

CENCO

**Scientific Instruments
Laboratory Apparatus
And Supplies**

for PHYSICS, CHEMISTRY
BIOLOGICAL SCIENCES and
INDUSTRIAL TESTING

CATALOG J-141

CENTRAL SCIENTIFIC COMPANY

Established 1889

Cable Address: CENCO

Incorporated 1900

Main Office and Factory: 1700 Irving Park Road, Chicago, U. S. A.

WAREHOUSE AND SALES BRANCHES

BOSTON, MASS., Central Scientific Co., Eastern Division, 79 Amherst St., Cambridge A Station

NEW YORK, N. Y., Central Scientific Company, 220 East 42nd St.

TORONTO, ONTARIO, CANADA, Central Scientific Co. of Canada, Ltd., 129 Adelaide St., West

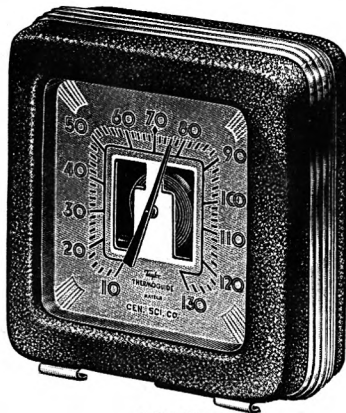
SAN FRANCISCO, CALIFORNIA, Redman Scientific Company, 585-587 Howard St.

LOS ANGELES, CALIFORNIA, Redman Scientific Company, 2041 South Santa Fe Ave.

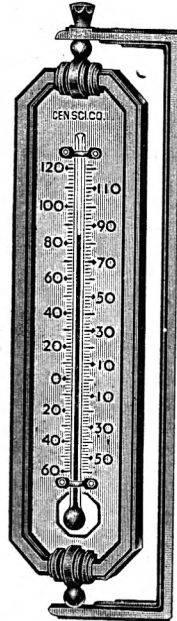
Copyright 1941 by Central Scientific Company

Printed in U. S. A.

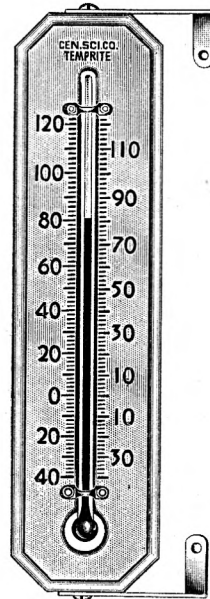
THERMOMETERS
Weather



19461



19465



19470

SPECIAL PURPOSE THERMOMETERS

27872 VISCOSIMETER THERMOMETERS, Fahrenheit, Saybolt, ASTM, for use in the determination of viscosity with Saybolt Universal and Furol Viscosimeters according to ASTM Standard Method D88-38. Made according to El Standard Specifications for ASTM Thermometers for Saybolt Viscosity Tests. Scaled for total immersion. Test points marked in red. Length, 10 inches.

No.	A	B	C	D	E	F
ASTM designation, El.	17F-39	18F-39	19F-39	20F-39	21F-39	22F-39
Range, degrees F	66 to 80	94 to 108	120 to 134	134 to 148	174 to 188	204 to 218
Subdivisions, degrees F	1/5	1/5	1/5	1/5	1/5	1/5
Test points, degrees F	70 & 77	100	122 & 130	140	180	210
Each	\$2.80	2.80	2.80	2.80	2.80	2.80

70724 VISCOSIMETER THERMOMETER, Centigrade, Stormer, for determining the temperature of the liquid in the test cup. Range, 0° to 105° C in 1° divisions. Scaled for total immersion. Length, 9½ inches. Each 1.80

19450 WALL THERMOMETER, Fahrenheit, for indicating air temperatures. An excellent household thermometer with adequate range for outdoor temperatures. Consists of a lens-front, permanent red-liquid thermometer with ivory-lacquered metal scale, mounted upon a brown molded wood back. The open graduations and large figures are easily read. The bulb is protected by a lacquered brass guard. Range, -40° F to 120° F in 2° divisions. Length, over all, 8 inches. Each .55

10% discount in lots of 12

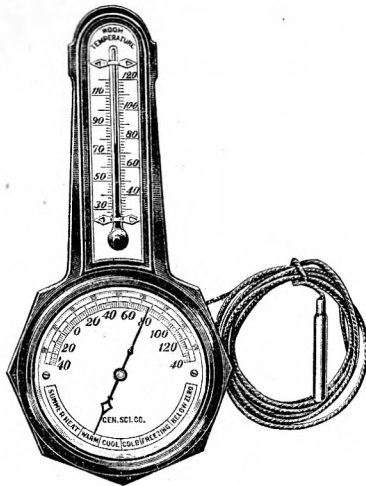
19455 WALL THERMOMETER, Triple Scale, Centigrade-Fahrenheit-Reaumur, for indicating air temperatures in all three temperature systems. Excellent for demonstrating relationships between these systems. Consists of a lens-front, permanent red-liquid thermometer mounted on a lacquered wood back upon which the scales and figures are printed. The bulb is protected by a metal guard. Range, -30° F to 120° F (-28° R to 40° R and -35° C to 50° C) in 2° divisions. Length, over all, 10 inches. Each 1.25

19461 WEATHER THERMOMETER, Fahrenheit, Bimetallic Coil, Demonstration Form, for indicating air temperatures. An artistic dial thermometer with big easy-to-read numbers and graduations plus a pointer that is clearly visible from any position. The dial is open in the center to reveal the bimetallic coil, which actuates the pointer, thus providing an excellent, practical demonstration of unequal expansion of metals.

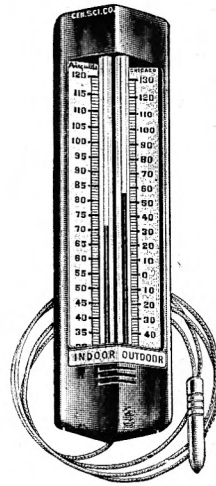
The case is cracked-black finish with chromium reed-trim. The etched dial, covered by a glass window, is silvered and the pointer is black. Range, 10° F to 130° F in 2° divisions. Dimensions: 4 inches by 4 inches by 1½ inches deep. Each 4.00

19465 WEATHER THERMOMETER, Fahrenheit, Window Type, Taylor DeLuxe, for outdoor air temperatures. Consists of a lens-front, permanent red-liquid thermometer mounted upon a white vitreous-enameled metal scale. The black figures and graduations are fired-in for permanence. The frame and bracket are of statuary bronze in an artistic design and permit adjustment to any angle. Range, -50° to 120° F in 2° divisions. Length, over all, 11 inches. Each 3.50

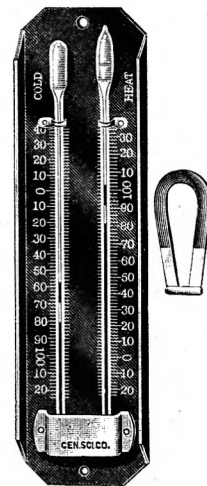
19470 WEATHER THERMOMETER, Fahrenheit, Window Type, Taylor Temprite, for use same as No. 19465 Thermometer, but with less expensive mounting. Consists of a lens-front, permanent red-liquid thermometer mounted upon a white vitreous-enameled metal back with fired-in black figures and graduations. Simple brackets are provided for attachment to the window frame. Length, over all, 8½ inches. Each 1.00

THERMOMETERS
 Weather


19475



19477



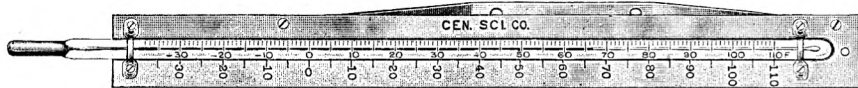
19485

- 19475 WEATHER THERMOMETERS, Fahrenheit, Outdoor-Indoor, Dial Type**, for indicating both outdoor and indoor air temperatures on separate indicating instruments mounted on a common panel that is hung on the wall of the room. May also be used for comparing temperatures within and without incubators, ovens, incubating rooms, hot houses, etc.

Consists of a lens-front, red-liquid thermometer on a metal scale with etched graduations and figures to indicate room temperatures, and a circular dial thermometer for outdoor temperatures having two scales—one a graduated degree scale, and the other a nominal scale. The dial needle is actuated through a spring by expansion and contraction of a fluid in a long closed metal tube. The bulb on the end of the tube is attached outside of the window or wherever temperature readings are desired.

Indoor range, 30° to 120° F in 2° divisions; outdoor range, -40° to 120° F in 2° divisions. Length of metal tube, 12 feet. Length, over all, 16 inches.....**Each \$12.00**

- 19477 WEATHER THERMOMETERS, Fahrenheit, Outdoor-Indoor, Double Tube Type**, for use same as No. 19475 Thermometers, but with two lens-front, red liquid-filled glass thermometers, one of which has the capillary extended by a 60-inch fine-bore steel tube to the metal bulb for outdoor temperature indications. A plated metal bracket is furnished for holding the metal bulb a distance of 4 inches from the outside wall. The two thermometers are mounted side by side in an artistic black enameled metal frame, having a nickel-plated strip label to indicate the location of their bulbs. The thermometer scales are graduated and numbered in black upon satin finish metal. Indoor range, 35° to 120° F in 1° divisions; outdoor range, -40° F to 130° F in 2° divisions. Length, over all, 9½ inches.....**Each 6.00**

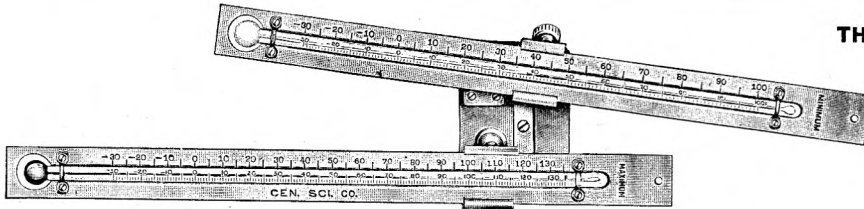


19480

- 19480 WEATHER THERMOMETER, Fahrenheit, U. S. Weather Bureau**, for accurate measurements of air temperature and for use as a standard for checking other weather thermometers. Consists of an engraved stem mercury thermometer, accurately graduated in single degrees and mounted upon a stainless steel back on which is marked at 5° intervals and numbered at 10° intervals corresponding to the same graduation marks on the thermometer. Range, -10° to -40° F to about 120° F in 1° divisions. Length of thermometer, 10½ inches. With brass insulating supports, binding screws and manufacturer's certificate of accuracy.....**Each 6.00**

- 19485 WEATHER THERMOMETER, Fahrenheit, Maximum-Minimum, Two-leg Type**, for indicating the highest and lowest temperatures reached in the interval between settings. Consists of a U-shaped thermometer, with a bulb at each end, mounted in a black metal frame having a graduated cold scale along the left tube and a graduated heat scale along the right tube. The lower part of the thermometer contains mercury, while the upper part, including the bulbs, contains a colorless liquid. Metal indicators on each side above the mercury indicate the high and low temperatures attained since the last setting of the instrument. Setting is accomplished by moving the indicators with a magnet supplied with the thermometer. Range: Minimum, -40° to 120° F in 2° divisions; maximum, -20° to 140° F in 2° divisions. Length, over all, 7½ inches. With magnet and directions**Each 3.40**

THERMOMETERS
Weather



19490

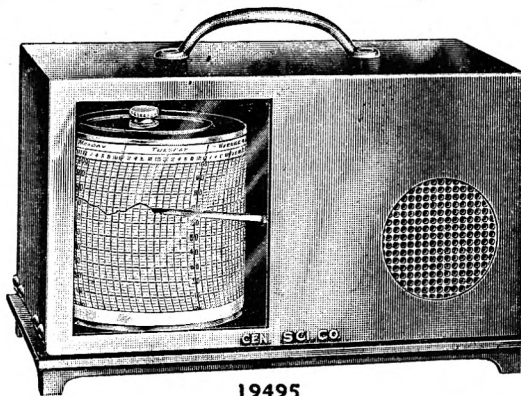
19490 WEATHER THERMOMETER SET, Fahrenheit, Maximum-Minimum, U. S. Weather Bureau, Townsend Support, for use same as No. 19485 Thermometers, but made according to the U. S. Weather Bureau specifications for greater accuracy of measurement, and provided with a Townsend support, which holds the thermometers in the positions necessary for minimum error of registration.

Consists of a pair of engraved stem thermometers mounted upon stainless steel backs, similar to No. 19480 Thermometer, and the Townsend support. The mercury maximum thermometer has a constriction in the stem above the bulb, which breaks the mercury thread with the slightest drop in temperature, the maximum temperature being indicated by the meniscus farthest from the bulb. The spirit-filled minimum thermometer contains a black index within the liquid in the capillary stem. Surface tension at the meniscus holds the index within the liquid at all times. As the meniscus moves to the lower temperatures the index moves with it and remains at its lowest position when the temperature rises and the meniscus advances to the higher indications. The metal Townsend support, in addition to holding the thermometers in the proper position for accurate indication, permits quick resetting; the maximum thermometer rotates freely to rejoin the mercury thread by centrifugal force; and the minimum thermometer rotates a quarter turn to allow the index to return to the meniscus under the force of gravity. Range: Minimum, -20° to -60° F to about 120° F in 1° divisions; maximum, 20° to 120° F in 1° divisions. Length of thermometers, over all, 11 inches. With metal Townsend support and manufacturer's certificates of accuracy.....

Per set \$18.00

19492 WEATHER THERMOMETER, Fahrenheit, Maximum Registering, U. S. Weather Bureau, for indicating maximum temperature attained between settings. Same as the mercury maximum thermometer of No. 19490 Thermometer Set. With manufacturer's certificate of accuracy, but without support Each 6.00

19494 WEATHER THERMOMETER, Fahrenheit, Minimum Registering, U. S. Weather Bureau, for indicating minimum temperature attained between settings. Same as spirit-filled thermometers of No. 19490 Thermometer Set. With manufacturer's certificate of accuracy, but without support. Each 6.00



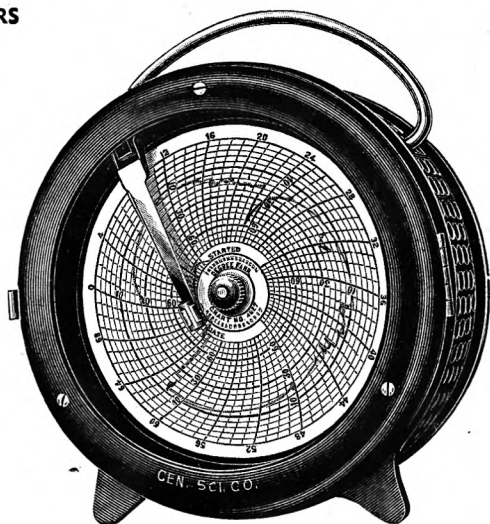
19495

19495 WEATHER THERMOMETER, Recording Thermograph, Air Type, Taylor, for accurately measuring and recording room temperatures by means of a pen on a printed chart. A complete record is made for one week. The charts may be retained as a record.

Consists of a bimetallic coil of non-rusting material, exposed to the atmosphere at the end of the ventilated metal case, and connected to the recording pen. As the temperature rises and falls, the coil unwinds or winds, causing the arm to move vertically across the chart which is attached to a metal drum with a 7-day, fully-jeweled clock movement. The charts are divided horizontally into days and into two hour subdivisions of a day, and vertically into degrees covering a range of 0° to 100° F. The top of the case is hinged at one end and is fastened at the opposite end by a metal hasp provided with small padlock with key. The case is finished in dark gray and has a clear glass window for observing the temperature chart. Complete with 1 box of charts (1 year's supply), bottle of ink with dropper stopper, padlock with two keys, and directions for use..... Each 45.00

19496 Thermograph Charts, for replacement on No. 19495 Recording Thermometer. Length, $12\frac{1}{4}$ inches; width, $3-11/16$ inches. Supplied in boxes containing a year's supply with directions for installation Per box 2.65

THERMOMETERS
Weather

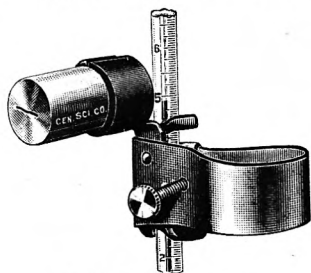


19498

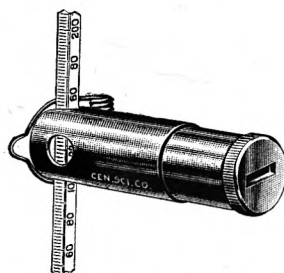


19515

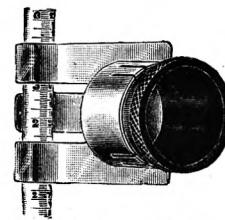
- 19498 **WEATHER THERMOMETER, Recording, Circular Type**, an accurate, convenient, portable instrument with circular chart for use in recording room temperatures. Consists of a metallic thermometer and a specially designed Seth Thomas clock for rotating the disk, mounted in a perforated cylindrical metal case. The thermometer is of the helical bimetallic type to one end of which is directly attached the pen arm. A frictionless glass fountain pen, clipped in the end of the pen arm, holds sufficient ink for a 72 hour chart. The charts regularly supplied with the thermometer are graduated circularly in single hour intervals with every fourth hour numbered. From outside to center, the chart is divided from 50° to 90° F in 2° divisions. The metal case is made of aluminum, finished in gloss-black baked enamel. The face is hinged and provided with a catch. Dimensions: Height, over all, 6 3/16 inches; diameter of case, 6 inches; diameter of face, 4 1/2 inches; diameter of chart, 3 7/8 inches. Complete with 100 Charts and bottle of recording ink.....**Each \$34.60**
- 19499 **Charts, Circular**, for replacement in No. 19498 Recording Thermometer, 72-hour charts covering a range of 50° to 90° F. Supplied in packages of 100 charts.....**Per package 1.35**
- 19510 **Ink, Recorder, Red**, for use with any recording thermometer or barograph. Supplied in 2-dram bottles**Per bottle .50**
- 19515 **THERMOMETER PIGMENT, Black**, for restoring the filling in the etched graduations and figures on etched stem thermometers, when they become dull or have been removed. The pigment is not affected by common dilute chemical solutions, or sterilizing agents, and is practically indelible. A standard tube will fill markings in several gross of thermometers. In 1 1/2-oz. screw-cap tube and with directions for use.....**Per tube 1.60**



19520 shown in use



19525 shown in use



19530 shown in use

- 19520 **THERMOMETER READER, Cenco Precision**, designed for increasing the precision of reading of any thermometer. Consists of a 19-mm lens in a tube mounting with an exit slit located at its principal focus, which eliminates parallax and consequently errors in reading. A thumb-operated push rod enables operation with one hand. Magnification of lens, approximately 4 diameters**Each 5.50**
- 19525 **THERMOMETER READER, Parr**, for use on any solid stem or Beckmann thermometer. It gives excellent magnification and admits light to the graduated scale from both front and rear. The spring clamp may be detached without moving the thermometer.....**Each 3.25**
- 19530 **THERMOMETER READER, Simple Form**, consisting of a magnifying lens set in an adjustable, nickel-plated housing, with spring clamp to attach to the stem of the thermometer. Magnification, approximately 3 diameters.....**Each 3.00**

PNEUMATICS
Weight of Air Globe



76755



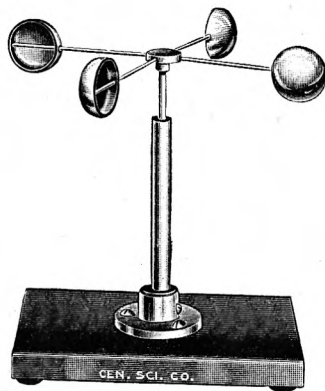
76760

76755 WATER HAMMER, all glass, one bulb, length 25 cm. Illustrating that water enclosed in vacuum falls as if solid, and on striking the bottom of the glass tube, emits a click as if the glass had been struck with a solid substance.....**Each \$1.35**

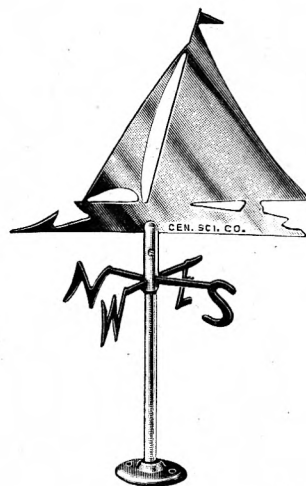
Note: Because of the likelihood of breakage due to freezing of the water in No. 76755 Water Hammer, it cannot be shipped during the winter months. Orders for it should be placed during the spring, summer or early fall. Otherwise we shall ask the privilege of cancelling No. 76755 from the order, advising that it be ordered later.

76760 WEIGHT OF AIR GLOBE, of copper, finished in copper bronze lacquer, 10 cm in diameter, with stop-cock and hook.....**Each 4.50**

For experiments employing this or similar apparatus see A. & B. Exp. 36, p. 206.



76800

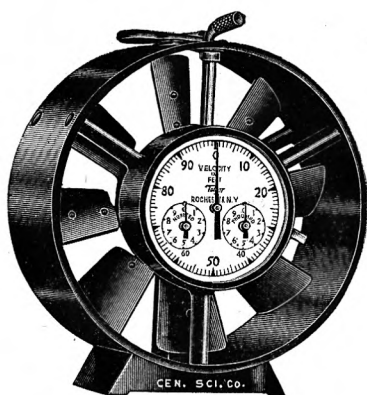


77196

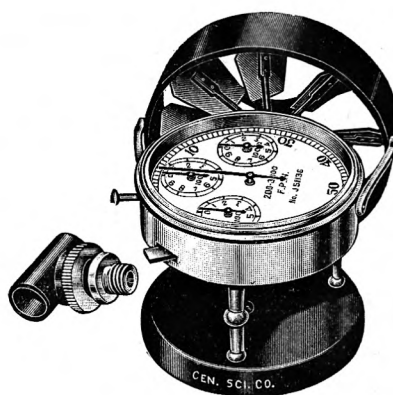
76800 ANEMOMETER, Working Model, to illustrate the principles involved in the measurement of wind velocity. Four metal cups at the ends of arms about 9 cm long mounted on a vertical axle make up the rotating member, which is supported free to rotate at the top of an upright metal rod. The upright is mounted on a wood base, 10 by 15 cm. Height over all about 17 cm**Each 3.50**

77196 WIND VANE, Working Model, for use in connection with No. 76800 Anemometer. Consists of a ship at full sail, to receive the wind and point its direction, attached to a vertical axle with foot plate. Screws are provided for mounting on a table or base. An indicator bearing large letters indicating the four cardinal compass points is also provided. Using an electric fan as a "wind" source, a laboratory study of the use of the wind vane may be made.....**Each 1.20**

METEOROLOGY
Air Velocity



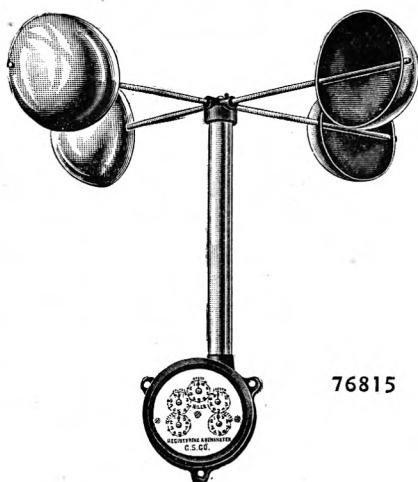
76805



76810

76805 ANEMOMETER, Biram's, for the measurement of velocity of air currents in schools, public buildings, mines, tunnels, flues, and sewers. Especially useful in studying the ventilating systems in schools, hospitals and other public buildings. Widely used in meteorological work for determining velocity of surface winds. The instrument is direct reading from 0 to 10,000 linear feet of total air passing in a given period. The readings are indicated by means of three registering dials, the largest of which reads from 0 to 100 feet. The instrument is accurately made with jewelled bearings and is furnished with a chart of corrections for velocities from 200 to 3,000 feet per minute. A zero setting device permits instant return of all pointers to zero. Diameter, 4 inches; weight, 16 oz. Complete with threaded socket for attaching to foot, in leatherette case**Each \$33.75**

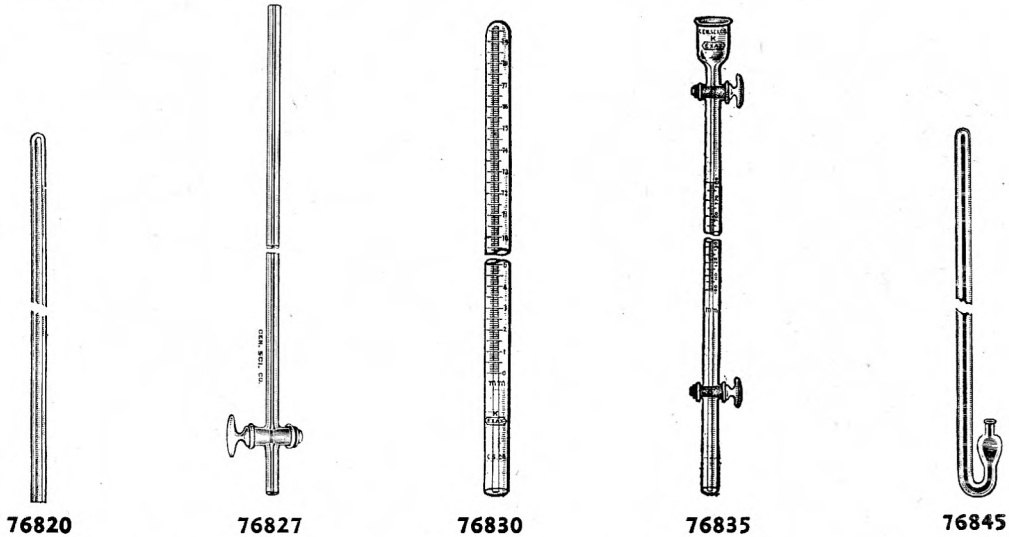
76810 ANEMOMETER, S. and M. Airmeter, similar to No. 76805 but with heavy base for stability and with horizontal dials. For purposes requiring a smaller instrument than No. 76805 and one which is not easily blown over by strong currents of air. Height over all, 3 inches; diameter of dial, 2½ inches; weight, 8½ oz.; for velocities from 200 to 3,000 feet per minute; maximum reading of the 4 dials, 100,000 feet. With jewelled bearings, instantaneous zero setting device, and correction chart for velocities from 200 to 3,000 feet. Complete with universal socket holder by which it can be held at any angle, in leather case.....**Each 72.75**



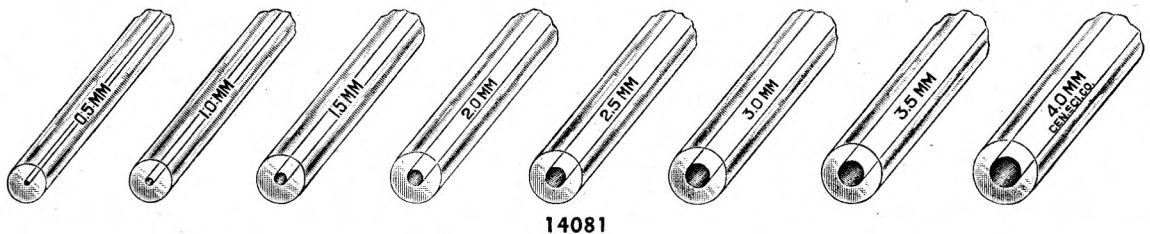
76815

76815 ANEMOMETER or WIND GAGE, for indicating air movement in miles, consisting of a vertical shaft to the upper end of which four arms, each carrying a Robinson hemispherical copper cup, rotate on ball bearings. These cups turn in one direction, regardless of the direction of the wind. The instrument is direct reading and cumulative from 1/100 of a mile to 100,000 miles. The method of use is to observe the reading of the dials at the beginning of a given period of time and to read again at the end of the elapsed period. The difference is converted by the use of the proper factor to miles per hour. If, for example, a ten minute period is used, the difference shown by the dials should be multiplied by six to give the wind velocity in miles per hour to hundredths. All parts are interchangeable. Each instrument is standardized and fully warranted. Length of arms, 19 inches. Diameter of cup, 4 inches**Each 35.00**

METEOROLOGY
Barometer Tubes



- 76820 **BAROMETER TUBE, Plain**, of large bore, heavy wall lime glass tubing with one end sealed round. Length, 86 cm.....Each \$0.60
- 76825 **BAROMETER TUBE, Plain**, same as No. 76820 Barometer Tube, but supplied with glass mercury well and pipette for filling.....Each .85
- 76827 **BAROMETER TUBE, Stopcock**, similar to No. 76820 Barometer Tube, but with stopcock at top.....Each 2.65
- 76830 **BAROMETER TUBE, ^{EXAX} Blue Line**, unfilled. Made of large bore, heavy wall lime glass tubing. Graduated from 0 to 800 mm in 1 mm divisions, and numbered each centimeter. Length, over all, 86 cm. Number in original case, 12.....Each 3.00
- 76832 **BAROMETER TUBE**, similar to No. 76830 Barometer Tube, but ordinary grade.....Each 2.00
- 76835 **BAROMETER TUBE, Demonstration Form, ^{EX} Stopcock, ^{EXAX} Blue Line**, unfilled, with funnel top and stopcocks at top and bottom for ease in filling and emptying. Graduated from 100 to 780 mm in 1 mm divisions, and numbered each centimeter. Length, 104 cm. See No. 15412 Stopcock Plugs, ^{EX} size No. 2, for replacement. Number in original case, 6.....Each 6.00
- 76840 **BAROMETER WELL, Iron**, for holding mercury and for use with Nos. 76820, 76830, and 76835 Barometer Tubes. It consists of a heavy cast iron well, conical on the inside and having a flat depression for the glass tube. Top diameter, 3 inches; height, outside, 1½ inches.....Each .50
- 76845 **BAROMETER TUBE, Siphon Form, Plain**, of large bore, heavy wall lime glass tubing with a bulb on the short arm. Length, 80 cm. Unfilled.....Each 1.00



14081

14081 **GLASS TUBING, Capillary, Lime, Machine-made**, same as No. 14076 Tubing, but in heavy wall capillary sizes. The larger sizes are suitable for use as barometer tubes. The allowable variation on inside diameters is $\pm \frac{1}{4}$ mm. Wall thickness of all sizes is 2.25 mm. Stocked in 4-foot lengths. Packed in bundles of 10 lbs and in cases of 3 bundles.

Diameter, inside, mm.....	0.5	1	1.5	2	2.5	3	3.5	4
Feet per lb, approx.....	30	26	23	20	18	16	15	13
Per lb.....	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

20% discount in lots of 1 case; 25% in lots of 5 cases; 30% in lots of 10 cases

"Exax" Case and Case Assortment Discounts, See Page 277.

METEOROLOGY
Barometers

ANEROID BAROMETERS

For certain purposes and in some respects aneroid barometers have advantages over mercury barometers. It should be remembered that whatever their advantages, they are secondary standards of barometric pressures and that the mercury barometer is a primary standard, and that its scale readings measure directly the barometric pressures.

Among the features of aneroid barometers are the following:

(1) They are portable and therefore convenient for field use.

(2) They can readily be provided with an altitude scale making unnecessary a conversion from the mercury column scale.

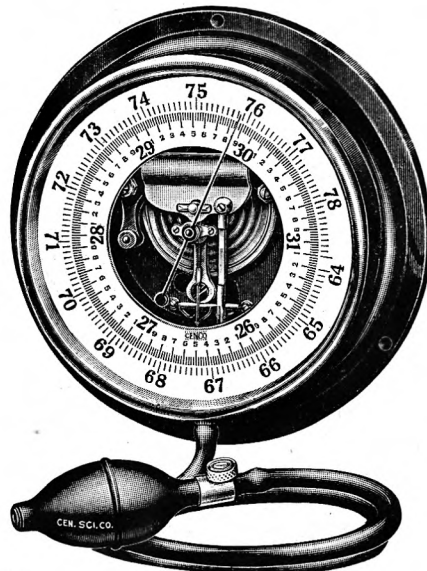
(3) Aneroid movements can be made so sensitive that an inch of barometric height is made to

cover 2 inches on the aneroid scale. Such an instrument is somewhat more sensitive to changes in pressure than the mercury barometer, which on the other hand is slightly offset by the fact that there is friction in the movement of the instrument.

(4) An aneroid barometer can readily be provided with a dial adjustable for altitude, like No. 76860. An instrument so equipped can be made to give sea level readings regardless of its actual altitude.

(5) An aneroid barometer can readily be compensated for temperature changes.

(6) The open scale and pointer are easier to read by the untrained person than is the vernier on the mercurial barometer.



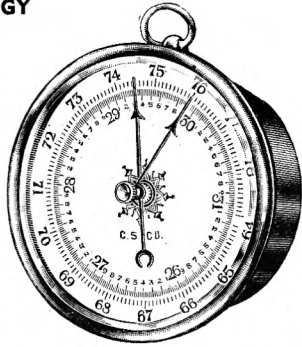
76856

76856 BAROMETER, Aneroid, Demonstration Form, Cenco-Taylor, English and Metric Scales, for use in showing the construction and operation of an aneroid barometer. This barometer, made for us by Taylor Instrument Companies, is of larger size and better grade than the corresponding instruments formerly imported and selling at higher prices. Being of the wall form, it is more easily visible to the class than the horizontal form. The same high-grade movement is used as in the finest barometers of this type. The diameter of the case proper is 6 5/8 inches, and the diameter of the mounting flange is 8 1/4 inches. An opening 4 1/4 inches in diameter is cut away from the central part of the dial to expose the entire movement. The rim thus left carries the metric and English graduations.

The glass window of the instrument is sealed so that changes in pressure may be produced within the case. To a tubulation at the bottom of the case is attached a standard rubber tube and bulb as used with sphygmomanometers. The bulb is equipped with valves so that it holds pressure, but the pressure can be released by loosening a knurled head in the bulb mounting which contains a needle valve. By pumping air into the case with the bulb, a pressure increase of 3 inches is easily produced. The bulb may be detached from the rubber tube and reversed, and when the opposite end is pressed against the open end of the rubber tube, the bulb becomes a suction pump, by means of which the pressure within the case may be reduced by 3 inches. The total of 6 inches of pressure change is sufficient to produce one complete excursion of the needle on the scale. Graduations are about 2 1/2 times the normal lengths which they represent. This provides an open scale which is easily read with precision.

By means of three screw holes in the flange, the barometer may be permanently mounted on the wall and used in the ordinary way **Each \$17.50**

METEOROLOGY
Barometers

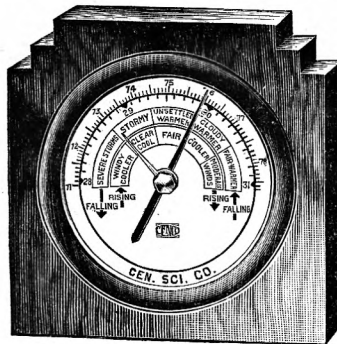


76860



76870

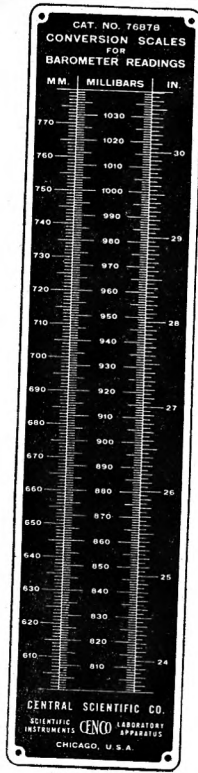
- 76860 BAROMETER, Aneroid, Altitude Adjustment Dial Type, English and Metric**, an excellent barometer for either educational or private use. It possesses practically all the features of a high grade barometer and, in addition, has a dial on the back graduated in altitudes from zero to 3,500 feet by 100-foot divisions which can be set to give readings corrected to sea level for any altitude within that range. A table of altitudes of all the meteorological stations in the United States is furnished with the barometer to assist in making the proper altitude adjustment. The instrument has a dial 5 inches in diameter of enameled metal. The case is of lacquered brass, provided with hook for wall suspension and retractable legs for table use. In the center of the glass face is a stationary hand which can be set as desired for showing changes in barometric pressure. The instrument is not compensated for temperature changes. The range of graduation in the metric scale is 65 to 79 cm by millimeters and in the English, 26 to 31 inches by 0.02 inches. It is intended for use in altitudes up to 3,500 feet.....**Each \$15.40**
- 76865 BAROMETER, Aneroid, Altitude Adjustment Dial Type**, of the same construction and specifications as No. 76860, but with brass adjusting plate graduated for correction to sea level readings at altitudes from 3,500 to 7,000 feet. With English and metric scales.....**Each 17.65**
- 76870 BAROMETER, Aneroid, Temperature Compensated Navy Type, English and Metric**, a high grade barometer suitable for practically any use in which an aneroid is found preferable to a mercurial barometer with a further advantage over No. 76860 for educational purposes in the fact that the dial is cut away in the center to form an opening 55 mm in diameter through which its movement and its various parts are plainly visible. Practically all parts of this barometer are constructed of nickel-silver or phosphor bronze, rendering it practically non-corrosive in the presence of moisture. Its readings are accurate at all ordinary temperatures because of the compensated movement.
The diameter of the dial is 5 inches. It is made of silvered metal with graduations lithographed. The instrument is compensated for temperature changes. It has a hook for suspension and a stationary hand for comparison. Its metric and English ranges are the same as those of No. 76860. It is intended for use in altitudes up to 3,500 feet.....**Each 16.90**



76875

- 76875 BAROMETER, Aneroid, Weather Indicating, Cenco-Taylor, Altitude Adjustment Dial Type, Metric and English**, a well made aneroid barometer with $3\frac{1}{4}$ inch dial, in an artistically designed mahogany-finished wood case. An altitude dial for elevations from 0 to 3,500 feet is provided on the back, which, when set at the user's altitude, gives indications of barometric pressure reduced to sea level to correspond with the U. S. Weather Bureau reports. The dial shows both metric and English mercury pressure scales, and in addition shows the weather forecast both with rising and falling barometric pressure, for all pressure indications. The transparent dial cover is fitted with a movable index, by means of which the change in barometric pressure from one reading to another may instantly be determined. The over all dimensions of the instrument are 12.5 by 12.5 by 4.5 cm. It may either be stood on a desk or hung on the wall**Each 5.00**
- 76876 BAROMETER, Aneroid, High Altitude, Cenco-Taylor**, same as No. 76875 Barometer, but with mechanism and altitude dial for use at elevations from 3500 to 7000 ft.....**Each 6.25**

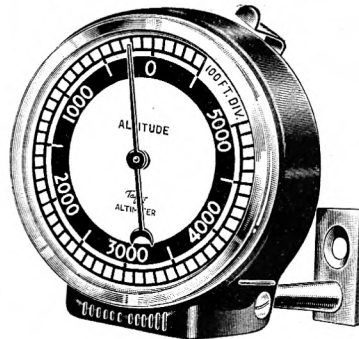
METEOROLOGY
Altimeters



76878



76880



76887

76878 BAROMETER CONVERSION SCALES, Cenco, for readily converting barometric pressures in inches or millimeters to the new official standard of pressure, the millibar, adopted by the U. S. Weather Bureau. The millibar is equal to 1000 dynes per square centimeter and one thousand of these equal a height of 750 mm of mercury. Consists of a metal plate, 22.5 cm by 5 cm, with reversed etched graduation and figures against a black enameled background. The scale divisions cover a range from 600 to 780 mm which corresponds to a range of approximately 800 to 1070 millibars, or to a range of approximately 23.6 inches to 30.7 inches. The scale is suitable for mounting on the wall near the barometer or to the backboard on which the barometer is mounted. The use of this unit by the U. S. Weather Bureau is another step toward the adoption of the metric system for all units of measurement. Pressures in millibars are now included on the weather forecast maps published by the U. S. Weather Bureau.....**Each \$0.25**
10% discount in lots of 12

76880 ALTIMETER, Pocket Type, for determination of atmospheric pressures and altitudes up to 8000 feet. Consists of a precision grade movement compensated for ordinary temperatures and mounted in a gilt case similar to a watch. The dial of 1 3/4 inch diameter carries two scales. The inner scale is graduated from 23 to 31 inches in .05 inch divisions. The outer scale which can be revolved by means of a milled ring is the altitude scale, reading from 0 to 8000 feet in 100-foot divisions. The needle is provided with a fine pointer, making it possible to estimate altitudes within 10 feet. An adjustment screw, accessible through an opening in back of the case, permits setting correctly with a standard barometer. The readings are as reliable as those of the best aneroid barometers. Convenient to carry in the pocket on field trips. With soft leather case.....**Each 20.65**

76885 ALTIMETER, High Altitude, Pocket Type, identical with No. 76880 Barometer, but with altitude scale reading from 0 to 12,000 feet in 100-foot divisions**Each 30.00**

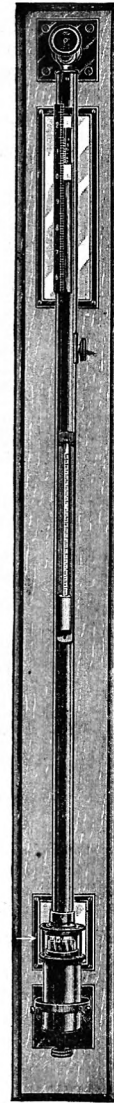
76887 ALTIMETERS, Auto-Type, for indicating altitude, measuring height of hills and depth of valleys, etc. Excellent for field trips and exploring parties. May be attached by means of ball bracket in a convenient position on an automobile windshield centerpost or molding. Consists of an aneroid movement in a brown molded plastic case with dial showing altitude in feet. A socket with set-screw in the back permits attachment to a chromium-plated bracket supplied with the instrument for permanent attachment in the conveyance used on the trip. A finger-lever at the top of the case permits setting the indicating needle at the starting elevation. Subsequent indications will be actual elevations in feet.

No.	A	B	C
Range, feet	-500 to +5000	-1000 to +10,000	-1000 to +15,000
Divisions, feet	100	100	200
Each	5.00	6.00	7.50

METEOROLOGY
Mercurial Barometers



76890

76893 shown
with barometer.

76894

76890 BAROMETER, Mercurial, Cenco-Improved Design (Patent No. 1,632,084). Before the Cenco Mercurial Barometer appeared on the market all low-priced barometers consisted essentially of a wooden back to which was rigidly secured the barometer cistern, tube and scale, and the thermometer when this was provided. In such instruments the risk of breakage is great, and the accuracy of reading is doubtful since changes in humidity cause shifting of the scale relative to the zero point of the mercury column.

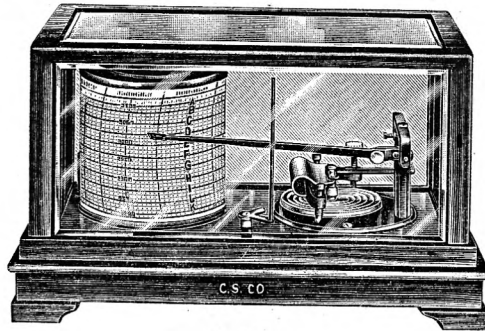
The Cenco-improved design, in its general lines, resembles the U. S. Weather Bureau type. The barometer tube is completely enclosed in hexagonal brass tubing, to which are attached the metric and English scales. At the upper end of the barometer there is a substantial ring which permits free suspension. The construction of the cistern eliminates the usual leather bag used in Fortin style barometers, but permits fine adjustments of the mercury level. The thermometer is secured to the brass case.

Some of the resulting advantages of this design over the obsolete wood-backed form are: (1) Freedom from error due to warping of wood, and permanent adjustment of scale relative to the ivory zero-index; (2) greater protection to barometer tube, minimizing the likelihood of breakage; (3) possibility of making temperature corrections, since brass, glass and mercury are the substances involved, to which instructions in the manuals are directly applicable. Location of the thermometer directly on brass tube is an aid to accuracy; (4) the instrument automatically hangs plumb.

In addition to these points, the elimination of the leather bag does away with the annoyance of loss of mercury by leakage when the leather becomes old. This feature is patented, and is found only in the Cenco-improved design.

(Continued on next page)

METEOROLOGY
Barograph



76908

76890 BAROMETER, Mercurial, Cenco-Improved Design (Patented) (continued from preceding page).

Specifications: Tube: Full 4 mm bore, filled with redistilled mercury by a special process. Scale: Range 600 to 800 mm, or 24.5 to 31.5 inches, for altitudes from 0 to 4000 feet; verniers read 1/10 mm and 5/1000 inch; scale and verniers silver finish Thermometer: Graduated both Centigrade and Fahrenheit. Finish: Oxidized and lacquered.

Complete with hook screw for suspending barometer and a U-shaped metal holder, with wood screws, for attachment to wall at a point slightly above the mercury well to prevent swinging of barometer. (Can be shipped by express only).....**Each \$22.50**

76891 BAROMETER, Mercurial, Cenco-Improved Design (Patent No. 1,632,084), for high altitudes, from 1,500 up to 10,000 feet. Similar to No. 76890 Barometer, but with range of scale 500 to 700 mm or 19.5 to 27.5 inches. (Can be shipped by express only).....**Each 27.50**

76893 Barometer Mounting, to provide a substantial support for Nos. 76890 and 76891 Cenco-Improved Mercurial Barometers. The use of the mounting prevents removal of the barometer from its place of suspension or other tampering which might be detrimental to its accuracy.

Consists of a substantial wood back finished in black lacquer, to which white plates are attached to provide light backgrounds for adjusting the zero index to the mercury surface and the vernier to the top of the mercury column. The suspension stud, at the top, and guard loop, near the bottom, are bolted through the wood back. Both are finished in nickel-plate. The mounting may be either permanently attached to the wall with wood screws or suspended from a hook by means of the nickel-plated loop at the top. Length, 37½ inches; width, 3½ inches. A Metal Conversion Scale, No. 76878, is securely fastened to the mounting. **Without** barometer.....**Each 5.00**

76894 BAROMETER, Standard Mercurial, United States Weather Bureau Type, Fortin principle. This barometer is of the highest type of excellence, endorsed by the United States Weather Bureau, and fully warranted by the manufacturer. The mercury tube is enclosed in a brass body with gunmetal finish. The vernier is operated by a rack-and-pinion movement. The scale is graduated on one side in inches and 10ths, on the other in centimeters and millimeters, the vernier reading to one-hundredths of an inch and one-tenth of a millimeter. Reads down to 25½ inches for use in altitudes up to 3,000 feet. Complete with hardwood back and thermometer with both Centigrade and Fahrenheit scales. (Can be shipped by express only.).....**Each 85.00**

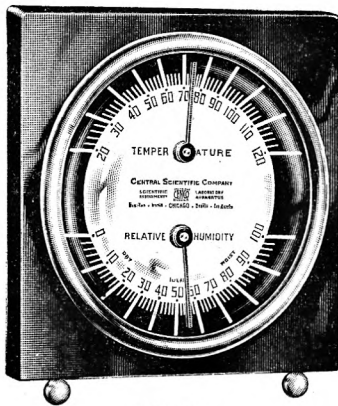
76895 BAROMETER, Standard Mercurial, United States Weather Bureau Type. Same as No 76894, but without the board back (Can be shipped by express only).....**Each 75.00**

76896 Back only, of No. 76894 Standard Barometer. May be used with No. 76895 Barometer. Size 4½ by 43 inches.....**Each 10.00**

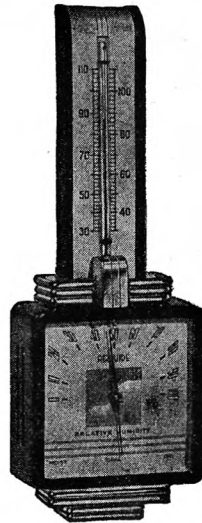
76908 BAROMETER, Recording Barograph, for recording variations in atmospheric pressure from 28 to 31 inches by tenths inches in intervals of two hours through seven days. May be used at any altitude from 0 to 3500 feet. Excellent for forecast of weather from an analysis of an accurate and continuous record for periods of 12 to 24 hours in the future.

Consists of a high-grade seven day clock movement for operating the recording drum and an exceedingly sensitive temperature-compensated aneroid mechanism mounted on a polished mahogany-finished wood base and enclosed within a plate glass case. The aneroid mechanism controls a long lever pen through a temperature-compensated system. The clock movement, located within the drum, is spring driven and wound by a key at the top of the drum. The charts are lithographed in green ink and gummed at one end for easy attachment and rouletted for easy removal. The horizontal divisions cover a period of seven days in two-hour intervals; the vertical divisions indicate tenth inches from 28 to 31 inches. A weather forecast card 6¾ by 10¾ inches is supplied which carries statements of the probable weather conditions 12 to 24 hours ahead that are based on the observed conditions recorded by the instrument. In addition a special display card is also furnished for posting the forecast.

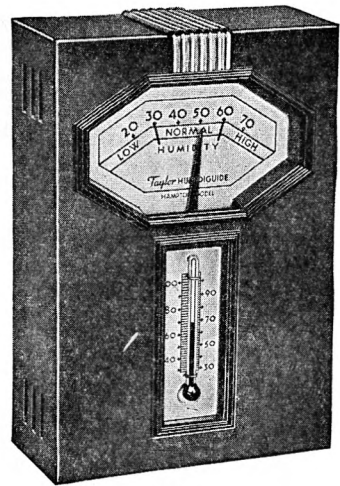
Complete with forecast cards, a year's supply of charts, and a bottle of special ink. Over all dimensions: Width, 7½ inches; length, 12¾ inches; height, 7 inches.....**Each 45.00**

METEOROLOGY
Hygrometers


76955



76960



76965

76909 **Barograph Charts**, for No. 76908 Barograph. In ordering send in a sample of the kind in use to assure proper fit. In boxes containing one year's supply.....Per box \$3.00

19510 **INK, Recording, Red**, for use in No. 76908 Recording Barometer. Supplied in 2-dram bottles.....Per bottle .50

76955 **HYGROMETER AND THERMOMETER, Cenco-Duo**, for direct indication of room temperature and humidity without reference to tables or charts or the necessity for calculations. The instrument is compact, rugged, and attractive in appearance. The 2½ inch, black and silver dial is graduated in the upper half in degrees Fahrenheit and in the lower half in per cent relative humidity. The divisions represent 2° on the temperature scale and 2 per cent on the humidity scale. The case is a square panel of black bakelite with circular chromium-plated bezel, glass dial cover and chromium-plated feet. An easel-type stand supports it at a convenient reading angle. Height, 3½ inches; width, 3¼ inches; depth, 1⅜ inches.....Each 1.00

76960 **HYGROMETER, Airguide**, for the direct indication of per cent of relative humidity and the temperature of the surrounding air. It is designed for indoor use only, and requires no calculations or reference to tables or charts.

The instrument consists of a moisture-sensitive element mounted in a square Bakelite case of artistic design, which also houses the indicating humidity dial. At the top of the Bakelite housing is a red fluid-filled thermometer. The square silvered-metal dial is graduated from 0 to 100 per cent relative humidity in 10 per cent divisions. The scale upon which the thermometer is mounted is also silvered metal with a dull finish. A chromium-plated metal trim of artistic design protects the thermometer bulb. In appearance the instrument suggests a modern banjo-type clock.

Dimensions: Dial, 2⅜ inches square; width, 2¾ inches; length, 7½ inches; depth, 1 inch.....Each 3.50

76965 **HYGROMETER AND THERMOMETER, Hampton Humidiguide**, for indication of relative humidity and temperature of the atmosphere surrounding the instrument. The instrument is direct reading and it is not necessary to refer to tables as is required with wet and dry bulb thermometers. Like all other direct reading hygrometers, it does not register rapid fluctuations in humidity and temperature. At least one hour in circulating air is required for the instrument to register correctly.

The instrument is enclosed in an attractive case of black molded plastic. Relative humidity is indicated by a red pointer on a 10 to 80° relative humidity scale marked on the upper rectangular, ivory dial. Temperatures from 30 to 100° F are indicated by a red liquid thermometer on the lower ivory panel to match the humidity scale. The moisture-sensitive element is a strip of material that expands and contracts with change in humidity. An adjustment screw within the case permits adjusting the reading of the humidity index to correspond with wet and dry bulb thermometer readings when required. Dimensions: Height, 5¾ inches; width, 3⅜ inches; depth, 1½ inches.....Each 2.50

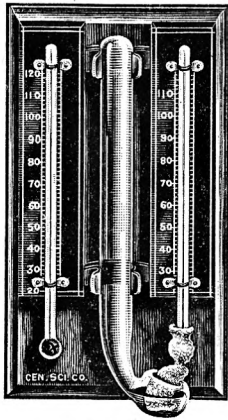
76970 **HYGROMETER, Mason**, for determining both relative humidity and dew point. Glass magnifying thermometers of approximate range from 30° to 120° F. are mounted on a metal scale with insulating support and attached to a mahogany finished panel 8½ by 4½ inches. With glass cistern and spare wicks, humidity tables and directions for use. (Illustrated on next page).
.....Each 5.00

For experiments employing this or similar apparatus see *T. W. & H. Exp.* 24, p. 101.

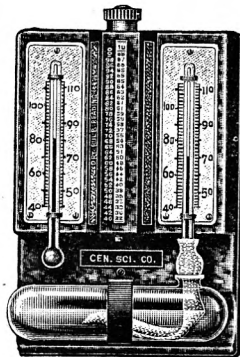
76972 **Cistern**, only, of No. 76970 Hygrometer.....Each .50

76974 **Thermometers**, only, of No. 76970 Hygrometer.....Each 2.00

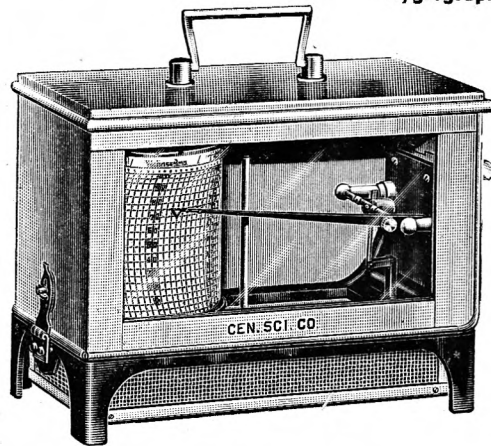
METEOROLOGY
Hygroph



76970



76990



76995

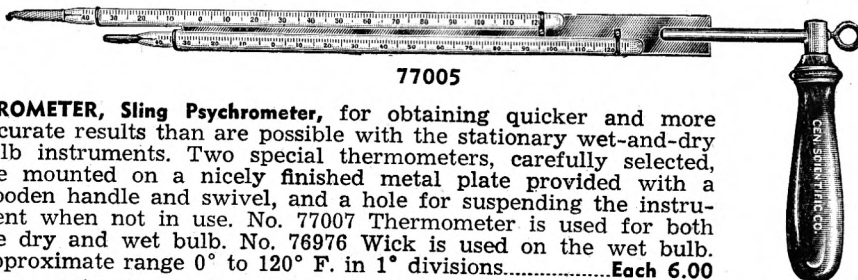
76976 Hygrometer Wick, for replacement on wet bulb thermometer of No. 76970 and No. 76990 Hygrometers or No. 77005 Sling Psychrometer. Should be ordered with No. 76974 or No. 77007 Thermometers when they are to be used as wet bulb thermometers.....**Each \$0.08**
Per dozen .75

76990 HYGROMETER, Mason Type, Humidiguide, Tycos, for determining conveniently the percentage of humidity in a room or enclosure. Consists of wet and dry bulb thermometers mounted on a molded Bakelite frame; between them is a cylinder bearing on its surface a table of percentages of humidity. The cylinder is behind a longitudinal slot of such width as to expose to view only one column of humidity figures. A knurled head at the top provides means for turning the cylinder. From the vertical column of figures corresponding to the difference in readings between the wet and dry bulb thermometers, can be read directly the relative humidity. There are 20 columns of humidities for differences by single degrees from 1 to 20. The graduations and figures are large and distinct. A glass cistern at the bottom of the Bakelite frame keeps the wick for the wet bulb moist. Directions are on an etched metal plate on the back of the instrument.

Dimensions: Length, 15 cm (6 in.); width, 9.5 cm (3 3/4 in.); thickness, 3.0 cm (1 1/4 in.); range of temperature, 40° to 116° F. Designed for wall mounting. Complete as described.....**Each 5.00**

76995 HYGROMETER, Recording Hygroph, for furnishing a continuous record of humidity over a period of seven days. Consists of a multiple hair unit exposed to the atmosphere in a well-ventilated screen protective covering and connected to a recording pen through a sensitive multiplying system. As the humidity changes, the recording pen moves across the chart which is attached to a metal drum with a 7-day clock movement. This gives a continuous relative humidity record over a range from 0 to 100% for seven days. The working mechanism is mounted in a metal case hinged at one end to the base, providing access to the recording drum and pointer. The base is finished in gloss black enamel and the case in light gray enamel with a clear glass window for observing the chart. Case is 12.5 cm wide, 25 cm long, and 18 cm high. Complete with charts for one year.....**Each 85.00**

76997 Hygroph Charts, for No. 76995 Hygroph. In boxes of 55.....**Per box 3.75**
10% discount in lots of 6 boxes



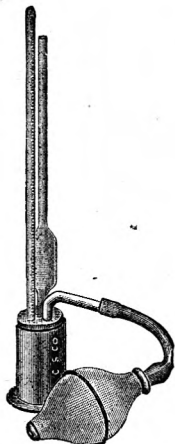
77005

77005 HYGROMETER, Sling Psychrometer, for obtaining quicker and more accurate results than are possible with the stationary wet-and-dry bulb instruments. Two special thermometers, carefully selected, are mounted on a nicely finished metal plate provided with a wooden handle and swivel, and a hole for suspending the instrument when not in use. No. 77007 Thermometer is used for both the dry and wet bulb. No. 76976 Wick is used on the wet bulb. Approximate range 0° to 120° F. in 1° divisions.....**Each 6.00**

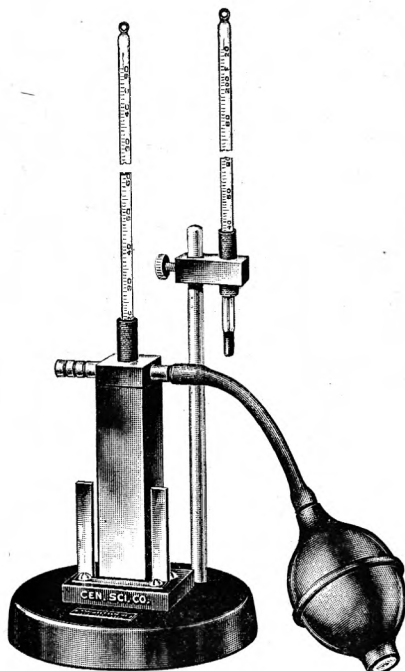
For experiments employing this or similar apparatus see I. & M. Exp. 35, p. 111; Ham. Exp. 212, p. 64; White Exp. 26, p. 153; Z. & E. Exp. 44, p. 78; Min. Exp. 40, p. 139; D. C. M. Exp. 86, p. 200; M. G. & E. Exp. 25, p. 96; S. & M. Exp. 44; S. E. P. H91b.

77007 Psychrometer Thermometers, only, of No. 77005 Hygrometer. No. 76976 Wick should be ordered also when a wet bulb thermometer is desired.....**Each 1.75**

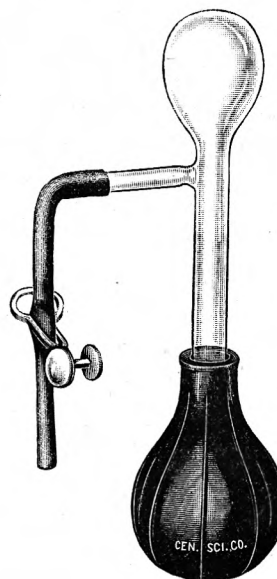
METEOROLOGY
Dew Point Apparatus



77015 shown in use



77020 shown in use



77022

77015 DEW POINT APPARATUS according to Millikan, Gale and Davis, Exp. 28. By means of a bulb, air is blown through ether contained in a small nickel-plated brass vessel, 28 by 54 mm. Complete with glass reservoir tube and No. 18080 Rubber Bulb, but **without** thermometer.....
Each \$1.00

77020 DEW POINT HYGROMETER, Alluard's Form, for precise determination of the temperature of the dew point. A square nickel-plated and highly polished container for ether or other volatile liquid is mounted on a heat insulating support. In use, a stream of air is bubbled through the liquid to produce cooling. The temperature of the highly polished surface is thus lowered to the point at which the water vapor of the jar begins to condense. To facilitate accurate determination of the temperature at which condensation begins, there is mounted on each side of the front surface of the tube, but not in thermal contact with the latter, a strip of highly polished nickel-plated brass. By observing the adjacent surfaces simultaneously the formation of the mist is very readily perceived. As soon as this occurs the temperature of the liquid is read on a thermometer inserted in the tube. Another thermometer, mounted on the same base with the apparatus, but with its bulb sufficiently removed from the tube so that room temperature will be correctly indicated, completes the equipment necessary for determining the humidity. For greatest accuracy of measurement the instrument should be protected from air currents, and the observer should stand several meters away, noting the formation of cloudiness and reading the thermometers with a telescope to avoid error due to body heat.
Without aspirator bulb or thermometers.....Each 9.00

For experiments employing this or similar apparatus see White Exp. 26, p. 153; T. W. & H. Exp. 24, p. 101; Cas. Exp. 11, p. 33; D. & S. Exp. 108, p. 476; S. E. P. H91b.

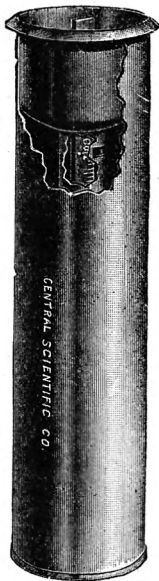
18080 Rubber Bulb, with metal valves, for pressure only, with connecting tube. For use in blowing air through the ether tube of No. 77015 Dew Point Apparatus or No. 77020 Dew Point Hygrometer. Capacity, about 50 ml.Each .30

10% discount in lots of 12

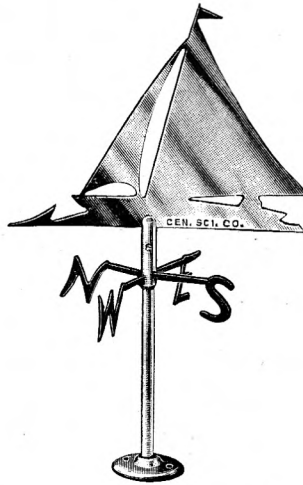
77022 CLOUD APPARATUS, for demonstrating the production of clouds. This simple apparatus is used to perform the famous experiment of Professor C. T. R. Wilson.

Consists of a glass bulb with an ungraduated tube, having two openings. To the larger opening is attached a stiff rubber bulb; to the other, a nipple such as a rubber tube and pinch clamp for the introduction of the gases to be investigated. When the rubber bulb is filled with water, compressed moderately, and then released suddenly, a dense cloud will be formed in the glass bulb. The effect of dust particles and ionized air on the formation of this cloud can also be shown. Diameter of tube, about 2 cm; over all length, about 30 cm.
Each 2.75

METEOROLOGY
Rain Gage



77025



77196

- 77025 RAIN GAGE**, similar to United States Weather Bureau type, but smaller and therefore not so accurate. The receiver is a zinc vessel 3 inches in diameter by 13 inches long, in the top of which is placed a copper cup having an open top exactly 3 inches in diameter with sharp edge and projecting rim. The bottom of this copper cup is open and fits in the top of a brass tube 1 inch in diameter in which the amount of rain is measured. This tube is provided with an overflow opening and a measuring stick graduated for reading the rainfall directly to 0.01 inch.
.....**Each \$4.00**
- 77027 Measuring Stick**, only, of No. 77025 Rain Gage.....**Each .50**
- 77035 RAIN GAGE**, for accurately determining the amount of rainfall. Consists of a receiver vessel 8 inches in diameter with a funnel-shaped bottom to conduct precipitation into the tall brass measuring tube which is 20 inches high and has a diameter of 2.53 inches. The receiver and measuring tube are mounted in a galvanized iron outer tube which also acts as an overflow can when there is an excess amount of rainfall. A wood measuring stick, graduated to read from .01 inch to 2.0 inches of rain, is furnished. The receiver is finished in dull black enamel; the measuring tube in polished brass.
In use the gage is placed in the open, free from interference. The amount of rainfall caught in the funnel top is measured in the inner tube by the wood measuring stick. The size of the inner tube in relation to the receiver is such that one inch of water in the tube means .1 inch on the surface of the receiver. The outer case also serves as a snow gage when the inside container is removed. Over all height, about 25.5 inches; outside diameter, about 8 inches.
.....**Each 17.50**
- 77037 Measuring Stick**, only, of No. 77035 Rain Gage.....**Each 1.10**
- 77180 WEATHER FORECAST CHART**, or Key to Barometer Readings and Chart for Aneroid Barometer, for aiding in the intelligent interpretation of barometer readings and in forecasting weather for twenty-four hours.
Consists of a barometric dial and chart printed on a heavy card 5½ by 5½ inches which bears a movable reference pointer. The dial is numbered in tenth inches from 29 to 30.9 inches, approximately, in each of two quadrants, the left with weather indications for falling barometer readings, the right for rising barometer readings. The card carries complete directions for use
.....**Each .75**
- 77182 WEATHER MAP, U. S., Blank**, for student tests in plotting weather data. Consists of the printed map used by the U. S. Weather Bureau for publishing daily graphic reports of weather conditions to show storm areas and their progress across the country.
No. A B
Package of, sheets..... 1 100
Per package05 .65
- 77185 "WEATHER AND WEATHER INSTRUMENTS."** This book describes the mechanism of the many instruments and in addition gives in concrete and simplified form the practical uses of the different instruments. The tables of classified data recommend it particularly to teachers. Pasteboard covers.....**Each 1.00**
- 77190 "PRACTICAL HINTS FOR AMATEUR WEATHER FORECASTERS."** Information on the care and exposure of barometers. 24 pages, illustrated.....**Each .20**
- 77196 WIND VANE, Working Model**, with movable vane in the form of a ship at full sail and a fixed arm with letters indicating the four cardinal compass points. On support with base plate and screws for mounting.....**Each 1.20**