

# PHYSICS-CHEMISTRY

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## W. M. Welch Scientific Company

Manufacturers, Importers and Exporters  
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1516 Orleans St.

Chicago, Ill., U.S.A.



# METEOROLOGICAL INSTRUMENTS.

Cat. No.

- 1200—Barometer Tubing, heavy, large bore, per meter .....  
 1202—Barometer Tube, 80 cm. long, open.....

## No. 1204.

- 1204—Barometer Tube, straight, 80 cm., sealed at one end .....  
 1205—Barometer Tube, straight, same as No. 1204, but graduated in millimeters.....  
 1206—Barometer Tube, cup and pipette, complete.....

## No. 1208.

- 1208—Barometer Tube, with bend and bulb.....  
 1210—Barometer Tube, same as 1208, but filled with mercury .....  
 1211—Mercury Well of japanned iron. Capacity about 50 cc.....  
 1212—New Experimental Barometer, embodies all the important features of other makes, and in addition is equipped with patented electrical attachment for reading the zero point. The following are points of its superiority:

- 1—The scale is graduated in both English and metric systems, reading by means of a vernier to 1/10 mm. and 1/200 inch.
- 2—The vernier moves independently of the glass tube and slides into an accurately cut slot, thus making reading very accurate.
- 3—The tube is filled with first quality distilled mercury. The mouth of the cistern is closed by the device so that in shipping it is practically impossible for the mercury to run out.
- 4—An accurate thermometer, graduated in F. and C. degrees, is mounted on the fine mahogany base.
- 5—The electrical attachment (see cut below) for reading the zero point is mounted on a fiber base, held in position by two taper plugs, which extend through the fiber base in brass sockets fitted into the base, on which the barometer tube is placed. The fiber base has two brass arms with platinum points, which pass into the cistern of the barometer tube. On the arms are two binding posts to be connected with the battery and bell.

- 6—The adjusting screw, used for raising the barometer tube, brings the mercury in contact with the platinum points, thus closing the circuit.

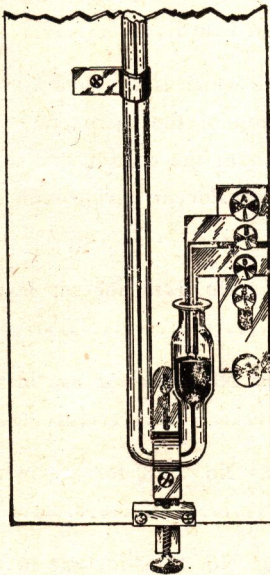
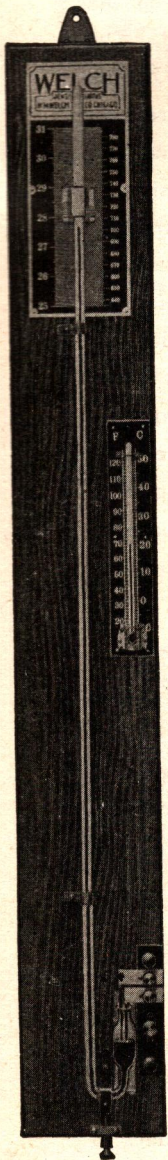
New improved barometer, complete with electrical attachment, thermometer and full instructions .....

- 1212A—Barometer, same as No. 1212 but without electrical attachment for reading the zero point .....

- 1212B—Barometer, same as No. 1212 but for use in high altitudes. Has a scale reading down to 20 inches .....

- 1213—Barometer, same as No. 1212 but equipped with a rack and pinion adjustment for the vernier .....

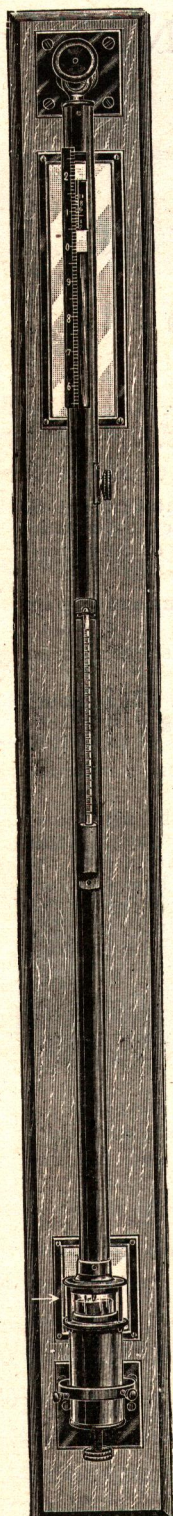
- 1214—Barometer Case for No. 1212-12B, made of finely polished wood for hanging on wall of school room or laboratory; with lock and key



No. 1212. Showing Electrical Attachments.



## STANDARD BAROMETER



No. 1218.

**1218—Standard Barometer, United States Weather Bureau Type,** Fortin principle. This barometer is of the highest type of excellence, indorsed by the United States Weather Bureau and fully warranted by the manufacturer. The mercury tube is inclosed in a bronze-brass body, having at its upper end two vertical openings, in which the vernier works, the latter operated by a rack and pinion movement. The readings are taken through these openings, aided by light reflected from a white opaque glass reflector attached to the mahogany board behind. The scale is divided on one side into inches and tenths, and on the other centimeters and millimeters, the vernier enabling a reading to be taken, in each case respectively of 1/100th of an inch and 1/10th of a millimeter. The attached thermometer consists of a well-seasoned tube with both Centigrade and Fahrenheit scales, with the figures etched on the stem. It is so mounted that it can be easily removed for testing, etc. Corrections for the thermometer accompany each instrument. No correction for capillary action or instrumental error is given with these barometers, as the scale has been adjusted until readings are identical with the standard compared with that of the Kew Observatory, England. The barometer may be used without the board by suspending it by the ring at the top, but the board, as shown in the illustration, possesses many advantages. For altitudes up to 3,000 feet, without board.....Net

**1220—Mahogany Back** for above, 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 white opaque glass reflectors, forming a translucent background for reading the instrument .....Net

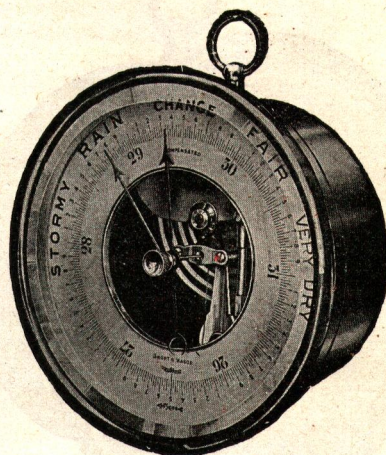
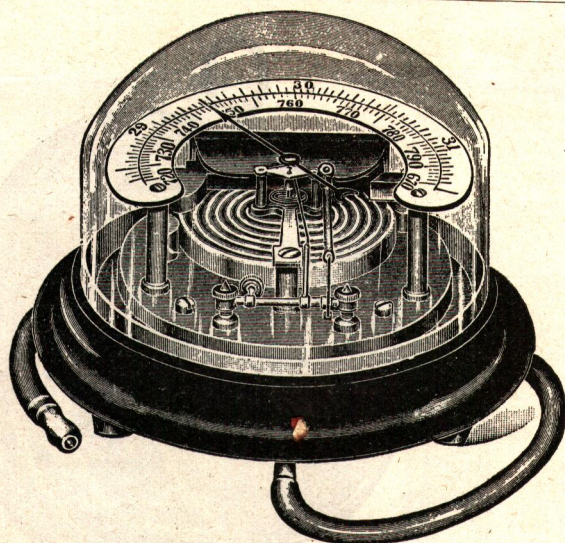
**1222—Standard Barometer,** same as No. 1218, for use in altitudes of 5,000 feet .....Net

**1224—Standard Barometer,** same as No. 1218, for use in altitudes of 8,000 feet .....Net

**1226—Standard Barometer,** same as No. 1218, for use in altitudes of 12,00 feet .....Net

**1228—Standard Barometer,** same as No. 1218, for use in altitudes of 16,000 feet .....Net





Cat. No.

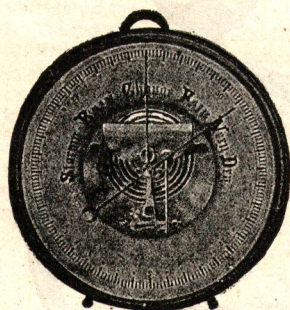
No. 1230.

No. 1232.

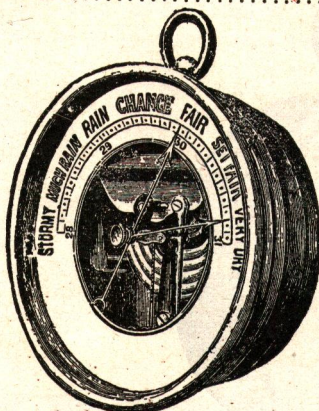
**1230—Demonstration Aneroid Barometer.** This instrument is a carefully constructed barometer, similar to the standard form used by the United States Weather Bureau, and in addition has the following special features:

1. The works are covered by dome-shaped glass so as to show all working parts in their relation to each other.
2. The case is kept air-tight, except for connection through the rubber tube. By blowing in or drawing out air, the needle may be made to change, and its action clearly seen. When not used as a demonstrating piece, it may be hung in the room and record barometric pressures as any other instrument. It reads in both centimeters and inches of mercury

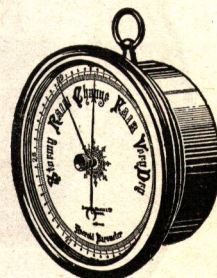
**1232—Aneroid Barometer,** as adopted by the United States Weather Bureau and the United States Navy. The highest type of brass case weather barometer. Movement especially adjusted and compensated for changes in temperature, hand-silvered metal dial, for altitudes up to 3,500 feet



No. 1234.



No. 1236.



No. 1238.

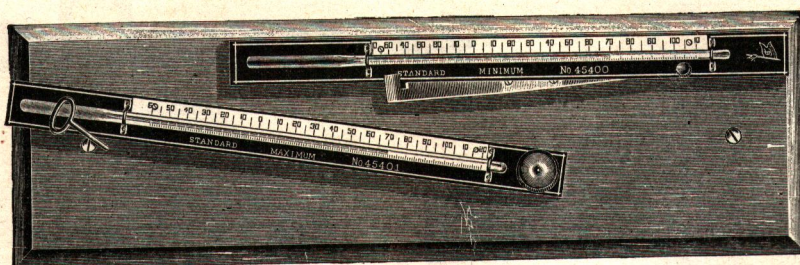
**1234—Aneroid Barometer,** four-inch card dial, nickel-plated case, open face, graduated metric and English systems (illustration shows English scale only)

**1236—Aneroid Barometer,** latest model, 4 inches in diameter. The movement is strongly mounted on brass base and in full view. The instrument is provided with a double vacuum chamber, which increases its sensitiveness. The lever chain is made of German silver so as to prevent rusting, thus retaining delicacy and accuracy of movement. The graduation is on the under surface of the glass top, and reads both in the English and Metric systems. An adjustable hand is provided for indicating changes of atmospheric pressure.

**1238—Aneroid Barometer,** similar in design to No. 1236, but a slightly larger and higher grade instrument, with the addition of a porcelain dial in place of a glass dial. 5-inch dial.

**1239—Similar to No. 1238,** with visible works. Five-inch dial

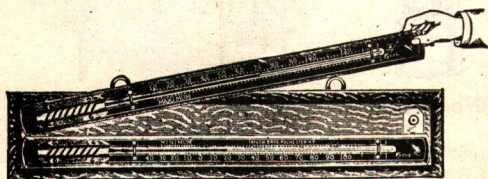




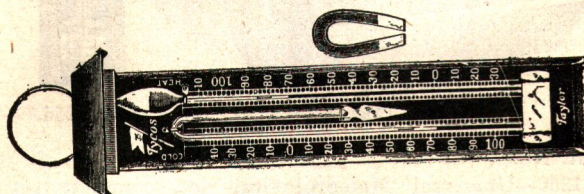
No. 1268.

## Cat. No.

- 1268—U. S. Weather Bureau Set of Maximum and Minimum Registering Thermometers, latest pattern, mounted on polished mahogany finished wood back. Furnished with certificates for each thermometer. Per set..... Net
- 1270—Standard Maximum Registering Thermometer of No. 1268, certified..... Net
- 1272—Standard Minimum Registering Thermometer of No. 1268, certified..... Net

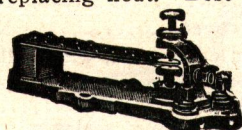


No. 1273.

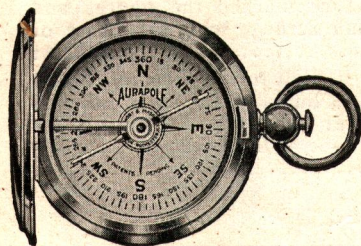


No. 1274.

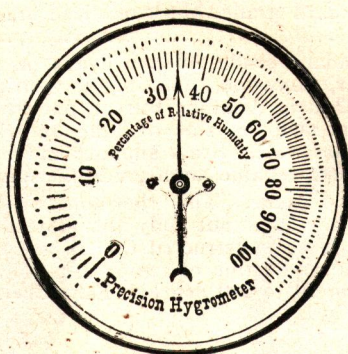
- 1273—Set of Maximum and Minimum Registering Thermometers, mounted on separate plates. Full description accompanies each instrument. High grade thermometers, but without certificate .....
- 1274—Six's Self-Registering Maximum and Minimum Thermometer. Metal case, with magnet for replacing float. Best grade instruments, 8-inch .....



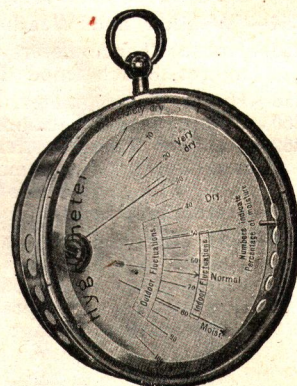
No. 1275A.



No. 1276.



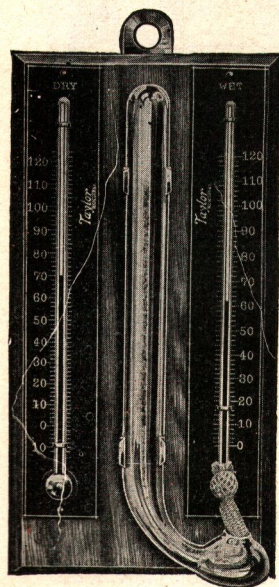
No. 1277.



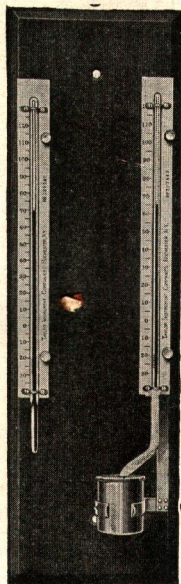
No. 1278.

- 1275A—Thermostat, Improved Adjustable. Can be set for any desired degree of heat or cold, and will make electrical contact on the rise or fall of temperature. Call bells or other electrical apparatus can be connected in the circuit at any desired distance from the instrument. Used for fire alarm, hot houses, incubators and many other places where uniform temperature is required .....
- 1276—Pocket Magnetic Compass. Dial is of aluminum and has a jeweled "bar" pattern needle. Mounted in white metal hunting case, strongly hinged, 1½ inches diameter.....
- 1277—Hair Hygrometer, 5-inch silvered metal dial showing relative humidity; standard. Reads directly in per cent.....
- 1278—Spiral Hygrometer, brass case, scale denotes humidity of air without reference to tables, 3-inch dial .....

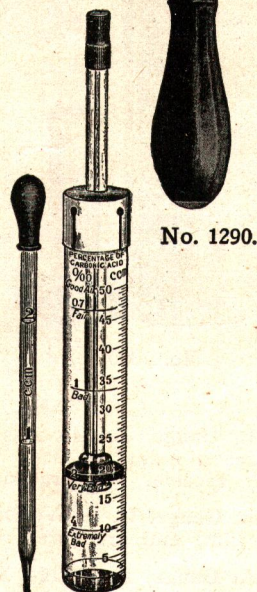




No. 1280.



No. 1286.

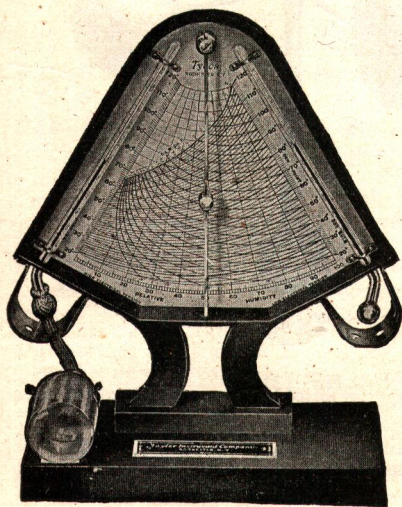


No. 1290.

No. 1294

## Cat. No.

- 1280—Mason's Hygrometer, for determining dew point and humidity, complete with glass cistern and tables. Markings are made on each thermometer, noting the normal regions so that one can tell if the humidity is near normal without consulting tables .....
- 1282—Glass Cistern only for No. 1280.....
- 1284—Mason's Hygrometer, similar to No. 1280, but thermometers not raised.....
- 1286—U. S. Weather Bureau Hygrometer, consisting of two standard thermometers, No. 1262, extending below the finely polished hardwood back, metal cistern with wick, and certificate for each thermometer .....
- 1288—Silk Wicks, for hygrometers.....



No. 1292.

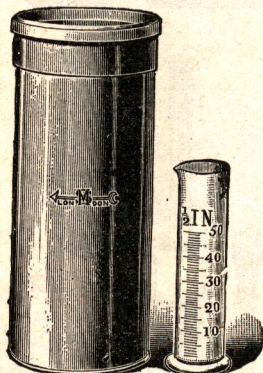
1290—"Sling" Psychrometer or Hygrometer, designed for the purpose of obtaining quick and more accurate results than are possible with the stationary wet and dry bulb instrument. Two high-grade paper-scale thermometers, mounted upon a brass plate with wooden handle with swivel attachment.....

1292—Hygrodeik, an improved form of the Mason's hygrometer. Consists of two thermometers, wet and dry bulbs, mounted upon the outer edge of a chart which has been plotted from new and corrected tables prepared under the direction of the U. S. Weather Bureau. Full directions furnished with each instrument .....

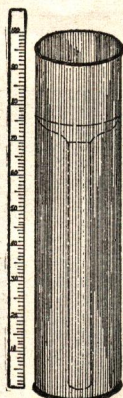
1294—Wolpert's Air Tester (carbacidometer), for obtaining the amount of carbonic acid gas, by direct readings from the graduations etched on the glass, thus doing away with all computations and tables as in the old forms. Another advantage of this form is that the air may be secretly tested, if desired. Directions and full set of test solutions furnished with each instrument .....

1296—Extra Chemicals for No. 1294. Five in a set.....

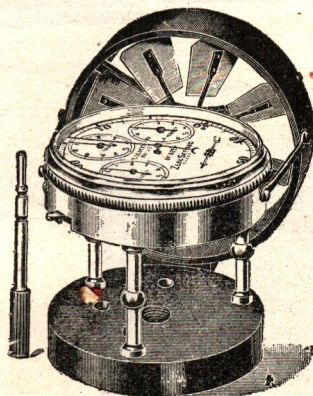




No. 1300.



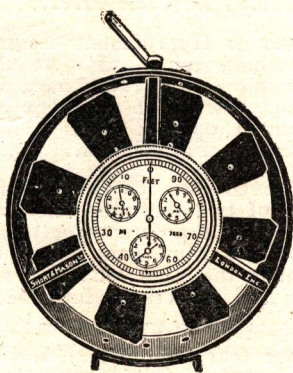
No. 1302.



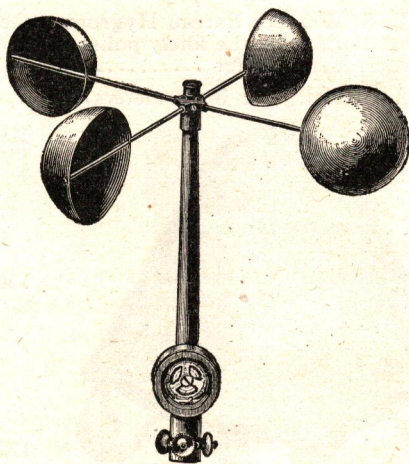
No. 1306.

**Cat. No.**

- 1300—Rain Gauge, British Association type. Consists of metal cylinder, 5-inch diameter, on which a funnel is made to fit as a cap. Interior of the cylinder contains a metal removable receiver and graduated glass jar, japanned, with brass ring.....
- 1302—Rain Gauge, U. S. Weather Bureau type, vessel 3 inches in diameter, 13 inches high, with overflow and graduated rule for reading the rainfall to 1/100th inch.....
- 1304—Rain Gauge, similar to No. 1302, but 8 inches diameter and 24 inches high, complete with rule .....
- 1306—Anemometer, portable form, for measuring velocities of air currents in buildings, etc. Indications are obtained by means of a delicately poised fan wheel  $2\frac{3}{4}$  inches in diameter. The long hand indicates on the outer circumference of the main dial the passage of 100 feet or less of air. The readings are continued up to 100,000 feet by a series of smaller dials, as shown in the illustration. Complete with joined socket-holder, zero setting device and disconnector, in mahogany case.....



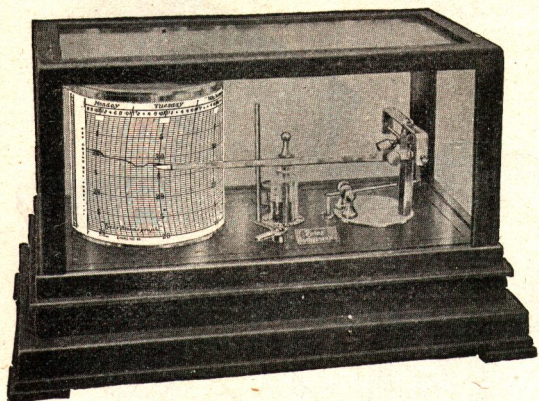
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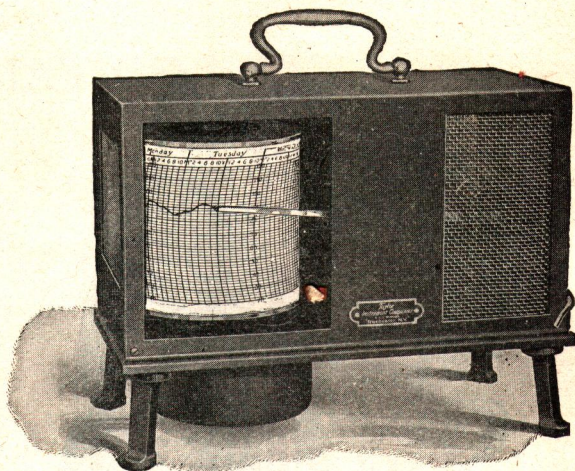
No. 1310.

- 1308—Anemometers, Biram's, 4 inches in diameter, four dials reading to 100,000 feet, complete with zero setting device and disconnector, in mahogany case.....
- 1310—Wind Gauge, for indicating the velocity of wind in miles. The dial is so divided as to show velocities from 1/100 of a mile to 10,000 miles, then repeating, commencing at zero.....





No. 1316.



No. 1320.

**Cat. No.**

**1316—Barograph (Recording Barometer).** This is a high grade barometer, mounted so that the lever traces the reading upon drum of paper. Keeps permanent record of barometric pressures. It is entirely automatic in its action and only needs attention to wind the clock movement for the drum and change the record sheets weekly. Enclosed in a glass case, making all parts visible. All brass and nickel parts are highly polished. Mounted on mahogany case, complete with record sheets.....

**1318—Barograph Charts,** for barographs, reading 28 to 31 inches, in a box containing a year's supply .....

**1320—Thermograph (Recording Thermometer).** Records temperature daily and hourly. Entirely automatic, making record on revolving drum and needs attention only to change the record sheets and wind the movement weekly. Used by the United States Department of Agriculture. Strongly built and very durable. Nicely finished. Complete in case with handle for carrying same.....

**1322 Thermograph Charts.** Per box containing a year's supply .....

**1326—Ink,** for barographs and thermographs, 1-oz. bottle .....

**6880—Sun Path Model or Heliodon** (Invented by J. F. Morris, Hyde Park High School, Chicago), consists of a horizon disc encircled by three rings representing the apparent daily path of the sun at the equinox and two solstice dates. By use of this model, the difficult but important subject of seasons can be made clear to pupils in much less time than is required for adequate treatment without it.....

**6881—Twilight Disc.** For use with No. 6880 Sun Path Model for obtaining the length of summer and winter twilight .....

**6884—Quadrant,** for Altitude Measurement. A 6-inch sector with graduations from 0° to 90°. Mounted on wood base with indicator and level .....

### Large Rainfall Wall Map of the United States.

This new wall map shows average annual precipitation of the United States for a period of over twenty years. The data is taken from a small map prepared by Henry Gannett, who uses as a source, material mainly from the United States Weather Bureau.

Distinct shades of blue represent the rainfall for areas less than 10, 10-20, 20-30, 30-40, 40-50, 50-60, and over 60. The legend key gives the percentage of land in each of these belts.

The size of the map is 64x42 inches and the scale was made just as large as possible. The colors are distinct and can be seen across a good-sized classroom.

The amount of rainfall is probably the most important factor governing the distribution of cereals and other agricultural products. This in turn largely determines the distribution of animals and also of man.

**Cat. No.**

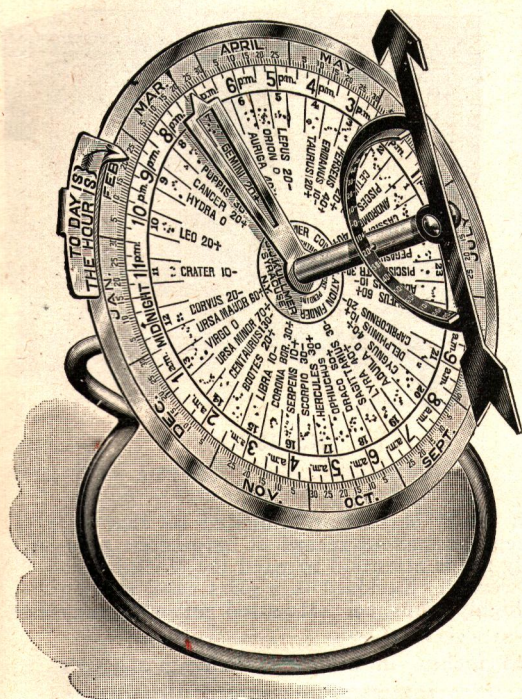
**7046 —Rainfall Map,** on cloth with rollers at top and bottom .....

**7046A—Rainfall Map,** on spring roller and board, with dust-proof cover.....

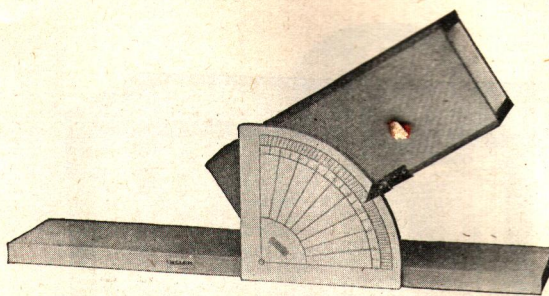
**7046B—Rainfall Map,** in oak spring roller case.....

**7046C—Rainfall Map,** in steel spring roller case.....

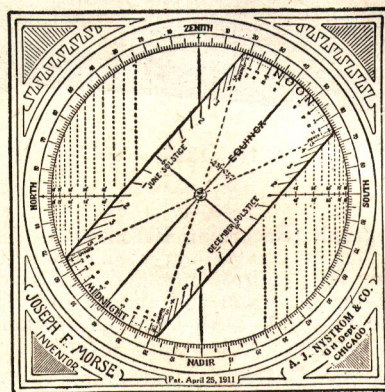




No. 6872.



No. 6876.



No. 6878.

**6870—Atlas of Popular Astronomy**, by Thomas Heath, First Assistant Astronomer, Royal Observatory, Edinburgh. This book is divided into 14 chapters with 47 illustrations showing the position of stars, photos of the moon, etc. Written in simple language that anyone can understand. 134 pages, including index and 21 double pages of colored plates and frontispiece. Size 11x7½, full cloth bound.....Net

**6872—Constellation Finder (Kullmer's)**. Based on the principle of the equatorial telescope mounting, an arrow taking the place of the telescope. When the slide and the dial are set for the day and the hour, and the indicator turned until the name of the constellation appears in the slit, the arrow, when properly set for declination, points to the desired constellation. A knowledge of astronomy is not essential and the arrow marks out on the sky the actual paths of heavenly bodies, and a very few exercises make clear the fundamental principles of the heavens. Complete with explanatory booklet, "Star Maps and Star Facts".....Net

**6876—Helior**. For measuring the proportional amount of heat received from the sun at different altitudes. Consists of a nicely finished wooden tube, inside measurement 4x4 inches, attached by hinges to a baseboard 24 inches long. A wooden quadrant with graduated scale is attached to the base. Indicator on tube may be clamped at any angle.....Net

#### Sun Path Dial.

(Invented by J. F. Morse, Hyde Park High School, Chicago.) This dial is an adjustable diagram made of durable chipboard for demonstrating the course of the sun above and below the horizon of different latitudes at different times of the year. When adjusted for a given latitude, the dial shows for each of the four seasons: mid-summer, mid-winter, and the spring and fall equinox, time and place of sunrise and sunset, the direction and altitude of the noon sun, and the location of the sun at midnight. It answers automatically any question that may be asked regarding the length of day, the time and place of sunrise and sunset and the length of twilight at different latitudes and the solstice dates (mid-summer and mid-winter)—problems that require the use of trigonometry for their mathematical solution.

Attachments: (1) **Insolometer**, a special meter for Sun Path Dial. The intensity of sunshine at any slant, as compared with vertical rays, can be read from the dial without computation; (2) **Twilight Zone** of transparent celluloid for reading the length of twilight at different reasons from the Dial.

**6878—Sun Path Dial complete with Insolometer and Twilight Zone**, each.....Net  
Per dozen .....Net