	.062	.063	.064	.066	.067	.068	.069	.070	.071	.072	54
55	.024	.053	.054	.055	.056	.057	.059	.060	.061	.062	.063	.064	.066	.067	.068	.069	.070	.072	.073	.074	.075	55
56	.025	.055	.056	.057	.058	.060	.061	.062	.063	.064	.066	.067	.068	.069	.071	.072	.073	.074	.076	.077	.078	56
57	.026	.057	.058	.059	.060	.062	.063	.064	.066	.067	.068	.069	.071	.072	.073	.075	.076	.077	.078	.080	.081	57
58	.027	.059	.060	.061	.063	.064	.065	.066	.068	.069	.070	.072	.073	.074	.076	.077	.078	.080	.081	.082	.084	58
59	.028	.061	.062	.063	.065	.066	.067	.069	.070	.072	.073	.074	.076	.077	.078	.080	.081	.083	.084	.085	.087	59
60	.028	.062	.064	.065	.067	.068	.070	.071	.072	.074	.075	.077	.078	.080	.081	.082	.084	.085	.087	.088	.089	60
60.5	.029	.063	.065	.066	.068	.069	.071	.072	.074	.075	.076	.078	.079	.081	.082	.084	.085	.087	.088	.089	.091	60.5
61	.029	.064	.066	.067	.069	.070	.072	.073	.075	.076	.078	.079	.081	.082	.084	.085	.086	.088	.089	.091	.092	61
61.5	.030	.065	.067	.068	.070	.071	.073	.074	.076	.077	.079	.080	.082	.083	.085	.086	.088	.089	.091	.092	.094	61.5
62	.300	.066	.068	.069	.071	.073	.074	.076	.077	.079	.080	.082	.083	.085	.086	.088	.089	.091	.092	.094	.095	62
62.5	.031	.067	.069	.071	.072	.074	.075	.077	.078	.080	.081	.083	.084	.086	.087	.089	.090	.092	.094	.095	.097	62.5
63	.031	.068	.070	.072	.073	.075	.076	.078	.079	.081	.082	.084	.086	.087	.089	.090	.092	.093	.095	.096	.098	63
63.5	.032	.069	.071	.073	.074	.076	.077	.079	.080	.082	.084	.085	.077	.088	.090	.092	.093	.095	.096	.098	.099	63.5
64	.032	.070	.072	.074	.075	.077	.078	.080	.082	.083	.085	.086	.088	.090	.091	.093	.094	.096	.098	.099	.101	64
64.5	.032	.071	.043	.075	.076	.078	.080	.081	.083	.084	.086	.088	.089	.091	.093	.094	.096	.097	.099	.101	.102	64.5
65	.033	.072	.074	.076	.077	.079	.081	.082	.084	.086	.087	.089	.091	.092	.094	.095	.097	.099	.100	.102	.104	65
65.5	.033	.073	.075	.077	.078	.080	.082	.083	.085	.087	.088	.090	.092	.093	.095	.097	.098	.100	.102	.103	.105	65.5
66	.034	.074	.076	.078	.079	.081	.083	.085	.086	.088	.090	.091	.093	.095	.096	.098	.100	.101	.103	.105	.107	66
66.5	.034	.075	.077	.079	.081	.082	.084	.086	.087	.089	.091	.093	.094	.096	.098	.099	.101	.103	.105	.106	.108	66.5
67	.035	.076	.078	.080	.082	.083	.085	.087	.089	.090	.092	.094	.095	.097	.099	.101	.102	.104	.106	.108	.109	67

67.5	.035	.077	.079	.081	.083	.084	.086	.088	.090	.092	.093	.095	.097	.098	.100	.102	.104	.106	.107	.109	.111	67.5
68	.036	.078	.080	.082	.084	.085	.087	.089	.091	.093	.094	.096	.098	.100	.102	.103	.105	.107	.109	.110	.112	68
68.5	.036	.079	.081	.083	.085	.087	.088	.090	.092	.094	.096	.097	.099	.101	.103	.105	.106	.108	.110	.112	.114	68.5
69	.037	.080	.082	.084	.086	.088	.089	.091	.093	.095	.097	.099	.100	.102	.104	.106	.108	.110	.111	.113	.115	69
69.5	.037	.081	.083	.085	.087	.089	.091	.092	.094	.096	.098	.100	.102	.104	.105	.107	.109	.111	.113	.115	.116	69.5
70	.037	.082	.084	.086	.088	.090	.092	.094	.095	.097	.099	.101	.103	.105	.107	.109	.110	.112	.114	.116	.118	70
70.5	.038	.083	.085	.087	.089	.091	.093	.095	.097	.098	.100	.102	.104	.106	.108	.110	.112	.114	.116	.117	.119	70.5
71	.038	.084	.086	.088	.090	.092	.094	.096	.098	.100	.102	.103	.105	.107	.109	.111	.113	.115	.117	.119	.121	71
71.5	.039	.085	.087	.089	.091	.093	.095	.097	.099	.101	.103	.105	.107	.109	.110	.112	.114	.116	.118	.120	.122	71.5
72	.039	.086	.088	.090	.092	.094	.096	.098	.100	.102	.104	.106	.108	.110	.112	.114	.116	.118	.120	.122	.124	72
72.5	.040	.087	.089	.091	.093	.095	.097	.099	.101	.103	.105	.107	.109	.111	.113	.115	.117	.119	.121	.123	.125	72.5
73	.040	.088	.090	.092	.094	.096	.098	.100	.102	.104	.106	.108	.110	.112	.114	.116	.118	.120	.122	.124	.126	73
73.5	.041	.089	.091	.093	.095	.097	.099	.101	.103	.105	.108	.110	.112	.114	.116	.118	.120	.122	.124	.126	.128	73.5
74	.041	.090	.092	.094	.096	.098	.101	.103	.105	.107	.109	.111	.113	.115	.117	.119	.121	.123	.125	.127	.129	74
74.5	.041	.091	.093	.095	.097	.100	.102	.104	.106	.108	.110	.112	.114	.116	.118	.120	.122	.124	.126	.129	.131	74.5
75	.042	.092	.094	.096	.099	.101	.103	.105	.107	.109	.111	.113	.115	.117	.119	.122	.124	.126	.128	.130	.132	75
75.5	.042	.093	.095	.097	.100	.102	.104	.106	.108	.110	.112	.114	.117	.119	.121	.123	.125	.127	.129	.131	.133	75.5
76	.043	.094	.096	.098	.101	.103	.105	.107	.109	.111	.113	.116	.118	.120	.122	.124	.126	.128	.131	.133	.135	76
76.5	.043	.095	.097	.100	.102	.104	.106	.108	.110	.113	.115	.117	.119	.121	.123	.125	.128	.130	.132	.134	.136	76.5
77	.044	.096	.098	.101	.103	.105	.107	.109	.111	.114	.116	.118	.120	.122	.125	.127	.129	.131	.133	.136	.138	77
77.5	.044	.097	.099	.102	.104	.106	.108	.110	.113	.115	.117	.119	.121	.124	.126	.128	.130	.133	.135	.137	.139	77.5
78	.045	.098	.100	.103	.105	.107	.109	.112	.114	.116	.118	.120	.123	.125	.127	.129	.132	.134	.136	.138	.141	78
78.5	.045	.099	.101	.104	.106	.108	.110	.113	.115	.117	.119	.122	.124	.126	.128	.131	.133	.135	.137	.140	.142	78.5
79	.046	.100	.102	.105	.107	.109	.112	.114	.116	.118	.121	.123	.125	.127	.130	.132	.134	.137	.139	.141	.143	79
79.5	.046	.101	.103	.106	.108	.110	.113	.115	.117	.120	.122	.124	.126	.129	.131	.133	.136	.138	.140	.143	.145	79.5
80	.046	.102	.104	.107	.109	.111	.114	.116	.118	.121	.123	.125	.128	.130	.132	.135	.137	.139	.142	.144	.146	80
80.5	.047	.103	.105	.108	.110	.112	.115	.117	.120	.122	.124	.127	.129	.131	.134	.136	.138	.141	.143	.145	.146	80.5
81	.047	.104	.106	.109	.111	.114	.116	.118	.121	.123	.125	.128	.130	.132	.135	.137	.140	.142	.144	.147	.149	81
81.5	.048	.105	.107	.110	.112	.115	.117	.119	.122	.124	.127	.129	.131	.134	.136	.139	.141	.143	.146	.148	.150	81.5
82	.048	.106	.108	.111	.113	.116	.118	.121	.123	.125	.128	.130	.133	.135	.137	.140	.142	.145	.147	.149	.152	82

Table III. Correction of mercurial barometer for temperature, English measures—Continued

°F	10.0	22.0	22.5	23.0	23.5	24.0	24.5	25.0	25.5	26.0	26.5	27.0	27.5	28.0	28.5	29.0	29.5	30.0	30.5	31.0	31.5	°F
	Inches										Subtract						Inches					
82.5	0.049	0.107	0.109	0.112	0.114	0.117	0.119	0.122	0.124	0.127	0.129	0.131	0.134	0.136	0.139	0.141	0.144	0.146	0.148	0.151	0.153	82.5
83	.049	.108	.111	.113	.115	.118	.120	.123	.125	.128	.130	.133	.135	.138	.140	.142	.145	.147	.150	.152	.155	83
83.5	.050	.109	.112	.114	.117	.119	.121	.124	.126	.129	.131	.134	.136	.139	.141	.144	.146	.149	.151	.154	.156	83.5
84	.050	.110	.113	.115	.118	.120	.123	.125	.128	.130	.133	.135	.138	.140	.143	.145	.148	.150	.153	.155	.158	84
84.5	.050	.111	.114	.116	.119	.121	.124	.126	.129	.131	.134	.136	.139	.141	.144	.146	.149	.151	.154	.156	.159	84.5
85	.051	.112	.115	.117	.120	.122	.125	.127	.130	.132	.135	.137	.140	.143	.145	.148	.150	.153	.155	.158	.160	85
85.5	.051	.113	.116	.118	.121	.123	.126	.128	.131	.134	.136	.139	.141	.144	.146	.149	.152	.154	.157	.159	.162	85.5
86	.052	.114	.117	.119	.122	.124	.127	.130	.132	.135	.137	.140	.142	.145	.148	.150	.153	.155	.158	.161	.163	86
86.5	.052	.115	.118	.120	.123	.125	.128	.131	.133	.136	.138	.141	.144	.146	.149	.152	.154	.157	.159	.162	.165	86.5
87	.053	.116	.119	.121	.124	.126	.129	.132	.134	.137	.140	.142	.145	.148	.150	.153	.155	.158	.161	.163	.166	87
87.5	.053	.117	.120	.122	.125	.128	.130	.133	.136	.138	.141	.144	.146	.149	.151	.154	.157	.159	.162	.165	.167	87.5
88	.054	.118	.121	.123	.126	.129	.131	.134	.137	.139	.142	.145	.147	.150	.153	.155	.158	.161	.163	.166	.169	88
88.5	.054	.119	.122	.124	.127	.130	.132	.135	.138	.141	.143	.146	.149	.151	.154	.157	.159	.162	.165	.168	.170	88.5
89	.055	.120	.123	.125	.128	.131	.134	.136	.139	.142	.144	.147	.150	.153	.155	.158	.161	.164	.166	.169	.172	89
89.5	.055	.121	.124	.126	.129	.132	.135	.137	140	.143	.146	.148	.151	.154	.157	.159	.162	.165	.168	.170	.173	89.5
90	.055	.122	.125	.127	.130	.133	.136	.138	.141	.144	.147	.150	.152	.155	.158	.161	.163	.166	.169	.172	.175	90
90.5	.056	.123	.126	.128	.131	.134	.137	.140	.142	.145	.148	.151	.154	.156	.159	.162	.165	.168	.170	.173	.176	90.5
91	.056	.124	.127	.129	.132	.135	.138	.141	.144	.146	.149	.152	.155	.158	.160	.163	.166	.169	.172	.175	.177	91
91.5	.057	.125	.128	.131	.133	.136	.139	.142	.145	.148	.150	.153	.156	.159	.162	.165	.167	.170	.173	.176	.179	91.5
92	.057	.126	.129	.132	.134	.137	.140	.143	.146	.149	.152	.154	.157	.160	.163	.166	.169	.172	.174	.177	.180	92
92.5	.058	.127	.130	.133	.135	.138	.141	.144	.147	.150	.153	.156	.159	.161	.164	.167	.170	.173	.176	.179	.182	92.5
93	.058	.128	.131	.134	.137	.139	.142	.145	.148	.151	.154	.157	.160	.163	.166	.168	.171	.174	.177	.180	.183	93
93.5	.059	.129	.132	.135	.138	.140	.143	.146	.149	.152	.155	.158	.161	.164	.167	.170	.173	.176	.179	.181	.184	93.5
94	.059	.130	.133	.136	.139	.142	.145	.147	.150	.153	.156	.159	.162	.165	.168	.171	.174	.177	.180	.183	.186	94
94.5	.059	.131	.134	.137	.140	.143	.146	.149	.152	.155	.158	.160	.163	.166	.169	.172	.175	.178	.181	.184	.187	94.5

95.....	.060	.132	.135	.138	.141	.144	.147	.150	.153	.156	.159	.162	.165	.168	.171	.174	.177	.180	.183	.186	.189	95
96.....	.061	.134	.137	.140	.143	.146	.149	.152	.155	.158	.161	.164	.167	.170	.173	.176	.179	.182	.185	.188	.191	96
97.....	.062	.136	.139	.142	.145	.148	.151	.154	.157	.160	.163	.167	.170	.173	.176	.179	.182	.185	.188	.191	.194	97
98.....	.063	.138	.141	.144	.147	.150	.153	.156	.160	.163	.166	.169	.172	.175	.178	.181	.185	.188	.191	.194	.197	98
99.....	.063	.140	.143	.146	.149	.152	.155	.159	.162	.165	.168	.171	.175	.178	.181	.184	.187	.190	.194	.197	.200	99
100.....	.064	.142	.145	.148	.151	.154	.158	.161	.164	.167	.171	.174	.177	.180	.183	.187	.190	.193	.196	.200	.203	100
101.....	.065	.144	.147	.150	.153	.157	.160	.163	.166	.170	.173	.176	.179	.183	.186	.189	.193	.196	.199	.202	.206	101
102.....	.066	.146	.149	.152	.155	.159	.162	.165	.169	.172	.175	.179	.182	.185	.189	.192	.195	.198	.202	.205	.208	102
103.....	.067	.148	.151	.154	.158	.161	.164	.168	.171	.174	.178	.181	.184	.188	.191	.194	.198	.201	.204	.208	.211	103
104.....	.068	.149	.153	.156	.160	.163	.166	.170	.173	.177	.180	.183	.187	.190	.194	.197	.200	.204	.207	.211	.214	104
105.....	.069	.151	.155	.158	.162	.165	.169	.172	.176	.179	.182	.186	.189	.193	.196	.200	.203	.207	.210	.213	.217	105
106.....	.070	.153	.157	.160	.164	.167	.171	.174	.178	.181	.185	.188	.192	.195	.199	202	206	209	213	.216	.220	106
107.....	.071	.155	.159	.162	.166	.170	.173	.177	.180	.184	.187	.191	.194	.198	.201	.205	.208	.212	.215	.219	.222	107
108.....	.072	.157	.161	.164	.168	.172	.175	.179	.182	.186	.190	.193	.197	.200	.204	.207	.211	.215	.218	.222	.225	108
109.....	.072	.159	.163	.167	.170	.174	.177	.181	.185	.188	.192	.196	.199	.203	.206	.210	.214	.217	.221	.224	.228	109
110.....	.073	.161	.165	.169	.172	.176	.180	.183	.187	.191	.194	.198	.202	.205	.209	.213	.216	.220	.224	.227	.231	110
111.....	.074	.163	.167	.171	.174	.178	.182	.185	.189	.193	.197	.200	.204	.208	.211	.215	.219	.223	.226	.230	.234	111
112.....	.075	.165	.169	.173	.176	.180	.184	.188	.191	.195	.199	.203	.207	.210	.214	.218	.222	.225	.229	.233	.237	112
113.....	.076	.167	.171	.175	.179	.182	.186	.190	.194	.198	.201	.205	.209	.213	.217	.220	.224	.228	.232	.236	.239	113
114.....	.077	.169	.173	.177	.181	.185	.188	.192	.196	.200	.204	.208	.211	.215	.219	.223	.227	.231	.234	.238	.242	114
115.....	.078	.171	.175	.179	.183	.187	.191	.194	.198	.202	.206	.210	.214	.218	.222	.226	.229	.233	.237	.241	.245	115
116.....	.079	.173	.177	.181	.185	.189	.193	.197	.201	.205	.208	.212	.216	.220	.224	.228	.232	.236	.240	.244	.248	116
117.....	.080	.175	.179	.183	.187	.191	.195	.199	.203	.207	.211	.215	.219	.223	.227	.231	.235	.239	.243	.247	.251	117
118.....	.080	.177	.181	.185	.189	.193	.197	.201	.205	.209	.213	.217	.221	.225	.229	.233	.237	.241	.245	.249	.253	118
119.....	.081	.179	.183	.187	.191	.195	.199	.203	.207	.211	.216	.220	.224	.228	.232	.236	.240	.244	.248	.252	.256	119
120.....	.082	.181	.185	.189	.193	.197	.201	.206	.210	.214	.218	.222	.226	.230	.234	.238	.243	.247	.251	.255	.259	120

Temperature corrections in this table are based on Smithsonian Meteorological Tables, 5th Edition, 1939.

INTERPOLATION TABLE

DIFFERENCE BETWEEN ADJACENT TABULATED CORRECTIONS

	0.000		0.001		0.002		0.003		0.004	
0.000	All values									
.001	0.000–0.250	0.500–0.750	0.251–0.500	0.751–0.000						
.002	.000–.125	.500–.625	.126–.374	.626–.874	0.375–0.500	0.875–0.000				
.003	.000–.083	.500–.583	.084–.249	.584–.749	.250–.416	.750–.916	0.417–0.500	0.917–0.000		
.004	.000–.062	.500–.562	.063–.187	.563–.687	.188–.312	.688–.812	.313–.437	.813–.937	0.438–0.500	0.938–0.000

Table IV. Correction of mercurial barometer for temperature, dynamic measures

[W. D. S. C. Form No. 80, Revised March 1944]

HEIGHT OF BAROMETER IN MILLIBARS

°C	300	740	760	780	800	820	840	860	880	900	920	940	960	980	1000	1020	1040	1060	°C
CORRECTION WILL BE ADDED IF TEMPERATURE IS NEGATIVE; SUBTRACTED IF TEMPERATURE IS POSITIVE																			
0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
0.5	.00	.05	.05	.05	.05	.05	.05	.05	.05	.05	.10	.10	.10	.10	.10	.10	.10	.10	0.5
1.0	.05	.10	.10	.15	.15	.15	.15	.15	.15	.15	.15	.15	.15	.15	.15	.15	.15	.15	1.0
1.5	.05	.20	.20	.20	.20	.20	.20	.20	.20	.20	.25	.25	.25	.25	.25	.25	.25	.25	1.5
2.0	.10	.25	.25	.25	.25	.25	.25	.30	.30	.30	.30	.30	.30	.30	.35	.35	.35	.35	2.0
2.5	.10	.30	.30	.30	.35	.35	.35	.35	.35	.35	.40	.40	40	.40	.40	.40	.40	.45	2.5
3.0	.15	.35	.35	.40	.40	.40	.40	.40	.45	.45	.45	.45	.45	.50	.50	.50	.50	.50	3.0
3.5	.15	.40	.45	.45	.45	.45	.50	.50	.50	.50	.55	.55	.55	.55	.55	.60	.60	.60	3.5
4.0	.20	.50	.50	.50	.50	.55	.55	.55	.55	.60	.60	.60	.65	.65	.65	.65	.70	.70	4.0
4.5	.20	.55	.55	.55	.60	.60	.60	.65	.65	.65	.70	.70	.70	.70	.75	.75	.75	.80	4.5
5.0	.25	.60	.60	.65	.65	.65	.70	.70	.70	.75	.75	.75	.80	.80	.80	.85	.85	.85	5.0
5.5	.25	.65	.70	.70	.70	.75	.75	.75	.80	.80	.85	.85	.85	.90	.90	.90	.95	.95	5.5
6.0	.30	.70	.75	.75	.80	.80	.80	.85	.85	.90	.90	.90	.95	.95	1.00	1.00	1.00	1.05	6.0
6.5	.30	.80	.80	.85	.85	.85	.90	.90	.95	.95	1.00	1.00	1.00	1.05	1.05	1.10	1.10	1.10	6.5
7.0	.35	.85	.85	.90	.90	.95	.95	1.00	1.00	1.05	1.05	1.05	1.10	1.10	1.15	1.15	1.20	1.20	7.0
7.5	.35	.90	.95	.95	1.00	1.00	1.05	1.05	1.10	1.10	1.15	1.15	1.15	1.20	1.20	1.25	1.25	1.30	7.5
8.0	.40	.95	1.00	1.00	1.05	1.05	1.10	1.10	1.15	1.15	1.20	1.25	1.25	1.30	1.30	1.35	1.35	1.40	8.0
8.5	.40	1.05	1.05	1.10	1.10	1.15	1.15	1.20	1.20	1.25	1.30	1.30	1.35	1.35	1.40	1.40	1.45	1.45	8.5
9.0	.45	1.10	1.10	1.15	1.15	1.20	1.25	1.25	1.30	1.30	1.35	1.40	1.40	1.45	1.45	1.50	1.55	1.55	9.0
9.5	.45	1.15	1.20	1.20	1.25	1.25	1.30	1.35	1.35	1.40	1.45	1.45	1.50	1.50	1.55	1.60	1.60	1.65	9.5
10.0	.50	1.20	1.25	1.25	1.30	1.35	1.35	1.40	1.45	1.45	1.50	1.55	1.55	1.60	1.65	1.65	1.70	1.75	10.0
10.5	.50	1.25	1.30	1.35	1.35	1.40	1.45	1.45	1.50	1.55	1.60	1.60	1.65	1.70	1.70	1.75	1.80	1.80	10.5
11.0	.55	1.35	1.35	1.40	1.45	1.45	1.50	1.55	1.60	1.60	1.65	1.70	1.70	1.75	1.80	1.85	1.85	1.90	11.0
11.5	.55	1.40	1.45	1.45	1.50	1.55	1.60	1.60	1.65	1.70	1.75	1.75	1.80	1.85	1.90	1.90	1.95	2.00	11.5
12.0	.60	1.45	1.50	1.55	1.55	1.60	1.65	1.70	1.70	1.75	1.80	1.85	1.90	1.90	1.95	2.00	2.05	2.05	12.0

Table IV. Correction of mercurial barometer for temperature, dynamic measures—Continued

°C	300	740	760	780	800	820	840	860	880	900	920	940	960	980	1000	1020	1040	1060	°C
CORRECTION WILL BE ADDED IF TEMPERATURE IS NEGATIVE; SUBTRACTED IF TEMPERATURE IS POSITIVE																			
12.5	.60	1.50	1.55	1.60	1.65	1.65	1.70	1.75	1.80	1.85	1.85	1.90	1.95	2.00	2.05	2.10	2.10	2.15	12.5
13.0	.65	1.55	1.60	1.65	1.70	1.75	1.80	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.10	2.15	2.20	2.25	13.0
13.5	.65	1.65	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.00	2.05	2.10	2.15	2.20	2.25	2.30	2.35	13.5
14.0	.70	1.70	1.75	1.80	1.85	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20	2.25	2.30	2.35	2.35	2.40	14.0
14.5	.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.15	2.20	2.25	2.30	2.35	2.40	2.45	2.50	14.5
15.0	.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	15.0
15.5	.75	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20	2.25	2.30	2.35	2.40	2.50	2.55	2.60	2.65	2.70	15.5
16.0	.80	1.95	2.00	2.05	2.10	2.15	2.20	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	16.0
16.5	.80	2.00	2.05	2.10	2.15	2.20	2.25	2.30	2.35	2.40	2.45	2.55	2.60	2.65	2.70	2.75	2.80	2.85	16.5
17.0	.85	2.05	2.10	2.15	2.20	2.25	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.90	2.95	17.0
17.5	.85	2.10	2.15	2.20	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.70	2.75	2.80	2.85	2.90	2.95	3.00	17.5
18.0	.90	2.15	2.25	2.30	2.35	2.40	2.45	2.50	2.60	2.65	2.70	2.75	2.80	2.85	2.95	3.00	3.05	3.10	18.0
18.5	.90	2.25	2.30	2.35	2.40	2.45	2.55	2.60	2.65	2.70	2.75	2.85	2.90	2.95	3.00	3.05	3.15	3.20	18.5
19.0	.95	2.30	2.35	2.40	2.50	2.55	2.60	2.65	2.70	2.80	2.85	2.90	2.95	3.05	3.10	3.15	3.20	3.30	19.0
19.5	.95	2.35	2.40	2.50	2.55	2.60	2.65	2.75	2.80	2.85	2.90	3.00	3.05	3.10	3.20	3.25	3.30	3.35	19.5
20.0	1.00	2.40	2.45	2.55	2.60	2.65	2.75	2.80	2.85	2.95	3.00	3.05	3.15	3.20	3.25	3.30	3.40	3.45	20.0
20.5	1.00	2.45	2.55	2.60	2.65	2.75	2.80	2.85	2.95	3.00	3.05	3.15	3.20	3.25	3.30	3.40	3.45	3.55	20.5
21.0	1.05	2.55	2.60	2.65	2.75	2.80	2.85	2.95	3.00	3.10	3.15	3.20	3.30	3.35	3.40	3.50	3.55	3.60	21.0
21.5	1.05	2.60	2.65	2.75	2.80	2.85	2.95	3.00	3.10	3.15	3.20	3.30	3.35	3.45	3.50	3.55	3.65	3.70	21.5
22.0	1.05	2.65	2.70	2.80	2.85	2.95	3.00	3.10	3.15	3.20	3.30	3.35	3.45	3.50	3.60	3.65	3.70	3.80	22.0
22.5	1.10	2.70	2.80	2.85	2.95	3.00	3.10	3.15	3.20	3.30	3.35	3.45	3.50	3.60	3.65	3.75	3.80	3.90	22.5
23.0	1.10	2.75	2.85	2.90	3.00	3.05	3.15	3.20	3.30	3.35	3.45	3.50	3.60	3.65	3.75	3.80	3.90	3.95	23.0
23.5	1.15	2.85	2.90	3.00	3.05	3.15	3.20	3.30	3.35	3.45	3.50	3.60	3.65	3.75	3.80	3.90	4.00	4.05	23.5
24.0	1.15	2.90	2.95	3.05	3.10	3.20	3.30	3.35	3.45	3.50	3.60	3.65	3.75	3.85	3.90	4.00	4.05	4.15	24.0
24.5	1.20	2.95	3.05	3.10	3.20	3.25	3.35	3.45	3.50	3.60	3.65	3.75	3.85	3.90	4.00	4.05	4.15	4.20	24.5

25.0	1.20	3.00	3.10	3.15	3.25	3.35	3.40	3.50	3.60	3.65	3.75	3.80	3.90	4.00	4.05	4.15	4.25	4.30	25.0
25.5	1.25	3.05	3.15	3.25	3.30	3.40	3.50	3.55	3.65	3.75	3.80	3.90	4.00	4.05	4.15	4.25	4.30	4.40	25.5
26.0	1.25	3.15	3.20	3.30	3.40	3.45	3.55	3.65	3.70	3.80	3.90	3.95	4.05	4.15	4.25	4.30	4.40	4.50	26.0
26.5	1.30	3.20	3.25	3.35	3.45	3.55	3.60	3.70	3.80	3.90	3.95	4.05	4.15	4.20	4.30	4.40	4.50	4.55	26.5
27.0	1.30	3.25	3.35	3.40	3.50	3.60	3.70	3.80	3.85	3.95	4.05	4.15	4.20	4.30	4.40	4.50	4.55	4.65	27.0
27.5	1.35	3.30	3.40	3.50	3.60	3.65	3.75	3.85	3.95	4.00	4.10	4.20	4.30	4.40	4.45	4.55	4.65	4.75	27.5
28.0	1.35	3.35	3.45	3.55	3.65	3.75	3.80	3.90	4.00	4.10	4.20	4.30	4.35	4.45	4.55	4.65	4.75	4.85	28.0
28.5	1.40	3.45	3.50	3.60	3.70	3.80	3.90	4.00	4.10	4.15	4.25	4.35	4.45	4.55	4.65	4.75	4.80	4.90	28.5
29.0	1.40	3.50	3.60	3.70	3.75	3.85	3.95	4.05	4.15	4.25	4.35	4.45	4.55	4.60	4.70	4.80	4.90	5.00	29.0
29.5	1.45	3.55	3.65	3.75	3.85	3.95	4.05	4.10	4.20	4.30	4.40	4.50	4.60	4.70	4.80	4.90	5.00	5.10	29.5
30.0	1.45	3.60	3.70	3.80	3.90	4.00	4.10	4.20	4.30	4.40	4.50	4.60	4.70	4.80	4.90	4.95	5.05	5.15	30.0
30.5	1.50	3.65	3.75	3.85	3.95	4.05	4.15	4.25	4.35	4.45	4.55	4.65	4.75	4.85	4.95	5.05	5.15	5.25	30.5
31.0	1.50	3.75	3.85	3.95	4.05	4.15	4.25	4.35	4.45	4.55	4.65	4.75	4.85	4.95	5.05	5.15	5.25	5.35	31.0
31.5	1.55	3.80	3.90	4.00	4.10	4.20	4.30	4.40	4.50	4.60	4.70	4.80	4.90	5.00	5 10	5.20	5.30	5.40	31.5
32.0	1.55	3.85	3.95	4.05	4.15	4.25	4.35	4.45	4.55	4.70	4.80	4.90	5.00	5.10	5.20	5.30	5.40	5.50	32.0
32.5	1.60	3.90	4.00	4.10	4.20	4.35	4.45	4.55	4.65	4.75	4.85	4.95	5.05	5.15	5.30	5.40	5.50	5.60	32.5
33.0	1.60	3.95	4.05	4.20	4.30	4.40	4.50	4.60	4.70	4.80	4.95	5.05	5.15	5.25	5.35	5.45	5.55	5.70	33.0
33.5	1.65	4.05	4.15	4.25	4.35	4.45	4.55	4.70	4.80	4.90	5.00	5.10	5.20	5.35	5.45	5.55	5.65	5.75	33.5
34.0	1.65	4.10	4.20	4.30	4.40	4.55	4.65	4.75	4.85	4.95	5.10	5.20	5.30	5.40	5.50	5.65	5.75	5.85	34.0
34.5	1.70	4.15	4.25	4.35	4.50	4.60	4.70	4.80	4.95	5.05	5.15	5.25	5.40	5.50	5.60	5.70	5.85	5.95	34.5
35.0	1.70	4.20	4.30	4.45	4.55	4.65	4.75	4.90	5.00	5.10	5.25	5.35	5.45	5.55	5.70	5.80	5.90	6.00	35.0
35.5	1.75	4.25	4.40	4.50	4.60	4.75	4.85	4.95	5.05	5.20	5.30	5.40	5.55	5.65	5.75	5.90	6.00	6.10	35.5
36.0	1.75	4.30	4.45	4.55	4.70	4.80	4.90	5.05	5.15	5.25	5.40	5.50	5.60	5.75	5.85	5.95	6.10	6.20	36.0
36.5	1.80	4.40	4.50	4.60	4.75	4.85	5.00	5.10	5.20	5.35	5.45	5.55	5.70	5.80	5.90	6.05	6.15	6.30	36.5
37.0	1.80	4.45	4.55	4.70	4.80	4.90	5.05	5.15	5.30	5.40	5.50	5.65	5.75	5.90	6.00	6.15	6.25	6.35	37.0
37.5	1.85	4.50	4.65	4.75	4.85	5.00	5.10	5.25	5.35	5.50	5.60	5.70	5.85	5.95	6.10	6.20	6.35	6.45	37.5
38.0	1.85	4.55	4.70	4.80	4.95	5.05	5.20	5.30	5.45	5.55	5.65	5.80	5.90	6.05	6.15	6.30	6.40	6.55	38.0
38.5	1.85	4.60	4.75	4.85	5.00	5.10	5.25	5.35	5.50	5.60	5.75	5.85	6.00	6.10	6.25	6.35	6.50	6.60	38.5
39.0	1.90	4.70	4.80	4.95	5.05	5.20	5.30	5.45	5.55	5.70	5.80	5.95	6.05	6.20	6.35	6.45	6.60	6.70	39.0
39.5	1.90	4.75	4.85	5.00	5.15	5.25	5.40	5.50	5.65	5.75	5.90	6.00	6.15	6.30	6.40	6.55	6.65	6.80	39.5

Table IV. Correction of mercurial barometer for temperature, dynamic measures—Continued

°C	300	740	760	780	800	820	840	860	880	900	920	940	960	980	1000	1020	1040	1060	°C
CORRECTION WILL BE ADDED IF TEMPERATURE IS NEGATIVE; SUBTRACTED IF TEMPERATURE IS POSITIVE																			
40.0	1.95	4.80	4.95	5.05	5.20	5.30	5.45	5.60	5.70	5.85	5.95	6.10	6.25	6.35	6.50	6.60	6.75	6.90	40.0
40.5	1.95	4.85	5.00	5.10	5.25	5.40	5.50	5.65	5.80	5.90	6.05	6.20	6.30	6.45	6.55	6.70	6.85	6.95	40.5
41.0	2.00	4.90	5.05	5.20	5.30	5.45	5.60	5.70	5.85	6.00	6.10	6.25	6.40	6.50	6.65	6.80	6.90	7.05	41.0
41.5	2.00	5.00	5.10	5.25	5.40	5.50	5.65	5.80	5.90	6.05	6.20	6.35	6.45	6.60	6.75	6.85	7.00	7.15	41.5
42.0	2.05	5.05	5.20	5.30	5.45	5.60	5.70	5.85	6.00	6.15	6.25	6.40	6.55	6.65	6.80	6.95	7.10	7.20	42.0
42.5	2.05	5.10	5.25	5.35	5.50	5.65	5.80	5.95	6.05	6.20	6.35	6.50	6.60	6.75	6.90	7.05	7.15	7.30	42.5
43.0	2.05	5.15	5.30	5.45	5.60	5.70	5.85	6.00	6.15	6.25	6.40	6.55	6.70	6.85	6.95	7.10	7.25	7.40	43.0
43.5	2.10	5.20	5.35	5.50	5.65	5.80	5.90	6.05	6.20	6.35	6.50	6.65	6.75	6.90	7.05	7.20	7.35	7.50	43.5
44.0	2.15	5.30	5.40	5.55	5.70	5.85	6.00	6.15	6.30	6.40	6.55	6.70	6.85	7.00	7.15	7.30	7.40	7.55	44.0
44.5	2.15	5.35	5.50	5.65	5.75	5.90	6.05	6.20	6.35	6.50	6.65	6.80	6.90	7.05	7.20	7.35	7.50	7.65	44.5
45.0	2.20	5.40	5.55	5.70	5.85	6.00	6.15	6.25	6.40	6.55	6.70	6.85	7.00	7.15	7.30	7.45	7.60	7.75	45.0
45.5	2.20	5.45	5.60	5.75	5.90	6.05	6.20	6.35	6.50	6.65	6.80	6.95	7.10	7.25	7.35	7.50	7.65	7.80	45.5
46.0	2.25	5.50	5.65	5.80	5.95	6.10	6.25	6.40	6.55	6.70	6.85	7.00	7.15	7.30	7.45	7.60	7.75	7.90	46.0
46.5	2.25	5.60	5.75	5.90	6.05	6.20	6.35	6.50	6.65	6.80	6.95	7.10	7.25	7.40	7.55	7.70	7.85	8.00	46.5
47.0	2.30	5.65	5.80	5.95	6.10	6.25	6.40	6.55	6.70	6.85	7.00	7.15	7.30	7.45	7.60	7.75	7.90	8.05	47.0
47.5	2.30	5.70	5.85	6.00	6.15	6.30	6.45	6.60	6.75	6.95	7.10	7.25	7.40	7.55	7.70	7.85	8.00	8.15	47.5
48.0	2.35	5.75	5.90	6.05	6.20	6.40	6.55	6.70	6.85	7.00	7.15	7.30	7.45	7.60	7.80	7.95	8.10	8.25	48.0
48.5	2.35	5.80	5.95	6.15	6.30	6.45	6.60	6.75	6.90	7.05	7.25	7.40	7.55	7.70	7.85	8.00	8.15	8.35	48.5
49.0	2.40	5.85	6.05	6.20	6.35	6.50	6.65	6.80	7.00	7.15	7.30	7.45	7.60	7.80	7.95	8.10	8.25	8.40	49.0
49.5	2.40	5.95	6.10	6.25	6.40	6.55	6.75	6.90	7.05	7.20	7.35	7.55	7.70	7.85	8.00	8.20	8.35	8.50	49.5
50.0	2.45	6.00	6.15	6.30	6.50	6.65	6.80	6.95	7.10	7.30	7.45	7.60	7.75	7.95	8.10	8.25	8.40	8.60	50.0

INTERPOLATION TABLE

DIFFERENCE BETWEEN ADJACENT TABULATED CORRECTIONS		0.00	0.05	0.10	0.15	0.20
	.00	All values				
	.05	0.00–10.00	10.05–20.00			
	.10	0.00– 5.00	5.05–15.00	15.05–20.00		
	.15	0.00– 3.30	3.35–10.00	10.05–16.65	16.70–20.00	
	.20	0.00– 2.50	2.55– 7.45	7.50–12.50	12.55–17.45	17.50–20.00

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