

1949 CATALOG

SCIENTIFIC
APPARATUS

•
CHEMICALS

and

SUPPLIES

for

PHYSICS

CHEMISTRY

BIOLOGY

and

GENERAL SCIENCE

W. M. WELCH SCIENTIFIC COMPANY

— Established 1880 —

1515 Sedgwick Street Chicago, Illinois, U. S. A.

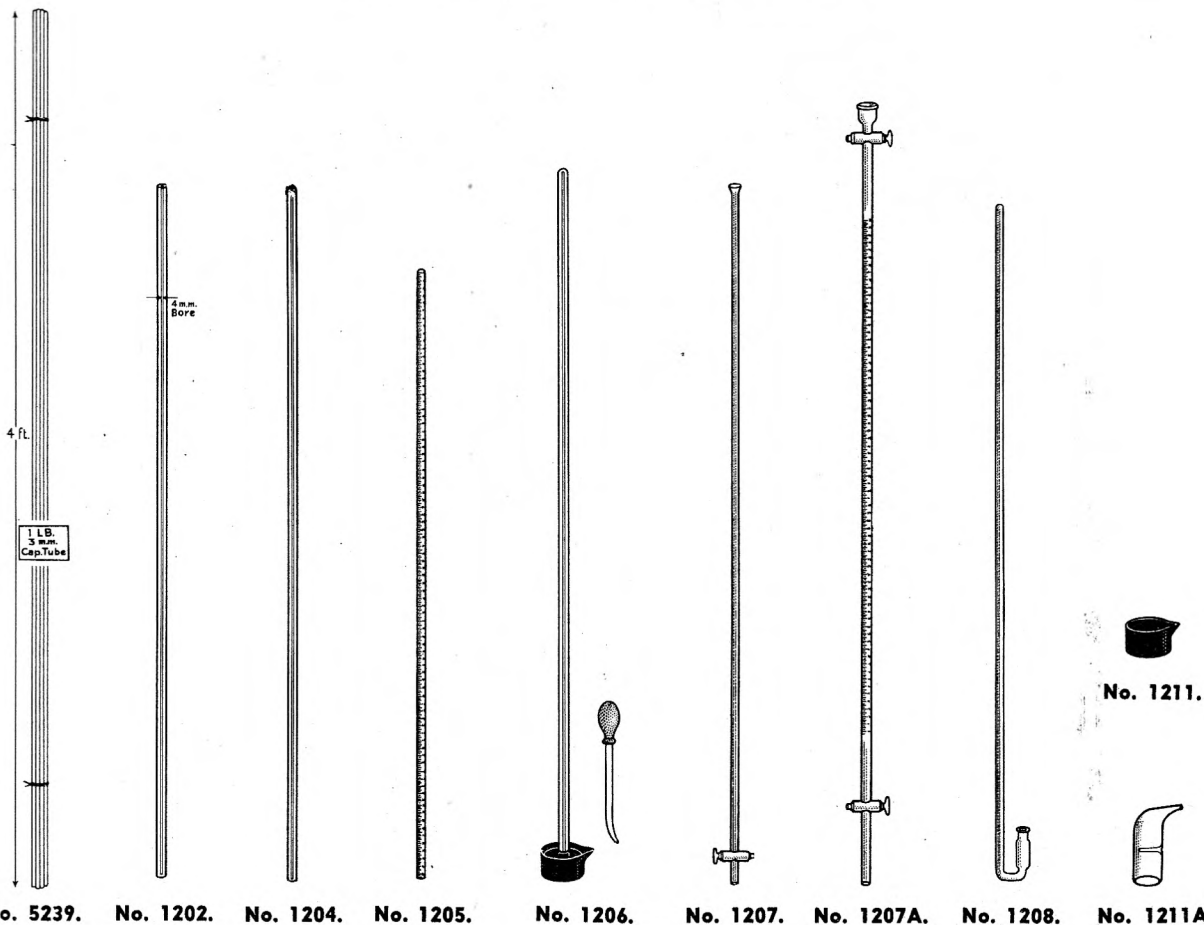
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By

W. M. Welch Manufacturing Company

Lithographed in U. S. A.

BAROMETER TUBES



No. 5239. No. 1202. No. 1204. No. 1205. No. 1206. No. 1207. No. 1207A. No. 1208. No. 1211A.

BAROMETER TUBING, Heavy Wall. This tubing has a bore 2 mm in diameter with 2.5 mm wall and is very useful for barometer work or for general use in the laboratory. Furnished in 4 foot lengths, 12 feet to a pound. Specify 2 mm bore.

No. 5239, Per Pound, \$1.25

BAROMETER TUBE, Straight, Four Millimeter Bore. Cut in lengths of 90 cm which is sufficient for making a barometer. Both ends open.

No. 1202, Each, \$0.80

BAROMETER TUBE, Straight, One End Closed. An unfilled barometer tube, 90 cm long, 4 mm bore, sealed at one end.

No. 1204, Each, \$0.85

BAROMETER TUBE, Straight, Graduated. A 4 mm bore barometer tube, graduated in millimeters.

No. 1205, Each, \$4.24

BAROMETER TUBE, With Mercury Cup and Pipette. Consists of Tube No. 1204, 90 cm long sealed at one end, with Mercury Well No. 1211 and pipette for filling the tube with mercury or for inserting a liquid in case the tube is used in vapor density experiments. Complete.

No. 1206, Each, \$1.25

BAROMETER TUBE WITH STOPCOCK. This is a very convenient form of Barometer or Boyle's Law Tube. By slanting the tube and placing the open end in a cup of mercury, the thread of mercury can very easily be drawn up the tube past the stopcock. This can then

be closed and the mercury will be trapped. A little care should be taken not to allow moisture-laden air from the mouth to go back into the tube. This provides a very rapid method for making the ordinary experimental barometer. Complete tube with 2 mm bore and stopcock, but without Mercury.

No. 1207, Each, \$2.75

BAROMETER TUBE. With funnel top and stopcocks at top and bottom for easy filling. Graduated from 100 to 780 mm in millimeter divisions.

No. 1207A, Each, \$9.08

BAROMETER TUBE, Siphon Type. Consists of an unfilled 4 mm bore barometer tube with top end closed and open end with bend and bulb.

No. 1208, Each, \$1.15

BAROMETER TUBE, Siphon Type, Filled. This is our No. 1208 tube filled with mercury.

No. 1210, Each, \$10.00

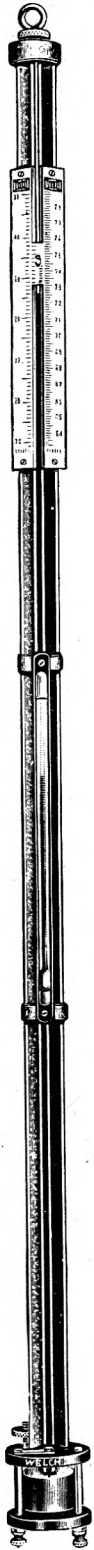
MERCURY WELL, Iron. Cast iron cup to be used as a mercury well. Approximate fluid capacity 2 ounces.

No. 1211, Each, \$0.50

MERCURY DISPENSER, Pipette and Reservoir. This is a very convenient pipette for introducing mercury into tubes of small bore. The reservoir can be easily filled through the side inlet tube and the flow of the mercury from the outlet can be nicely controlled by placing the thumb over the inlet tube. Capacity 30 ml.

No. 1211A, Each, \$1.10

MERCURIAL BAROMETER



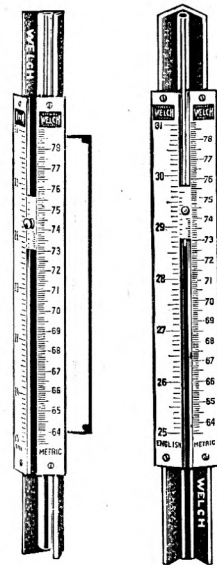
1215. MERCURIAL BAROMETER, Improved Design.

- Mercury column entirely exposed
- Bore of tube 4 mm
- Straight form, Fortin type
- New form of molded glass cistern with bakelite discs top and bottom
- Unique method of adjusting mercury to zero point by means of bakelite float
- Electrical contact device for zero setting
- Individually checked with a certified Weather Bureau instrument
- Vernier scale reading from 25 inches to 31 inches by 0.01 inches and 60 cm to 83 cm by 0.1 mm
- Milk glass screen mounted in frame back of mercury column as aid to accurate setting of vernier

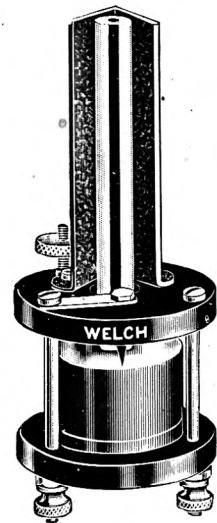
The barometer is of the standard Fortin type with a straight tube held firmly by a pressed metal case, open entirely in front which makes the mercury column visible over its entire length. From a teaching standpoint this is a decided improvement over the shut-in type because the student can at all times actually see the column of mercury which is being supported by the atmosphere. The barometer at the same time provides the advantages of the straight tube cistern type over the siphon type with bent tube. The frame is absolutely rigid, being made of sheet metal bent in a "V" cross-section with a formed cover fastened securely to the top and with the top bakelite cistern plate securely fastened at the bottom. The cistern is of unique construction, consisting of a molded glass vessel to contain the mercury securely held by bakelite discs at the top and bottom, the latter being held securely together by means of three rods. The change in level of the mercury is produced by a bakelite float which is raised or lowered in the mercury by means of a screw above the ceiling of the cistern. This furnishes a very delicate means of setting the mercury at the zero point of the scale. An electrical contact circuit for this zero setting is provided by means of two binding posts fastened to the bottom bakelite disc with the proper connections leading one terminal to the Monel metal zero pin and the other to the mercury through the rod which passes through the float. A milk glass panel is held behind the upper level of the mercury in a metal frame which provides a diffused light to aid in the setting of the vernier at the exact level of the mercury. Two wall brackets sent with the barometer can be screwed to the frame so as to provide a rigid and secure mounting on a wall if so desired. Black crystal finish throughout. Both English and Metric scales are provided with a vernier plate which is easily adjusted to any height, reading from 25 inches to 31 inches by hundredths of an inch and from 60 mm to 83 mm by tenths of a millimeter. This range is sufficient for all altitudes from sea level to 4,000 feet. An accurate Centigrade, and Fahrenheit thermometer is provided for observing the temperature of the mercury column. The mounting is so designed that the tube can be shipped safely in a separate container and adjusted in position without difficulty by the operator.

No. 1215.

- 1215A. **BAROMETER TUBE, Straight Tube, Vacuum Filled.** Replacement tube for No. 1215 Barometer. Each, \$27.50
- 1212F. **BAROMETER MOUNTING BOARD.** A hardwood board 108x10 cm with holes already drilled for the bracket furnished with No. 1215 Barometer. Each, \$5.50
1214. **BAROMETER CASE, With Glass Front, for No. 1215 Barometer.** Complete with lock and key. Each, \$14.50



Side View Showing Milk Glass Plate



No. 1215.
Pat. No. 1,950,497

MARINE BAROMETER

U. S. NAVY SPECIFICATIONS

No. 1225 MERCURIAL BAROMETER, MARINE DESIGN

- **Barometer tube with 16-inch capillary section for safe shipping and for sea-going service.**
- **Mercury cistern with large diameter provides permanent zero for scale.**
- **Two scales graduated in inches and millibars protected by glass sleeve.**
- **Verniers read to .002 inch and .1 millibar.**
- **Scales compensated for zero error.**
- **Special hinged support with gimbal joint for barometer when used on boat.**

This barometer is of the typical marine type and identical in every particular with those furnished the U. S. Navy. The glass barometer tube of approximately 1/3 inch diameter has a capillary section 16.5 inches long and approximately .030 inch diameter between its upper and lower sections of larger diameter. This provides a drag on the mercury when the ship rolls, and thus prevents a disruptive surge of the mercury toward the top of the tube, which otherwise would break the tube. This same feature is an advantage both in shipping and in manipulation if the barometer tube is used on land.

Another feature is a mercury cistern three inches in diameter, which gives a ratio of vertical movement of the mercury in the cistern for a change of elevation of the mercury in the tube of almost 1 to 100. By compensating the scale graduations for the slight error, a permanent zero of the scales is obtained. In other words, a reading of the barometer scale gives the true reading of the barometer at all times without further adjustment.

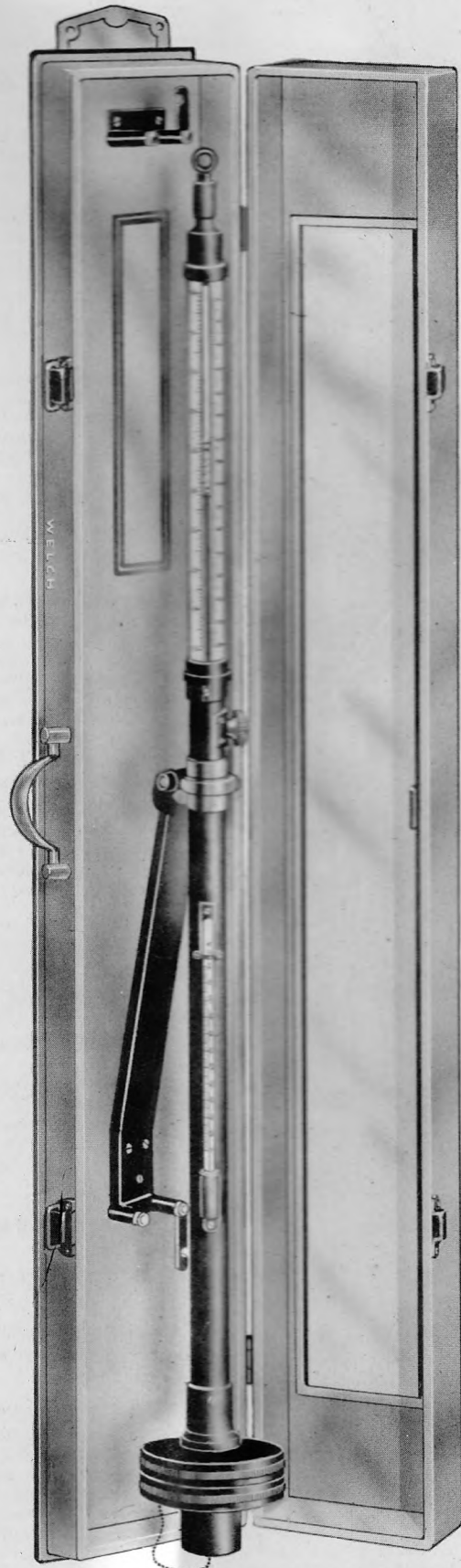
The scales are of nickel silver and when mounted on the barometer shell are completely enclosed by a sleeve of glass tubing. The inch scale is graduated in tenths and half-tenths, with a vernier of 25 divisions reading to .002 inch. The millibar scale is graduated in 2 millibar divisions with a vernier of 20 divisions reading to .1 millibar. The verniers are moved by a rack and pinion operated by a thumb nut on the outside of the barometer shell. The thermometer reads to degrees F. from 10° to 120°.

The barometer is furnished complete with tube in place ready for operation.

Without Case, Each, \$155.00

1225A. MARINE BAROMETER IN CASE. Complete barometer mounted in place in metal case with full-length glass door, and provided with a hinged arm support with gimbal joint which holds the barometer vertical and completely clear of case to compensate for the roll of the ship when taking observations.

Complete Barometer in Case, Each, \$185.00



Marine Barometer. Supported Outside Its Case by Hinged Arm and Gimbal Joint.

STANDARD MERCURIAL BAROMETER

BAROMETER, Standard U. S. Weather Bureau Type. This barometer is of the standard mercury well, or Fortin, type, which is the type used in the United States Weather Bureau, and other laboratories for observations of the highest accuracy. It consists of a 6-mm heavy-walled glass tube, vacuum-filled with mercury, placed open end down in a cistern of mercury. The tube and cistern are supported and protected by a brass tube in which two long slits have been cut near the upper end so as to show the top of the mercury column within the lower and upper limits of the scale (61 to 81.3 cm). Fastened to the shell alongside the slits are metric and English scales with vernier plates, which are operated up and down by a rack and pinion. The metric reads to .05 mm while the inch vernier reads to .002 inch.

The portion of the casing opposite the cistern has a larger diameter than the upper part and has also a glass window at the mercury level, so that a setting of the mercury surface may be made by a thumb screw pushing against the flexible bottom of the cistern, thus raising or lowering the mercury in the cistern until it just touches the ivory point, which is the zero of the scale. This zero point is permanently fixed to the ceiling of the cistern casing and has, of course, been accurately upper casing, that is, at 61 cm. The ranges of the scales (61 to 81.3 cm and 24 to 32.7 inches) make the barometer available for elevations of approximately 6000 ft. and for points approximately 1500 ft. below sea level.

The scales are made of non-tarnishable 18 percent nickel silver, polished and formed to the shell. The graduations are engine divided.

A double-scale thermometer is mounted in the casing so that the temperature of the barometer column may at all times be known. All metal parts of the barometer are black-nickel finish. A mounting board is available under No. 1220 as described below.

Complete as described with vacuum-filled tube. No. 1218. Each \$99.50

WOOD BACK ONLY, For Holding Barometer No. 1218. Consists of a wood board to which is attached a brass bracket to receive the ring in the top of the barometer, a ring with steadying screws to clamp about the cistern, and milk-glass reflectors, forming an opaque background for reading the instrument. Essential as a permanent mounting for the barometer.

No. 1220. Each, \$15.00

HIGH ALTITUDE BAROMETER

BAROMETER, MERCURIAL, For High Altitudes, Patent No. 1,950,497. Barometer is designed the same as our No. 1215 shown on the preceding page but with the Metric scale graduated from 52 to 66 cm. and with the inch scale graduated from 20.5 to 27, making the barometer capable of giving reading from 3,000 feet to 10,000 feet.

1215B. Each, \$30.00

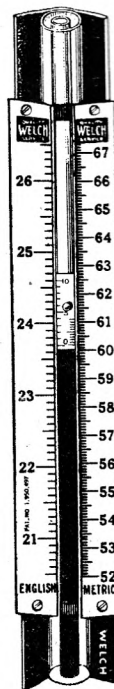
DEMONSTRATION BAROMETERS

BAROMETER, Demonstration. Makes it easy to demonstrate the principles of a mercurial barometer or of a manometer. Mercury is placed in the reservoir and then pumped up into the barometer tube past the stopcock. When the stopcock is closed and the pressure released from the reservoir, the mercury falls to regular barometer height.

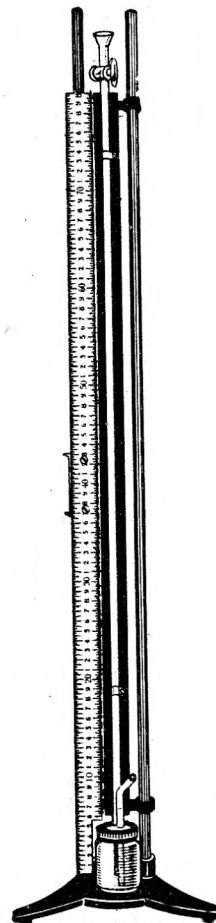
No. 1216. Each, \$13.85

BAROMETER DEMONSTRATION, and Vacuum Gauge. This is a convenient barometer or vacuum gauge to be used underneath a bell jar on a pump plate. The barometer tube may be filled with mercury and then inverted in the mercury well. The whole outfit may be clamped on to the circular metal base which will hold it in a vertical position. It can then be placed on a pump plate and covered with a bell jar such as our No.1483. Complete with a barometer tube mounted on a metric scale 89 cm long, mercury well, and support but without mercury well, or bell jar.

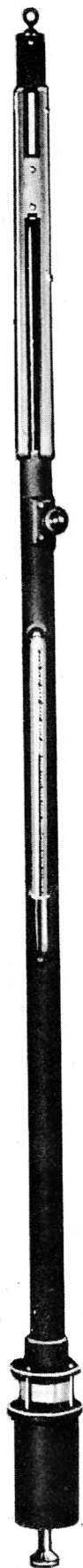
No. 1216A. Each, \$7.25



No. 1215B.



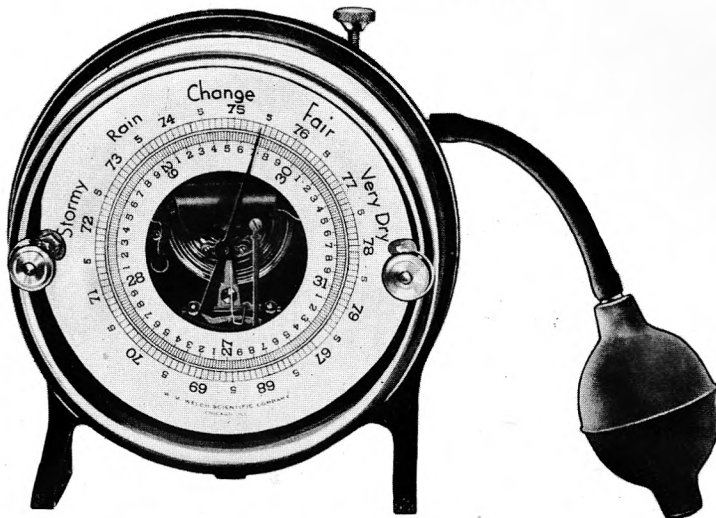
No. 1216.



No. 1218.

DEMONSTRATION ANEROID BAROMETER

How An Aneroid Barometer Works



No. 1230.

1230. **ANEROID BAROMETER, Demonstration Form.** The barometer unit of this instrument is mounted on a cast aluminum base with lugs designed to allow a vertical or a horizontal position of the dial. The mechanical parts are mounted clear of the base and together with the dial are tightly covered with a dome of heavy glass so that the parts can be protected and yet the dial can be read and the construction studied. This makes the barometer ideal for demonstration purposes. An outlet connecting with the bellows has attached to it a piece of rubber tubing and bulb with pressure valve, which allows the operator to show the effect of an **increase** in the pressure. To illustrate a **decrease** below normal pressure the bulb can easily be removed and a suction produced by the mouth. Base 15 cm in diameter. Complete with bulb and rubber tubing.

Each, \$21.75

TAYLOR ANEROID BAROMETERS



No. 1232.



No. 1240.



No. 1240, Showing Dial.

1232. **ANEROID BAROMETER, (Taylor), Metric and English.** This is the standard form adopted by the United States Weather Bureau and the United States Navy. The movement is adjustable and compensated for changes in temperature. The case is of lacquered brass, 12 centimeters open dial with hand-silvered finish, graduated in inches to 1/50th inch and in centimeters to 1 millimeter, making it possible to obtain very accurate readings. Range from sea level to altitudes of 3,500 feet. This is our highest grade aneroid barometer for ordinary service.

Each, \$30.00

1240. **ANEROID BAROMETER, (Taylor), High-grade, Adjustable, Metric and English.** We recommend this barometer for physiological laboratories because it is exceptionally high grade and it may be taken on field trips and will give very dependable observations. Durably built and will stand considerable rough usage. It is of somewhat higher grade than our No. 1239. One of the other features of this instrument is that it is adjustable for altitudes up to 3,500 feet by means of a dial on the back as shown in the illustration. To adjust, turn the brass disc on the back until the arrow on the case points to the altitude of the given location. The hand will then point to the proper reading at sea level, which reading will then be comparable with the United States Weather Bureau readings. This instrument is mounted in a lacquered brass case 12 cm in diameter with an enameled dial graduated in inches and permitting readings to 1/50th inch and 1 millimeter. Fitted with an adjustable stationary hand for marking the last position so as to note the rise and fall

Each, \$30.00

ANEROID BAROMETERS



No. 1236.

THE BEST INEXPENSIVE ANEROID AMERICAN MADE

- Brass and Wood Case
- Nine-centimeter Dial
- Open Face Showing Mechanism
- Readings in Centimeters and Inches
- Extra Outside Pointer

METRIC AND ENGLISH SCALES. This Aneroid Barometer is excellent for all types of laboratory and household use. As elevations are usually expressed in feet, the inch scale will give readings with which to plot contours and determine elevations in your locality. The mechanism is sturdy and is protected by a brass dial set in a hardwood back 12.5 cm in diameter and 3 cm thick. In addition to the index arrow, a stationary arrow operable from outside the case is provided so that changes of the moving arrow may more easily be detected. A thoroughly tested instrument at a very moderate price. Altitude limit 3500 feet.

If readings are used with U. S. Weather Maps the instrument should be corrected to sea level by means of a screw at the back of the case. The instruction sheet furnished with the instrument gives a table of corrections.

No. 1236, Each, \$9⁰⁰



No. 1239.

CLASSROOM BAROMETER

- American Made
- Spun Brass Case
- Five-Inch Dial
- Metric and English Scales
- Stationary Pointer for Outside Setting

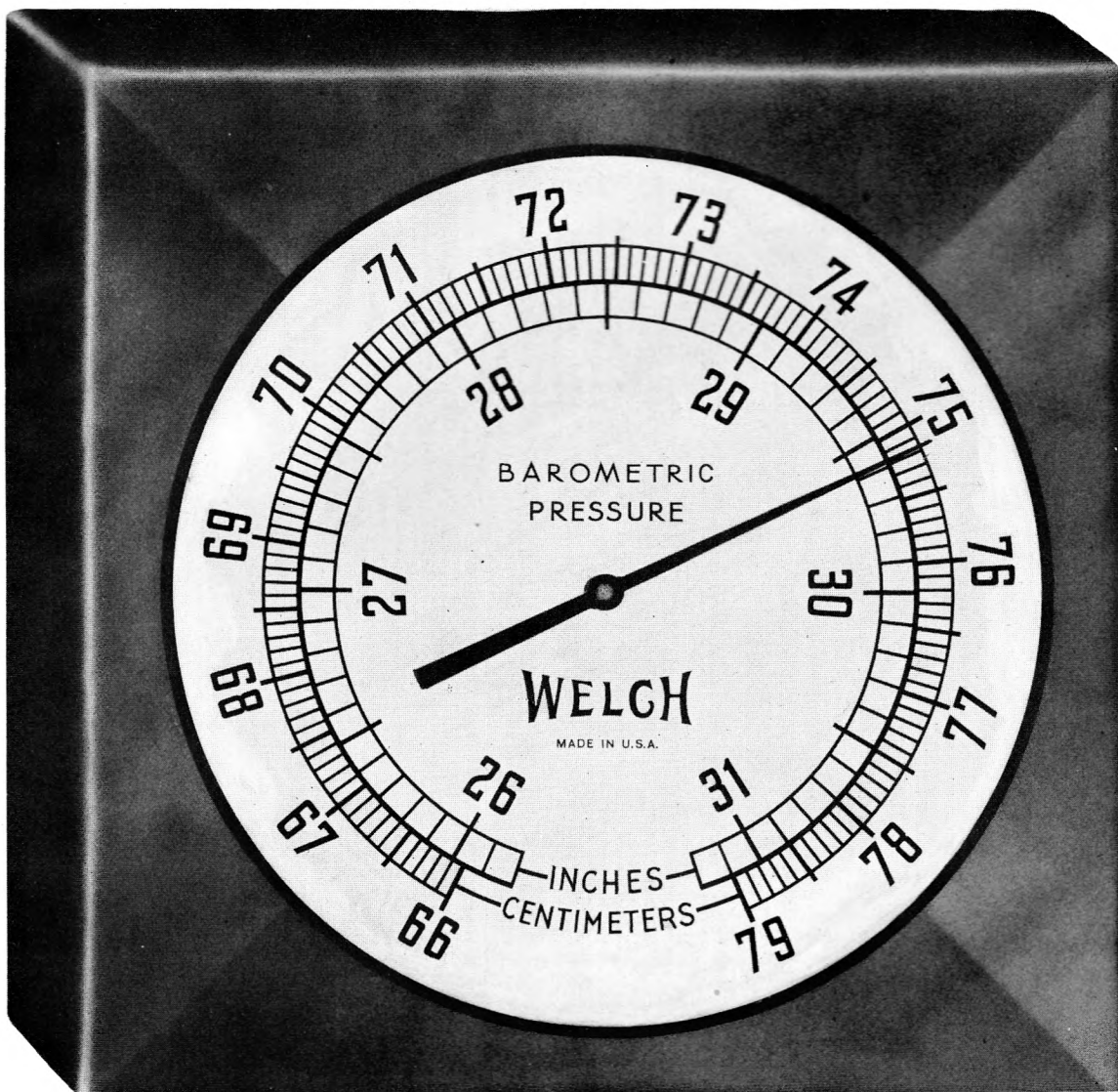
SCALES GRADUATED TO MM AND .05 INCH. A thoroughly well-made instrument housed in a spun-brass case, polished and lacquered. The full 12.5 cm (5 inch) dial gives large divisions and makes accurate readings easy. The inch scale is graduated in half-tenth divisions, the metric scale to mm. The instrument when shipped has been adjusted to agree with our standard barometer and should be so used in all laboratory work. If readings are used with U. S. Weather Maps the instrument should be corrected to sea level by means of a screw at the back of the case. The instruction sheet furnished with the instrument gives a table of corrections.

This instrument we recommend for all routine work. For laboratory and contour work in the field it is excellent on account of the large graduations. The pointer is under sufficient tension to provide practically no backlash. The English scale range is 26 to 31 inches, the metric scale from 66 to 79 cm. The instrument will register elevations up to 3500 feet. With instruction sheet.

No. 1239, Each, \$13⁵⁰

W. M. WELCH SCIENTIFIC COMPANY

Make Your Class Barometer Conscious



No. 1233.

- **Large size. Dial 12 inches diameter**
- **Operating torque about 40 times that of ordinary aneroid**
- **High sensitivity—5 to 10 times as sensitive as usual type**
- **Small temperature error**
- **No back lash—put on the wall and read like a clock**
- **High order of accuracy**

An astonishing instrument which combines the advantages of direct reading and continuous action of the ordinary aneroid with the high accuracy and reliability of the mercury barometer. An operating torque on the axis of the pointer 40 times that of the ordinary aneroid makes the pointer assume its correct position without tapping. The instrument, therefore, may be placed on the wall and read like a clock from almost any place in the laboratory.

The pressure element is a large bellows whose movement for a given pressure change is limited by a mainspring. This mainspring operates at only a small fraction of the load of which it is capable, thus eliminating any drift of the pointer after a movement of the bellows due to a change in the baro-

metric pressure. The instrument is 5 to 10 times as sensitive to small changes in pressure as the usual aneroid. The Range of the instrument is 26 to 31 inches by 0.1 inch and 66 to 79 centimeters by 1 mm but can be read much more accurately.

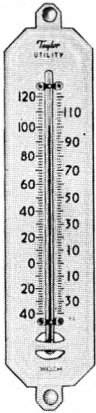
The temperature error has been carefully checked and is less than .002 inches for a temperature change of 1 degree F. which is negligible for all routine observations. Due to the large size of the individual parts of the mechanism, the unit as a whole is very rugged and will last for a great many years.

The instrument is set for true atmospheric pressure but can be adapted to sea-level readings by means of a screw in the top of the case. The dial is 12 inches in diameter, the length of the pointer $7\frac{3}{4}$ inches. The case is walnut.

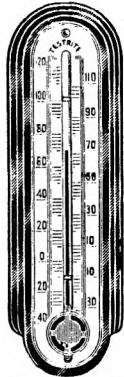
No. 1233, Barometer, Each, \$65.00

W. M. WELCH SCIENTIFIC COMPANY

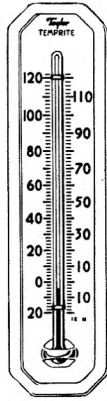
MOUNTED THERMOMETERS



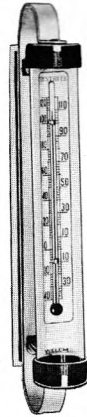
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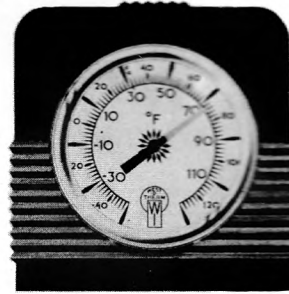
No. 1256A.



No. 1257.



No. 1257A.



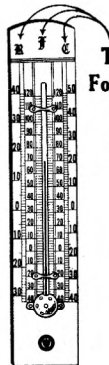
No. 1605.

1256. **THERMOMETER, Standard Grade.** Permacolor tube mounted on a white enameled plate. Reads in Fahrenheit from minus 40 deg. to plus 120 deg. Very good house thermometer with legible figures, magnifying tube with red permacolor liquid. **Each, \$1.75**
- 1256A. **THERMOMETER, Indoor.** Mounted on a Bakelite back 16 cm long with a magnifying tube and the scale reading from minus 30° to plus 120° Fahrenheit. **Each, \$0.85**
1257. **OUTDOOR THERMOMETER, Taylor.** Excellent Fahrenheit thermometer with bracket for outside mounting. Graduations distinct black on white enamel. Range approximately 20° to 60° F below zero to about 120° F above. **Each, \$1.75**
- 1257A. **THERMOMETER, Outdoor.** The thermometer is conveniently mounted in a glass tube which is provided with a rust-proof bracket. The thermometer has a good magnifying tube, reading from minus 40° to plus 120° Fahrenheit and may be turned at any convenient angle for reading. Length overall 22 cm. **Each, \$0.85**
1605. **THERMOMETER, Bimetallic.** An excellent thermometer of exceptional accuracy and unusually rugged construction. It is mounted in a Bakelite case which tilts back slightly to facilitate reading. Range minus 50 to plus 130 degrees Fahrenheit. **Each, \$3.00**

SPECIAL MOUNTED THERMOMETERS



No. 1258.

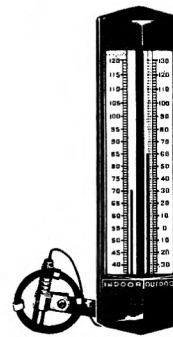


No. 1260.

Three Scales
For Comparison
Centegrade
Fahrenheit
Reaumur



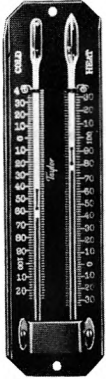
No. 1262.



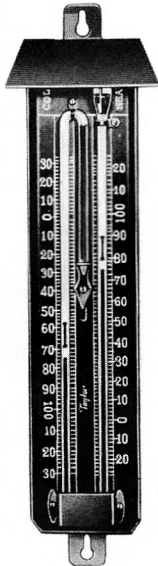
No. 1265.

1258. **HOUSE THERMOMETER, (Taylor).** A Fahrenheit thermometer reading from minus 40° to plus 120°. Mounted in a metal case which protects it on all sides from damage. Lens-shaped tube magnifies the column of mercury. **Each, \$2.75**
1260. **THERMOMETER, For Comparison of Different Scales.** This is a standard form of mercury house thermometer, mounted on a wood back 25 cm long, with scales of Fahrenheit, Centigrade and Reaumur. This permits a comparison of the readings of the same temperature in three scales, thus effectively showing the method of changing temperatures from one scale to another. **Each, \$1.45**
1262. **THERMOMETER, Standard, (Taylor).** This is the standard form of United States Weather Bureau Thermometer 20 cm long. Has a cylinder bulb with an engraved stem. A brass support with binding screws for attaching to the wall or other support. Complete with certificate. Range from minus 30° to plus 120° Fahrenheit. **Each, \$10.00**
1265. **INDOOR-OUTDOOR THERMOMETER, Airguide.** A clever adaptation of remote control to the house thermometer without the aid of the electric current. A very large thermometer bulb in the form of a sealed metal tube is connected to the visible thermometer column by an extremely minute flexible metal tube approximately 42 inches long protected by a woven wire covering. By fastening the metal bulb outside the window on the bracket provided and mounting the case on the wall near the window, one thermometer will register room temperatures while the other will register outside temperatures. Range - 30 to 120° F for outside, 40° to 120° F inside. Complete with bracket and screws for mounting. **Each, \$6.75**

MAXIMUM AND MINIMUM THERMOMETERS



No. 1273.



No. 1274.

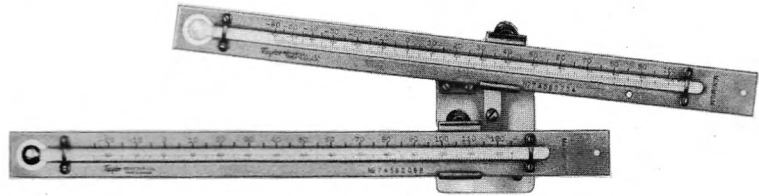
a double purpose—the ends of the mercury column give the readings for the thermometers at any time and push the indexes along the tube as the columns recede or advance, leaving these indexes at the minimum and maximum temperature points. Tube on the maximum side ends in a second smaller bulb which is only about half full of alcohol thus allowing some room for expansion. The minimum thermometer graduations read downward while the maximum thermometer graduations read upward like any ordinary thermometer. A small magnet is furnished with the instrument for resetting the indexes.

Each, \$10.00

1268.

MAXIMUM AND MINIMUM SELF-REGISTERING THERMOMETER, (Taylor). This is the adopted type of the United States Weather Bureau. Consists of one thermometer which marks the lowest temperature reached during a given time, while the other is a maximum thermometer and marks the highest temperature reached during the same time. Thermometers are furnished with certificates. Complete set mounted on a metal support, the thermometers being 27 cm long.

Each, \$30.00



No. 1268. U. S. Weather Bureau Type.

1273.

MAXIMUM AND MINIMUM SELF-REGISTERING THERMOMETER. Similar to No. 1268 in the methods of registering temperatures but thermometers are not removable and no certificates are furnished. A very satisfactory instrument for ordinary laboratory requirements. Length 20 cm.

Each, \$10.00

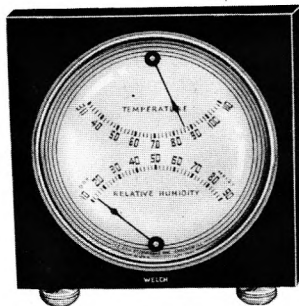
1274.

MAXIMUM AND MINIMUM THERMOMETER, Six's Self-Registering. Consists of a double-column thermometer with a long bulb filled with alcohol. The stem is partly filled with mercury which serves

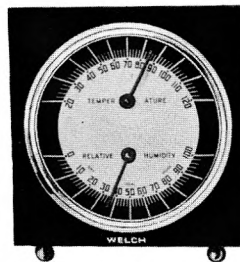
DIAL HYGROMETERS



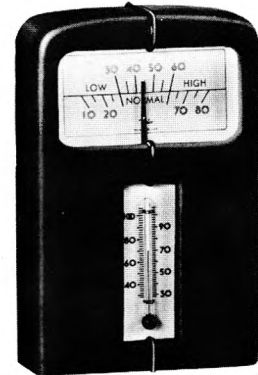
No. 1277A.



No. 1279.



No. 1279B.



No. 1279A.

1277A. HYGROMETER, Direct Reading. This is an accurate hygrometer reading directly in percentage of relative humidity from 5% to 95%. The operating element is a moisture-sensitive, delicately balanced spiral which winds and unwinds with changes in relative humidity and moves the pointer accordingly. The Bakelite case is 12 cm diameter and is conveniently arranged for wall mounting with a key slot in the back plate.

Each, \$7.50

1279. HYGROMETER and THERMOMETER. This is an excellent combined instrument with large scales and movements that are carefully tested and mounted. The thermometer reads from 30 deg. to 110 deg. Fahrenheit and the hygrometer scale is from 0 to 100 per cent relative humidity. The movement with soft finished dial is placed in a substantial Bakelite block 11 x 11 cm with back support so that it will stand upright.

Each, \$4.00

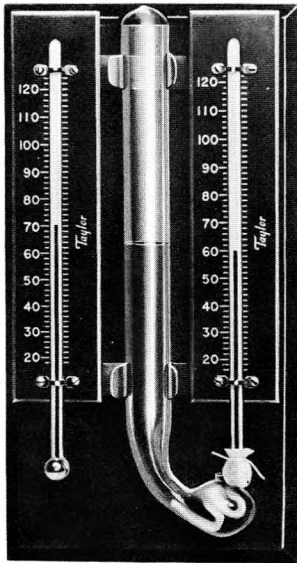
1279A. HYGROMETER, Humidiguid, Hampton Pattern. This is a direct-reading hygrometer of modern design in a Bakelite case 4 inches by 3/4 inches by 6 inches high. Dial is grained aluminum with a magnifying tube thermometer mounted in the lower part.

Each, \$5.00

1279B. HYGROMETER and THERMOMETER, Junior. This instrument is similar to No. 1279 but of smaller size and the shorter scales do not provide quite as great accuracy. Size of Bakelite panel 8x8 cm.

Each, \$2.00

WET-AND-DRY BULB HYGROMETERS



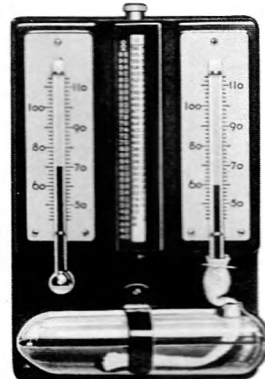
No. 1280.

THE STANDARD LABORATORY HYGROMETER

Accurate
Thermometers

Free Circulation
of Air

Long Easily-Read
Scales



No. 1281.

COMPACT HYGROMETER

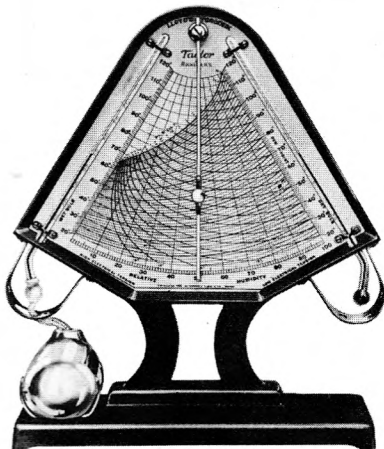
The Scale
Table Reads
Directly in
Per Cent of
Humidity

- 1280. HYGROMETER, MASON'S (Taylor).** For Determining Dew Point and Humidity. Consists of two thermometers set on brackets 2 cm away from a wood back 12x22 cm so as to give free circulation of air about the bulbs. One thermometer is provided with a wick over the bulb which is kept moist by water from a reservoir. One of these instruments should be in every laboratory and school-room, so as to keep a check on the humidity in the room. Complete with instructions Each, \$7.50
- 1281. HYGROMETER, Taylor, Wet-and-Dry Bulb Form.** Similar in principle to No. 1280 but thermometers and bulb are mounted on bakelite frame with movable barrel between thermometers which carries scale graduated so that per cent of humidity can be read off directly without referring to table. Each, \$6.50
- 1282. GLASS CISTERN** only of No. 1280 for the wet-bulb thermometer. Each, \$0.75
- 1284. HYGROMETER, MASON'S.** Similar to No. 1280 but thermometers are not set out on brackets. With instructions. Each, \$6.75
- 1284A GLASS CISTERN.** Only of No. 1284 for the wet-bulb thermometer. Each, \$0.75
- 1288. SILK WICKS** for Hygrometers. Will fit any style of hygrometer listed above. Each, \$0.15

SLING PSYCHROMETER



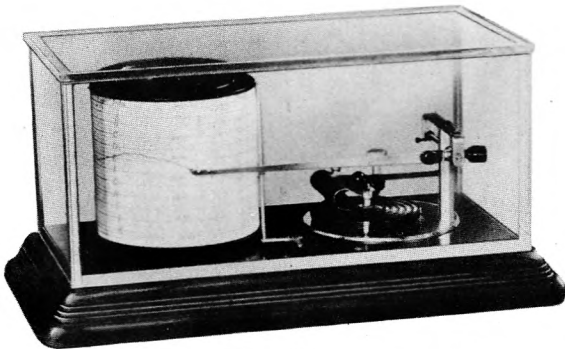
No. 1290.



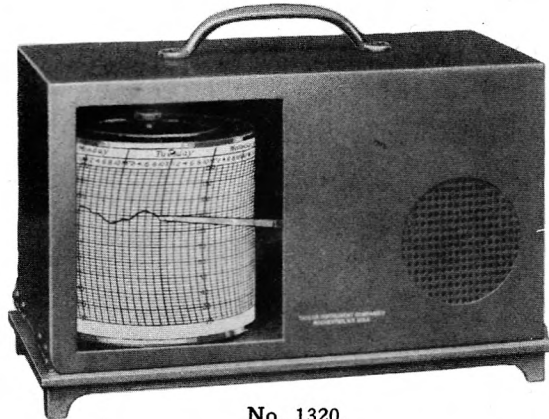
No. 1292.

- 1290. HYGROMETER, or "Sling" Psychrometer.** Consists of the usual wet and dry bulb thermometers reading to 120° F. securely mounted on a metal plate which is free to swing about a wooden handle as an axis. When the instrument is whirled rapidly in the hand, the wet thermometer comes to a stationary condition more quickly than if it were to remain at rest. Much used in cold storage warehouses and other places where observations must be taken rapidly. Complete with instructions. Each, \$8.50
- 1292 HYGRODEIK, (Taylor).** This is an improved form of Mason's Hygrometer 26 cm high in which the wet and dry bulb thermometers are sufficiently separated to accommodate a curve chart from which relative and absolute humidities as well as dew-points may be read without the use of tables. An adjustable index swings across the scale and makes the observations easy. This is the type of instrument used by the U. S. Weather Bureau for making readings more rapidly and yet not in any way sacrificing accuracy. Each, \$27.00

BAROGRAPH AND THERMOGRAPH



No. 1316.

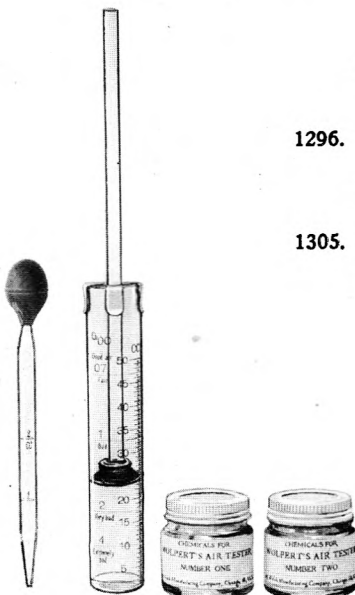


No. 1320.

1316. **BAROGRAPH, Recording Barometer. (Taylor).** This is a high-grade aneroid barometer with long indicating arm which traces the variations of the barometer pressure on a chart mounted on a revolving drum. As a clock mechanism drives the drum exactly one revolution per week, record charts need be changed only once a week. All parts enclosed in an attractive dust-proof, glass-covered case 31 x 18 x 10 cm. For altitudes from 0 to 3500 feet. Complete with year's supply of charts and bottle of ink. Each, \$150.00
1318. **BAROGRAPH CHARTS.** One box containing a year's supply for barographs reading from 28 to 31 inches Per Box, \$3.75
1320. **THERMOGRAPH, Recording Thermometer. (Taylor).** Consists of a bi-metallic thermometer coil to which is attached a long arm which changes position as the thermometer coils and uncoils with the changes in temperature. Charts on the revolving drum are graduated for a week's temperature record in day and two-hour subdivisions, the horizontal graduations being in degrees. Used by the United States Department of Agriculture. All parts enclosed in gray-enamel, metal case, 25 x 16 x 12.5 cm with handle. Complete with bottle of ink and full instructions. Each, \$125.00
1322. **THERMOGRAPH CHARTS.** Box containing a year's supply of charts, range from 0 to 100 degrees Fahrenheit. Per Box, \$3.75
1326. **INK, For Barographs and Thermographs.** 1 oz. bottle. Each, \$0.75

AIR TESTER

1294. **WOLPERT'S AIR TESTER, or Carbacidometer.** This instrument is used for obtaining the per cent of carbonic acid gas in the atmosphere. It has a capacity of 50 cc and is graduated to 0.5 cc and also gives percentages of CO₂ direct, thus doing away with all calculations or use of tables. The entire instrument is small enough to fit in the pocket, being 15 cm long. Complete with 2 cc glass dropper, full directions for using and test solutions for making a number of tests. Each, \$8.75
1296. **EXTRA CHEMICALS, For No. 1294.** Capsules of 139 mg sodium carbonate and 75 mg phenolphthalein only. Other chemicals needed are hydrochloric acid and ethyl alcohol, which are usually part of a laboratory equipment or can be purchased locally. Per Set, \$0.75
1305. **MAPS, Weather.** Blank weather maps of the United States 7 $\frac{3}{4}$ x9 $\frac{3}{4}$ inches. 100 in an envelope. Per Envelope, \$0.85

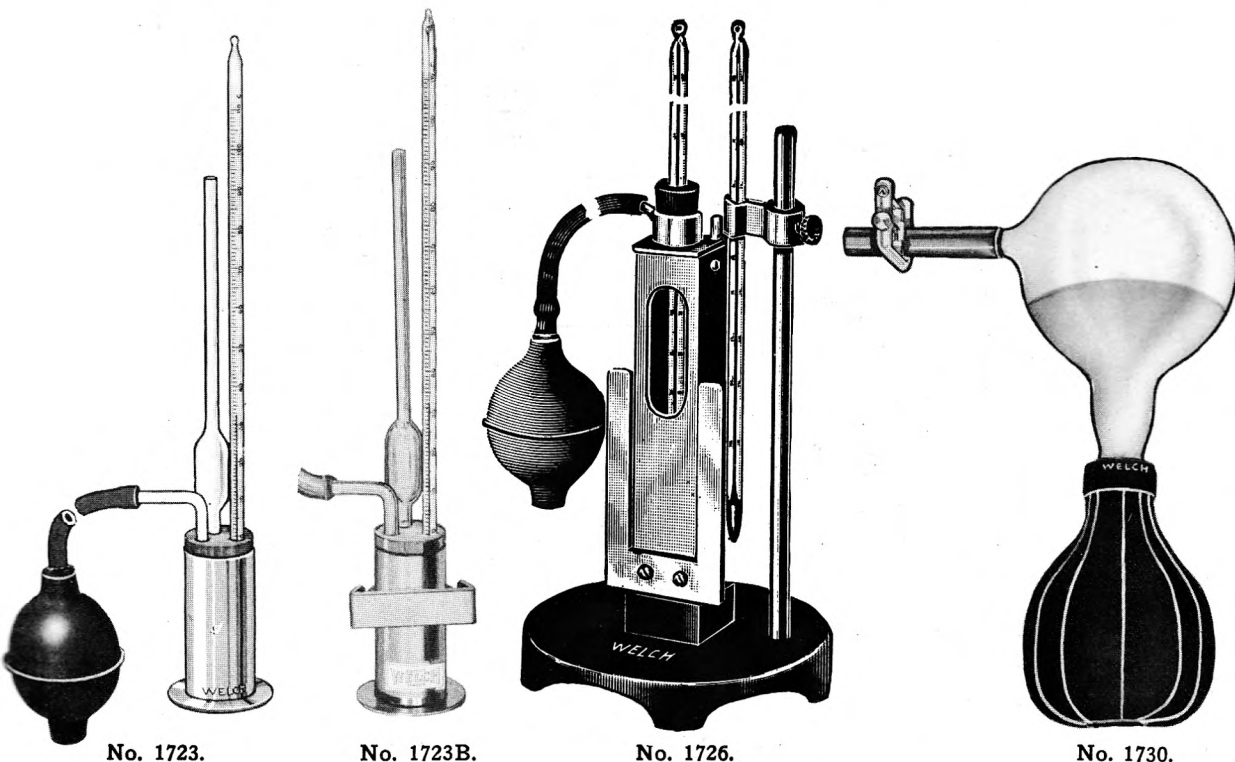


No. 1294.



No. 1305.

DEW POINT AND CLOUD APPARATUS

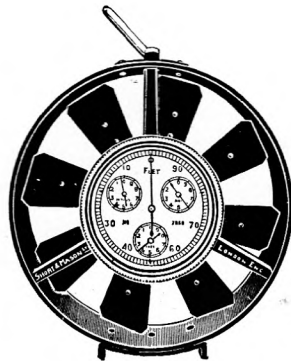


- No. 1723.** **DEW-POINT APPARATUS, Simple Form.** According to specifications of Millikan, Gale and Bishop. A nickel-plated cylinder 6 x 3 cm is provided with an aspirator bulb and inlet and outlet tubes. By passing air through ether or other volatile liquid in the cylinder, the temperature may be gradually lowered until a cloudiness appears on the polished nickel-plated surface. This is the dew-point and its temperature may be determined by a thermometer. A very convenient and rapid method for determining dew-point. Complete with instructions but without thermometer. **Each, \$1.65**
- No. 1723B.** **REFERENCE ATTACHMENT, Dew Point.** This consists of a nickel-polished metal strip provided with a spiral spring for fastening it on the barrel of No. 1723. This provides an uncooled reference surface for detecting the first cloudiness on the barrel, thus securing a more accurate determination of the dew point. **Each, \$0.50**
- No. 1726.** **DEW POINT APPARATUS.** This apparatus combines No. 1723 and No. 1723A. **Each, \$2.15**
- 1726.** **ALLUARD DEW-POINT APPARATUS, OR HYGROMETER.** Made according to specifications of Millikan's, "Mechanics, Molecular Physics and Heat." Consists of a thin-walled, polished nickel-plated brass vessel, provided with inlet and outlet tubes, and a window for viewing the thermometer. On the sides of the vessel but not in contact with it, are polished, nickel-plated brass strips. When ether is placed in the vessel and air passed through it by means of an aspirator bulb, the rapid evaporation causes cooling and the very first cloudiness from condensation of moisture on the outside of the vessel can be detected by comparison with the upright strips. Supports are provided for holding one thermometer in the vessel and one thermometer entirely separated from the vessel for recording the room temperature. Complete with aspirator bulb but without thermometers. **Each, \$19.75**
- 1730.** **CLOUD FORMING DEMONSTRATION APPARATUS, After Knipp.** Provides a very simple means of demonstrating the principles of cloud formation. When the bulb and flask are partially filled with water and the clamp is opened and the bulb squeezed, some of the air is forced out; then if a burning match is held near the open end of the rubber tube while the bulb is released, some carbon particles are drawn into the flask. If the clamp is then closed and the bulb compressed it causes an increase in the temperature of the saturated air in the flask. When the bulb is released the temperature is suddenly lowered and a cloud is formed in the flask. Press the bulb and the cloud disappears, release it and the cloud forms again. The purpose of drawing in a small amount of smoke from a match is to provide tiny carbon particles which act as nucleuses on which the cloud droplets of water collect. When these carbon particles have been absorbed by the water the cloud will not form and it is necessary to re-introduce the smoke. **Each, \$3.35**

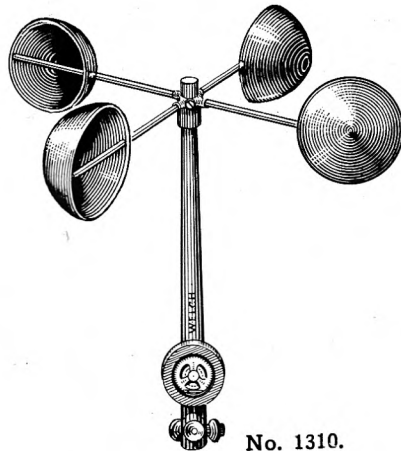
RAIN AND WIND GAUGES



No. 1302.

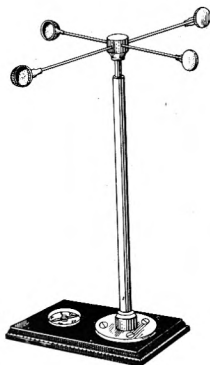


No. 1308.

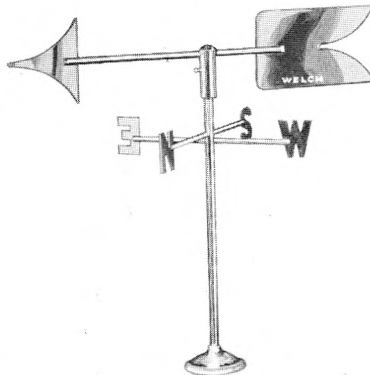


No. 1310.

1302. **RAIN GAUGE, United States Weather Bureau Type.** Fitted into zinc can 8 cm dia. and 33 cm high is a copper vessel 7.9 cm in dia. with a funnel leading into a brass tube closed at its bottom end and having exactly 1/10th the cross-section of the copper vessel. The rain entering the copper vessel is collected in the bottom of the tube and the rain fall is measured directly to 0.01 inch by means of a wood scale properly graduated for this purpose. With instructions. **Each, \$4.95**
1304. **RAIN GAUGE, Standard United States Weather Bureau Specifications.** Same as No. 1302 but standard size, 20 cm in diameter and 60 cm high. **Each, \$23.50**
1308. **ANEMOMETER, Biram's Type. (Taylor).** Consists of a fan 10 cm in diameter with a three-dial, jewel-bearing movement mounted on the same shaft. Reads up to 10,000 feet, and will measure air currents from 200 feet to 3000 feet per minute. In sole-leather case. **Each, \$90.00**
1310. **ANEMOMETER, or Wind Gauge.** For determining the velocity of wind in miles per hour. Consists of a vertical shaft on the upper end of which are four 25 cm arms with hemispherical cups, which always turn in one direction, regardless of the wind. The dial is arranged to show cumulative values from 1/100th of a mile up to 10,000 miles, and then repeat. To determine the wind velocity in miles per hour take the readings of the dials at the beginning and end of a measured interval and, by means of the proper multiplying factor, obtain the value in miles per hour. **Each, \$80.00**



No. 1312.



No. 1312A.

1312. **ANEMOMETER MODEL.** This is a small model made to illustrate the expensive type of anemometer or wind gauge such as our No. 1310. Four hemispherical cups are radially mounted on arms 10 cm long. The hub is provided with a cone bearing to provide for easy rotation on the point of the upright rod. In the base is mounted a 40 mm compass. This base is also available for mounting our No. 1312A Weather Vane illustration. **Each, \$4.50**
- 1312A. **WEATHER VANE ILLUSTRATION.** This weather vane consists of an arrow 36 cm long with a vertical axis 33 cm high so that the arrow is free to swing to the wind direction. There is also mounted at right angles on the vertical axis four brass letters to indicate north, south, east and west. A small pressed metal base is provided so that the weather vane may be screwed into any convenient place. Complete as illustrated. **Each, \$2.50**

W. M. WELCH SCIENTIFIC COMPANY