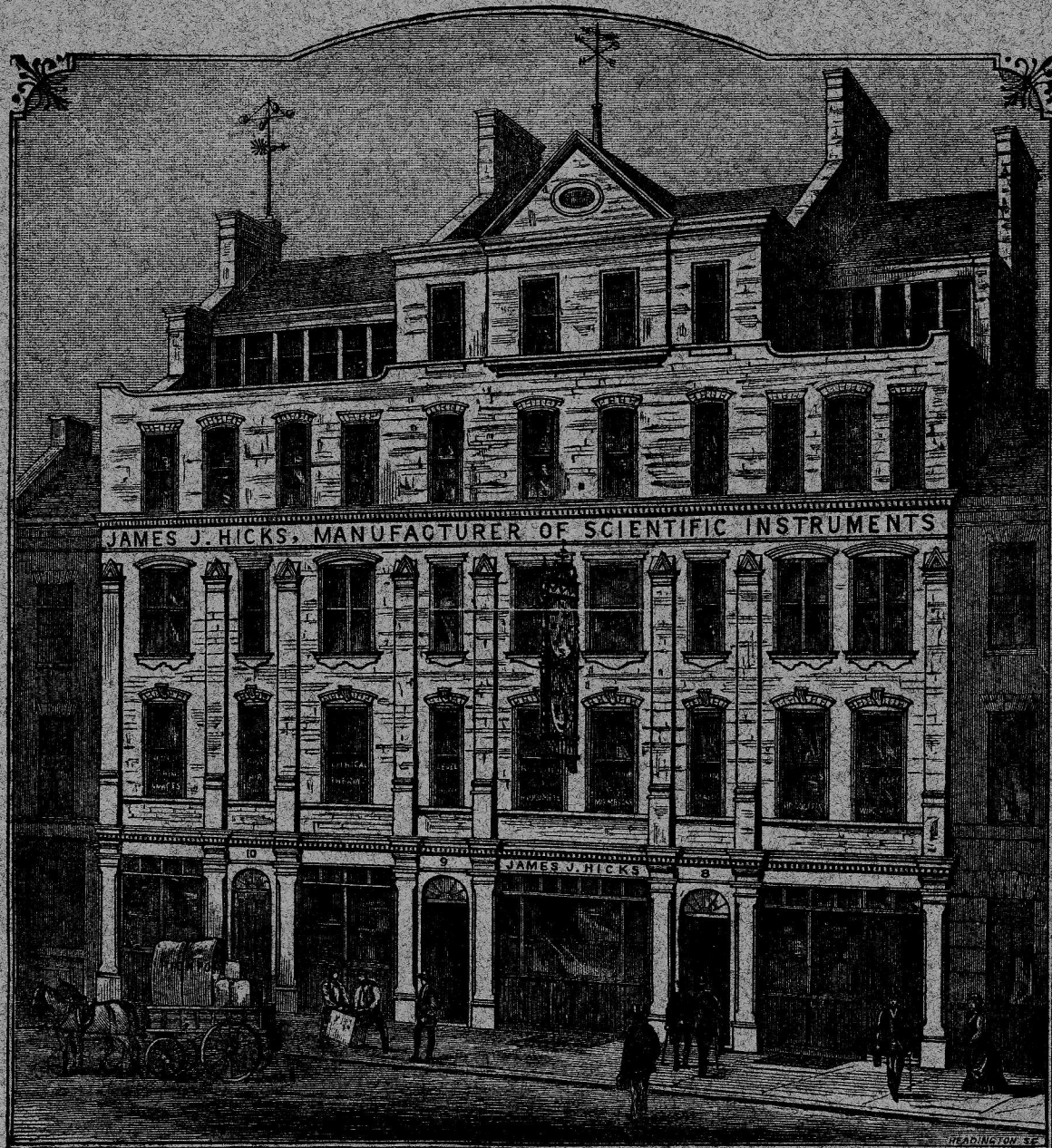


# JAMES J. HICKS

(Incorporated with W. F. STANLEY & CO., Ltd.)

STANDARD

## *Mercurial Barometer Catalogue*



*Instrument Maker by Appointment to His Majesty's Home, Colonial and Indian*



*Governments the Meteorological Department, and the Board of Inland Revenue.*

Also to many Foreign Governments and the Principal Observatories, Universities and Colleges throughout the World.

**8, 9, & 10, Hatton Garden, London, E.C. 1**

# JAMES J. HICKS

(Incorporated with W. F. STANLEY & CO., Ltd.)

## Illustrated Catalogue

—OF—

# Standard Mercurial Barometers

Standard Thermometers, Sunshine Recorders, Anemometers, Rain Gauges and Meteorological Instruments of every description.



*Instrument Maker by Appointment to His Majesty's Home, Colonial, and Indian Governments and the Meteorological Office.*

Also to many Foreign Governments and the Principal Observatories, Universities, and Colleges throughout the World.



8, 9 & 10, Hatton Garden  
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### GOLD MEDALS AND AWARDS

LONDON, 1862. PARIS, 1867. PHILADELPHIA, 1876. LONDON, 1885. RIO DE JANEIRO, 1909

**Awarded 9 Medals, Paris Exhibition, 1900.**

GRAND PRIX, FRANCO-BRITISH EXHIBITION, 1908.

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FOUR GRANDS PRIX AND GOLD MEDAL, TURIN EXHIBITION, 1911.

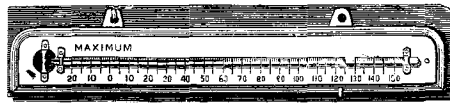


# Hicks' Set of Meteorological Instruments

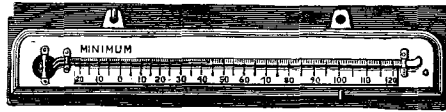
Suitable for Educational Purposes, or for private use at home consisting of



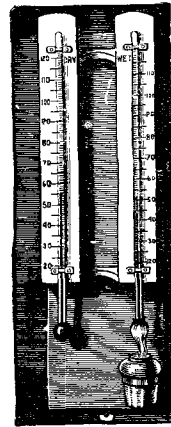
B 263



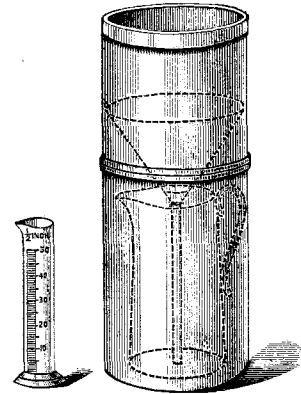
B 265



B 266



B 264



B 267

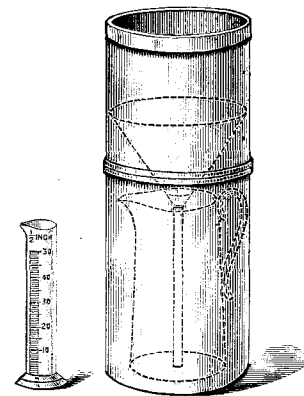
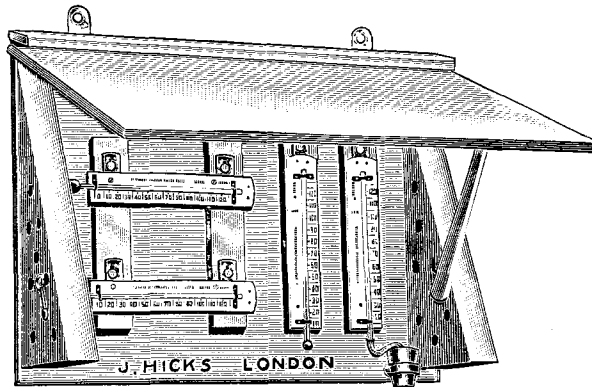
No.		£	s.	d.
B 263	1 Mercurial Barometer, with attached Thermometer .. .. .	1	18	6
B 264	1 Wet and Dry Bulb Hygrometer, on oak board .. .. .	1	3	6
B 265	1 Registering Maximum Thermometer, in oak frame .. .. .	0	17	6
B 266	1 Registering Minimum Thermometer, in oak frame .. .. .	0	17	6
B 267	1 Symons' Copper Rain Gauge and Graduated Measure .. .. .	1	1	0

(Kew Certificates Extra.)

£5 18 0

N.B.—This List can be modified or extended as desired.  
Every instrument is guaranteed of standard excellence.

## The Collegiate Meteorological Set



£ s. d.

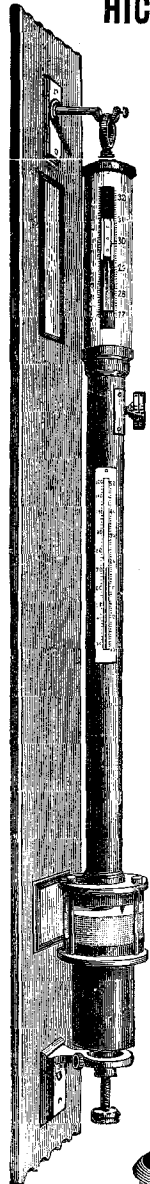
This useful Set of Instruments comprises Maximum and Minimum Thermometers and Mason's Hygrometer; all being graduated on the stems, and figured on porcelain scales; the whole fitted on a wood screen with an adjustable front, for fixing on wall or post. Also a Symons' 5-inch Copper Rain Gauge with graduated measure reading to .01 inch. Price Complete .. .. . **3 18 6**

*Kew Observatory Verifications for above Instruments (if required) can be supplied at a cost of 10/6.*

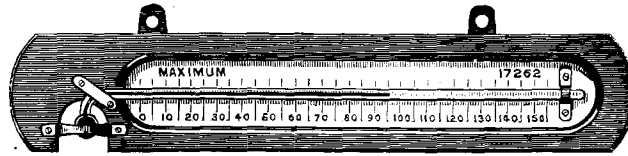
### HICKS' SPECIAL SET OF METEOROLOGICAL INSTRUMENTS

SUITABLE FOR OBSERVATORIES, &c.

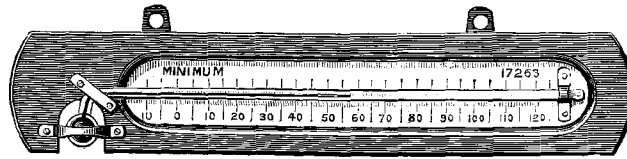
(For Prices and Description see page 36).



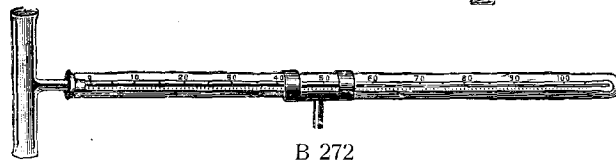
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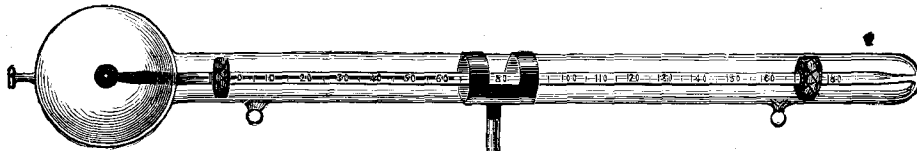
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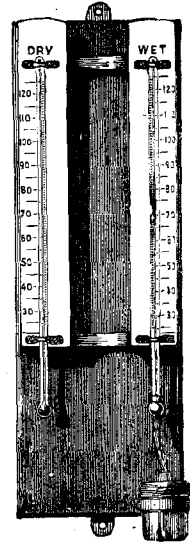
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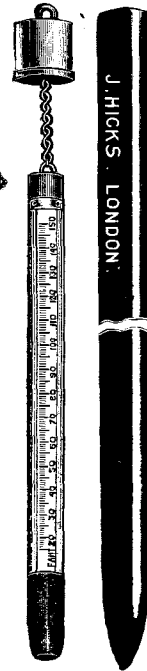
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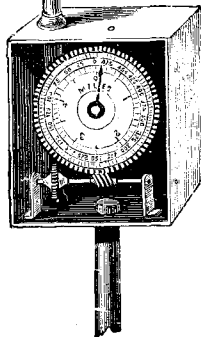
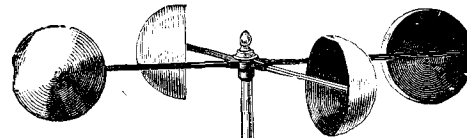
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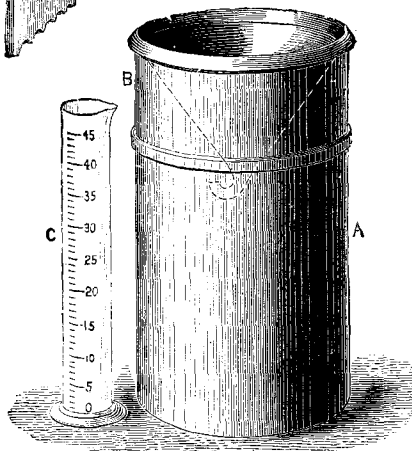
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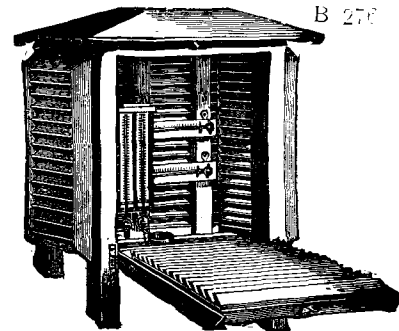
B 274



B 275



B 274



B 277



## HICKS' SPECIAL SET OF METEOROLOGICAL INSTRUMENTS

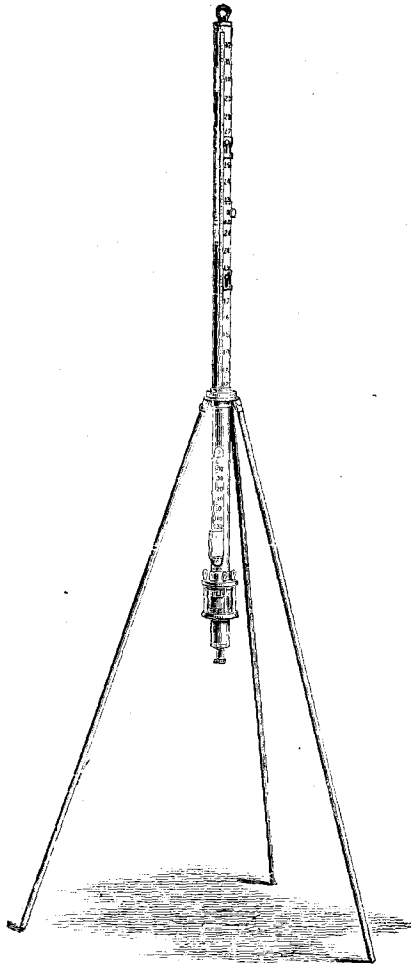
SUITABLE FOR OBSERVATORIES (*illustrated on page 32*).

No.		£	s.	d.
B 268	1 Standard Barometer, diameter of tube 0.5 in., mounted on mahogany board .. .. .	9	9	0
B 269	1 Maximum Standard Thermometer, in oak frame .. .. .	1	1	0
B 270	1 " " " black bulb, in vacuo on stand .. .. .	1	14	0
B 271	1 Minimum " " " in oak frame .. .. .	1	1	0
B 272	1 " " " terrestrial, on stand.. .. .	1	3	0
B 273	1 Wet and Dry Bulb Hygrometer, on oak board .. .. .	1	3	6
B 274	1 Glaisher's Copper Rain Gauge, with Standard measure .. .. .	1	13	0
B 275	Beckley's Improved Anemometer, on 3-foot iron pedestal frame .. .. .	8	8	0
B 276	1 Standard Earth Thermometer, in boxwood frame, with pointed iron tubing .. .. .	1	2	6
B 277	1 Stephenson's Thermometer Screen .. .. .	2	5	0
(Kew Certificates extra)				

£29 0 0

N.B.—These Instruments are of Standard quality, both as regards manufacture and accuracy.

Purchasers may extend or modify the list according to their requirements.



B 282

B 282 **MOUNTAIN BAROMETER** on Fortin's principle, ivory pointer in cistern, attached Thermometer, graduated on stem. Barometer tube enclosed in metal body, portable brass tripod stand and gimbals to revolve, packed in leather sling case, metal lined, for travelling .. .. . £9 9 0

## SYMPIESOMETERS

The Sympiesometer is now used chiefly in conjunction with the Mercurial and Aneroid Barometers, for purposes of comparison. Its indications result partly from the pressure, and partly from the temperature, of the atmosphere; it would, therefore, be more correctly named a Thermo-Barometer.

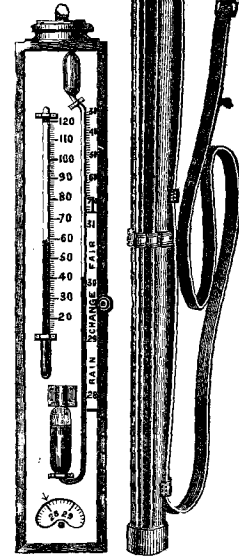
In using it, note first the temperature of the attached Thermometer, then adjust the metal pointer of the pressure scale to the same degree as the Thermometer at side; the height at which the coloured fluid then stands, shews on the sliding scale the atmospheric pressure in inches and tenths of the Barometer scale.

B 278 **SYMPIESOMETER**, in rosewood or mahogany frame, rackwork motion, plate-glass front registering index .. .. . £3 7s. 6d.

B 279 **SYMPIESOMETER**, as above, sliding motion .. .. . £2 16s. 6d.

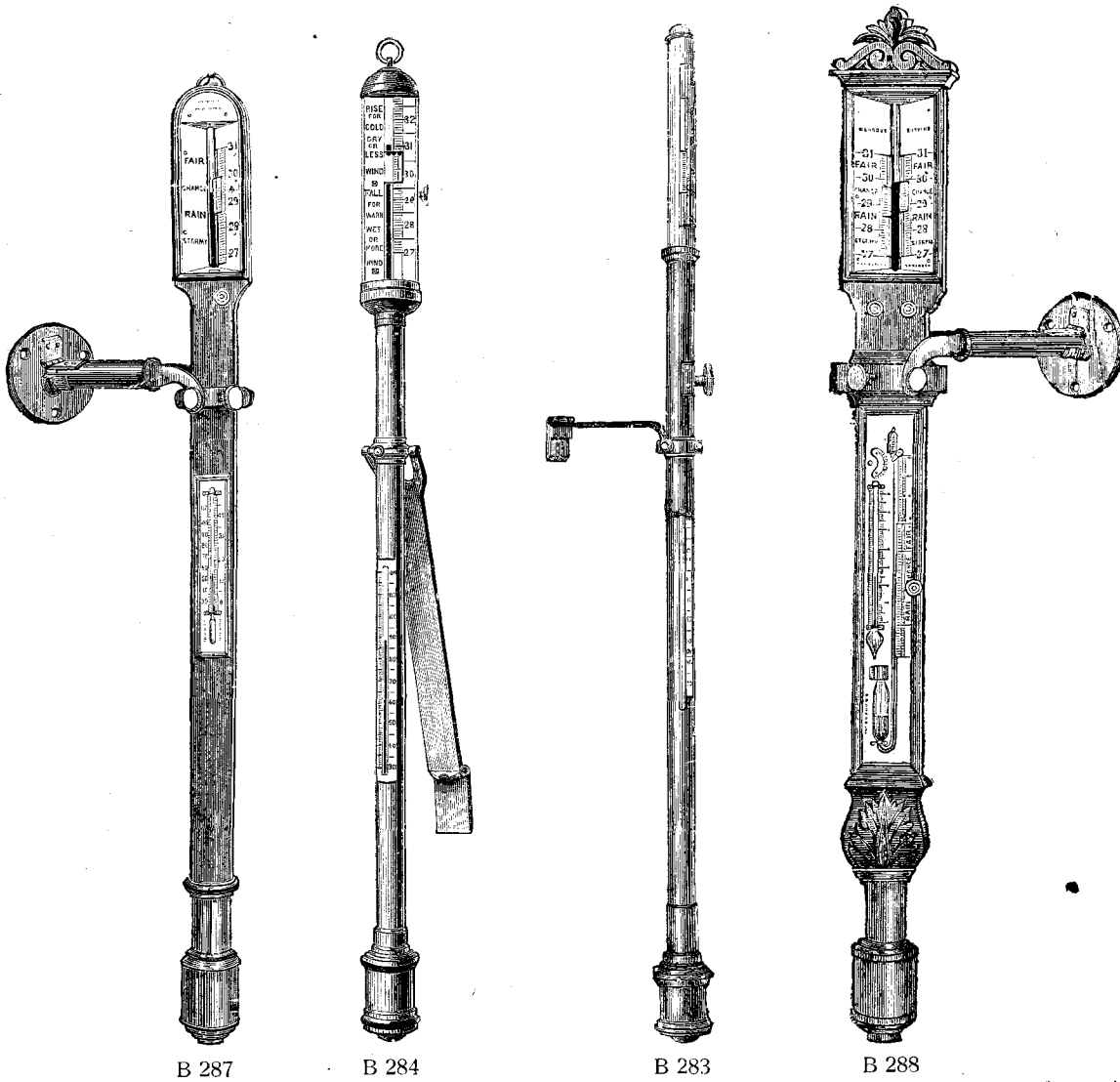
B 280 **SYMPIESOMETER**, portable, for taking altitudes, in sling leather case (10,000 feet) £3 7s. 6d.

B 281 **SYMPIESOMETER**, same as preceding for altitudes to 15,000 feet, for the pocket £5 0s. 0d.



B 278  
Scale  
about †  
Case for  
B 282

# MARINE BAROMETERS



No.		£ s. d.
B 283	<b>BOARD OF TRADE MARINE STANDARD BAROMETER</b> , on the Kew principle, with metal scale (compensated), as used by the Admiralty and the Meteorological Office, and recommended by the Brussels Conference. The cistern is of iron and the frame of brass, and is suspended by a stout but elastic brass arm in gimbals, to facilitate making correct observations at sea. The tube is contracted, to prevent oscillation during the heaviest storm. The scale reads to 1-500 inch . . .	4 14 6
B 284	<b>GUN MARINE BAROMETER</b> , is constructed with special reference to its employment in the Royal Navy during the discharge of the largest guns. It is found to withstand the most violent atmospheric concussions completely, and yields readings, which, for accuracy, are not exceeded by the best Barometers . . .	4 14 6
B 285	<b>MARINE BAROMETER</b> , with attached Thermometer, and with single vernier revolving in centre ring and gimbals, complete in oak frame . . . . .	3 3 0
B 286	Do. do. with attached Thermometer, ivory scales, double vernier, reading 1-100th inch, revolving in centre ring and gimbals, complete in oak frame . . . . .	3 7 6

No.		£	s.	d.
B 287	<b>SOLID ROSEWOOD MARINE BAROMETER</b> , brass arm and gimbals, and attached Thermometer complete, ivory scale (compensated), reads by vernier to 100th inch .. .. .	2	5	0
B 288	<b>SOLID ROSEWOOD COMBINED MARINE BAROMETER</b> , substantially made, is furnished with stout brass arms and gimbals, double vernier for temporarily recording the difference between two readings. It has a Sympiesometer attached, which, with its Thermometer, affords the means of making accurate and <i>comparative</i> observations .. .. .	5	12	6
B 289	Do. do. .. smaller size than B 288.. .. .	4	7	6
B 290	<b>MARINE BAROMETER</b> , round top, attached Thermometer, ivory scales, double vernier, reading to 100th inch, with stout plate glass fronts, in mahogany, rosewood or oak .. .. .	2	13	6
B 291	Do do. same as preceding, with single vernier .. .. .	2	7	6
B 292	Do. do. of simple construction, quite trustworthy, ivory scales and gimbals, sliding vernier and attached Thermometer, in solid mahogany .. .. .	2	5	0
B 293	Do. do. carved top, attached Thermometer, single vernier, capillary tube, to prevent ingress of air during violent oscillations of a storm .. .. .	3	2	0
B 294	Do. do. same as preceding, in carved frame inlaid with pearl .. .. .	4	2	0

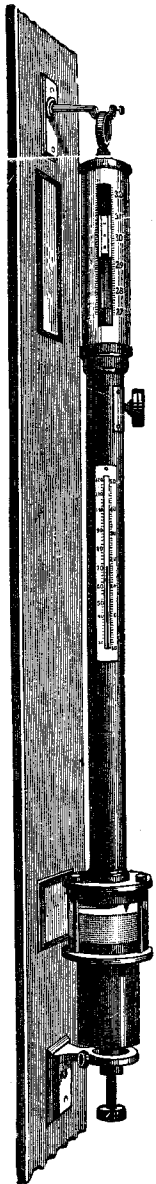
## MARINE THERMOMETERS

No.		£	s.	d.
B 295	Metal scale, enamel tube, copper case .. .. .	0	3	6
B 296	Do. do. do. .. .. .	0	4	6
B 297	Do. do. do. .. .. .	0	6	0
B 298	Do. do. do. .. .. .	0	7	0
B 299	Porcelain scale do. do. .. .. .	0	5	6
B 300	Do. do. do. .. .. .	0	6	6
B 301	Do. do. do. .. .. .	0	8	0
B 302	Do. do. do. .. .. .	0	9	0
B 303	Metal or porcelain scale, magnifying tube, in scooped and riveted copper case .. .. .	0	10	6
B 304	Do. do. do. do. .. .. .	0	13	6
B 305	Do. do. do. do. .. .. .	0	15	6

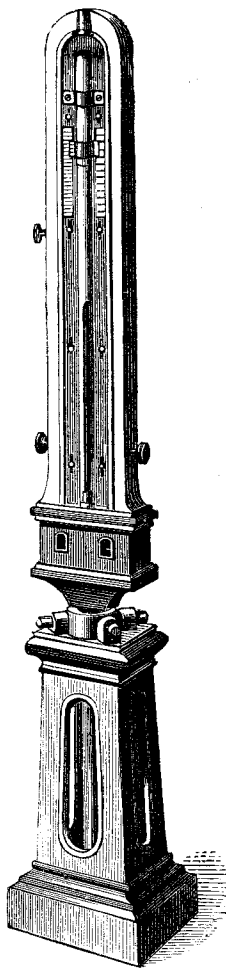
NOTE.—Any special kind of thermometer made to order. Accuracy guaranteed.

# STANDARD MERCURIAL

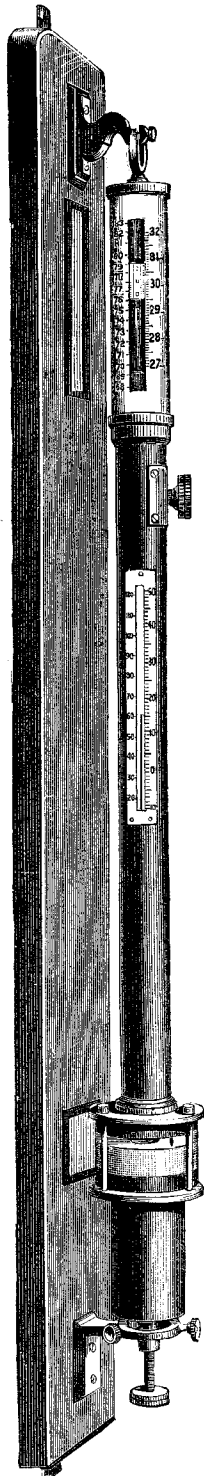
# BAROMETERS



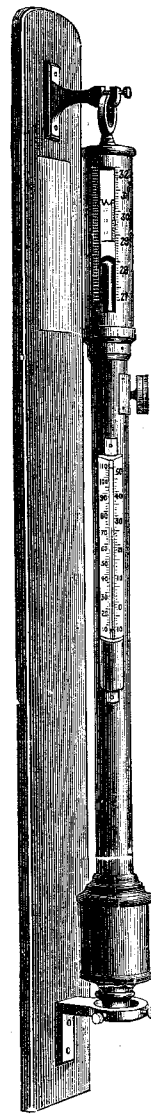
B 308



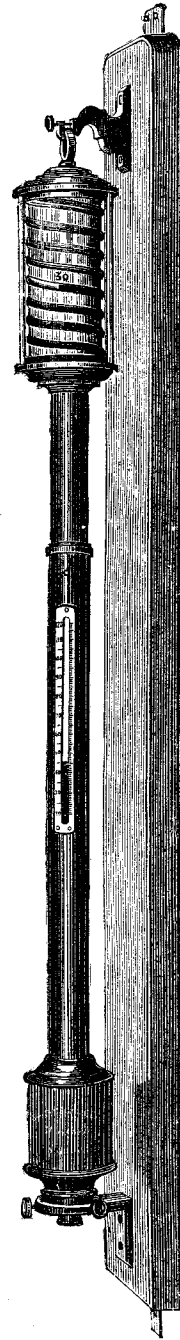
B 307



B 306



B 312

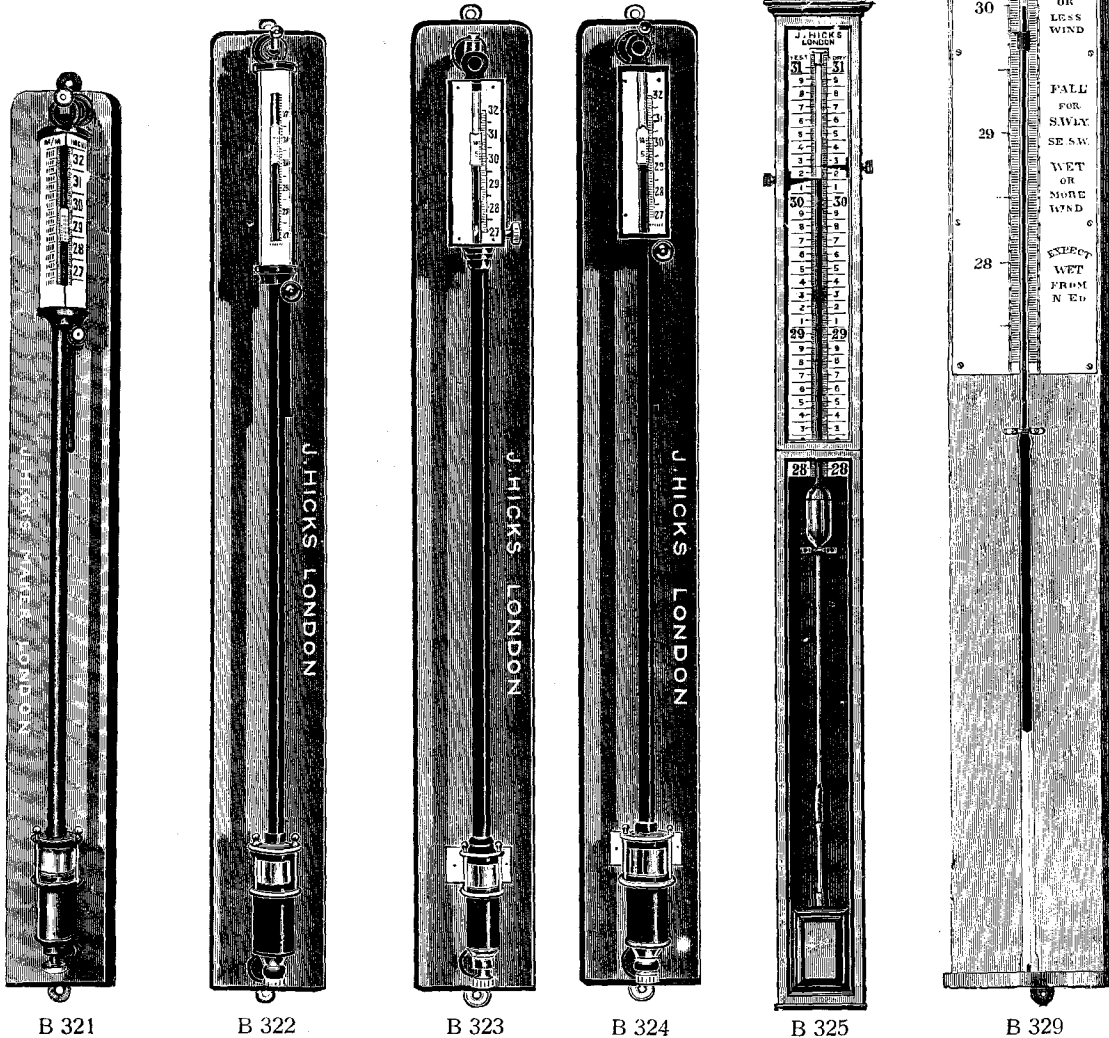


B 314



# STANDARD MERCURIAL BAROMETERS

The Student's Patterns.



B 321

B 322

B 323

B 324

B 325

B 329

## THE MERCURIAL BAROMETER

The first Barometer was invented by TORRICELLI, a Florentine, in 1643, and in so perfect a form that in its essential features it has not been superseded. It is a matter for regret to know that the illustrious inventor died only four years after, at the early age of 39 years, having made himself for ever famous by the invention of an instrument, the usefulness of which it is impossible to over-estimate.

The mode of constructing a Barometer in its simplest form consists in hermetically sealing a glass tube about three feet long at one end, and filling it with mercury. The finger is placed over the open end of the tube, which is then inverted and placed in a vessel of mercury, and the finger withdrawn. The mercury will then be seen to fall some three or four inches, leaving an empty space at the top of the tube, which is called the "Torricellian Vacuum." The mercury is prevented from falling lower by the external pressure of the atmosphere. The *weight* of this column, therefore, represents the *weight* or pressure of a corresponding column of air many miles in height; and so close is the relation between the column of mercury and the external air that the *height* of the former changes with the slightest variation in the *weight* of the latter, and the instrument thus becomes a measure of the weight of the air, from which property its name is derived: the Greek words *baros* and *metron*, signifying respectively "weight" and "measure."

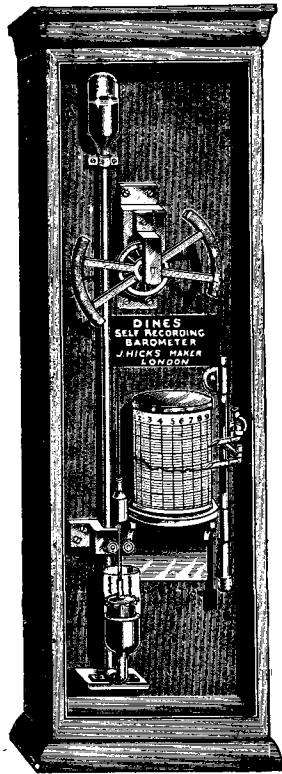
No.		£ s. d.
B 306	<b>STANDARD BAROMETER</b> , on FORTIN'S principle, with its tube, which is 0.75 inch bore, enclosed in a brass body, having at its upper end two vertical openings, in which the vernier works. The readings are taken through these openings, aided by light reflected from a white opaque glass reflector let into the mahogany board behind. The scale is divided on one side into English inches and 20ths, and on the other to French centimetres and millimetres, the vernier enabling a reading to be taken in each case respectively of 1-500th of an inch and 1-10th of a millimetre. In making the instrument, the mercury is boiled in the tube, to ensure the complete exclusion of air and moisture; while FORTIN'S principle of cistern ensures a constant level from whence to take the readings. A highly sensitive Thermometer, with scale, engine divided on stem, is attached to the brass mount, which is perforated to admit the attenuated bulb of the Thermometer into absolute contact with the glass tube of the Barometer, to ensure its indicating the same temperature as the contained mercury. The instrument is suspended by a ring from a brass bracket attached to a mahogany board; and the lower end passes through a larger ring having three screws for its vertical adjustment. A "reading" is taken in the following manner:—1. Note the temperature by the attached Thermometer. 2. Raise or lower the mercury in the cistern by turning the screw underneath until the reflected image of the ivory point on the mercury seems to be in contact with the ivory itself. Adjust the vernier by the milled head until its lower edge just touches the top of the mercurial column, when scale and vernier will indicate the height of the Barometer in inches, 10ths and 100ths	23 10 0
B 307	<b>STANDARD BAROMETER</b> , to revolve on cast iron pedestal frame, as used at the Kew and other leading observatories, internal diameter of tube, 1 inch	28 0 0
B 308	Ditto This instrument is of similar construction to B 306, having a tube of 0'06 inch bore, and reading by the aid of a vernier to 1-500th of an inch and 1-10th of a millimetre. The tube is enclosed in brass, has an attached Thermometer of extreme delicacy, the whole suspended on brackets attached to a mahogany board	13 10 0
B 309	Ditto diameter of tube 0'5 inch	9 9 0
B 310	Ditto The construction of this instrument is similar to B 308. The internal diameter of its tube is 1-3rd inch, and the vernier reads to 1-500th inch	8 5 0
B 311	Ditto Smaller size, 3-10th inch bore, and reading by aid of the vernier to 1-500th inch	6 15 0
B 312	<b>STANDARD BAROMETER</b> , constructed on the Kew principle for meteorological stations. The tube is 0.5 inches in diameter, mounted in brass, like B 306 Standard Barometer, with silvered scale and vernier reading to 1-500th inch, but having the graduations so arranged as to compensate for the rise and fall of mercury in the cistern, thus obviating the necessity for adjustment to the zero point before reading, as in the FORTIN principle. A Thermometer divided and figured on the scale is attached. It is mounted on mahogany board, and is adjustable for light coming from any angle	7 2 6
B 313	Ditto Constructed on the Kew principle as above, tube 3-10ths diameter, reading to 1-500th inch	5 18 6
B 314	<b>HICKS' PATENT SPIRAL TUBE BAROMETER</b> , mounted in metal on mahogany board, with brackets, similar to B 306. In this instrument the scale is so open as to give 12 inches to 1 inch on the ordinary Barometer scale	18 18 0
B 315	<b>GLASS CASE</b> for Standard Barometer, plate-glass sides and door, silvered plate-glass reflector at back	4 10 0
B 316	Ditto for Standard Barometer, plate-glass sides and door, silvered plate-glass reflector at back, for larger size standard	6 10 0

If desired, Standard Barometers B 306 to B 309 may, in place of the metric scale, be graduated in degrees of pressure or millibars on the Barometer scale, and in centigrade degrees from absolute zero on their attached Thermometers at an extra cost of 7/6.

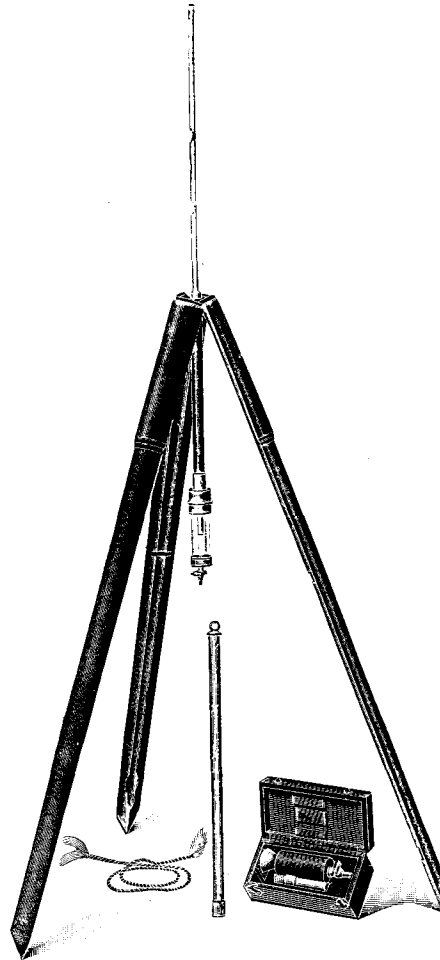
No.			£	s.	d.
B 317	<b>GLASS CASE</b> for Standard Barometer, of polished ebonized mahogany, glass front and sides, an efficient protection from dust .. .. .		2	13	6
B 318	Do. for Standard Barometer, same as preceding, smaller size .. .. .		2	0	0
B 319	Do. for Standard Barometer, of ebonized mahogany, &c., as preceding, with silvered plate-glass back .. .. .		3	7	6
B 320	Do. same as preceding, smaller size .. .. .		2	10	0
B 321	<b>THE DEMONSTRATORS' STANDARD BAROMETER</b> has been specially prepared for college use. The diameter of the mercurial column is $\frac{1}{25}$ inch, and with the aid of the vernier attached gives a bold, well-defined reading to $\frac{1}{100}$ th inch and 1-10th millimetre. Strongly mounted, with angular face as illustrated, on board with brackets (if English scale only is required, 5/- will be allowed) .. .. .		5	0	0
B 322	Do. do. with cylindrical face and reading to $\frac{1}{100}$ th inch .. .. .		4	15	0
B 323	Do. do. with flat silvered metal scale and glass front .. .. .		4	10	0
B 324	Do. do. with flat enamel glass scale .. .. .		4	10	0
B 325	<b>OPEN SCALE BAROMETER.</b> This is without doubt one of the best instruments of its kind ever introduced to the public. It is not only extremely sensitive and accurate, but simple and distinct. The coloured fluid in the tube and the very legible porcelain scale behind it can be seen and read with the greatest ease. Owing to the extremely open range of the barometer (over 8 ins. to an in. of mercury) no vernier is required, and a reading can be easily taken to $\frac{1}{1000}$ th of an inch. .. .. .		9	9	0
	Do. More highly finished, with rackwork .. .. .		11	16	6
B 326	<b>GAY LUSSAC'S STANDARD SYPHON TUBE BAROMETER,</b> of large size, with metal scales and verniers, mounted on mahogany board, with attached Thermometer .. .. .		5	5	0
* These Barometers require no correction for capillary or capacity, each surface of mercury being equally depressed by capillary attraction; and the quantity of mercury falling from the long limb occupies the same space in the short limb. The usual correction for temperature must, however, be applied.					
B 327	<b>MOUNTAIN BAROMETER,</b> on GAY LUSSAC'S principle, syphon tube and arrangement for exclusion of air, tripod stand, and leather case. The metal tube enclosing glass tube is graduated from the centre, with double vernier, the sum of the two readings giving the correct height to $\frac{1}{500}$ th inch .. .. .		5	18	6
B 328	Do. do. as preceding, without stand or leather case .. .. .		4	14	6
B 329	<b>HICKS' PATENT OPEN SCALE BAROMETER.</b> This instrument yields readings in which a rise or fall of one inch of mercury on the ordinary Barometer scale is extended over a space of five inches to one inch .. .. .		1	12	6

It will be seen on reference to Fig. B 329 that the lower half of the tube is larger in the bore than the upper. When the column falls from the upper tube to the lower it becomes shorter, and *vice versa*. It will thus be seen that by varying the relation between the diameters of the upper and lower portions of the tube, scales of any range may be constructed.

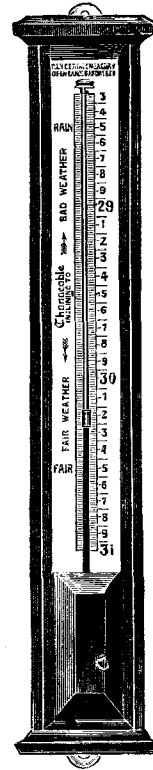
Fig. B 329 illustrates an instrument in which a rise or fall of five inches is equivalent to one inch of the ordinary Barometer scale.



B 330



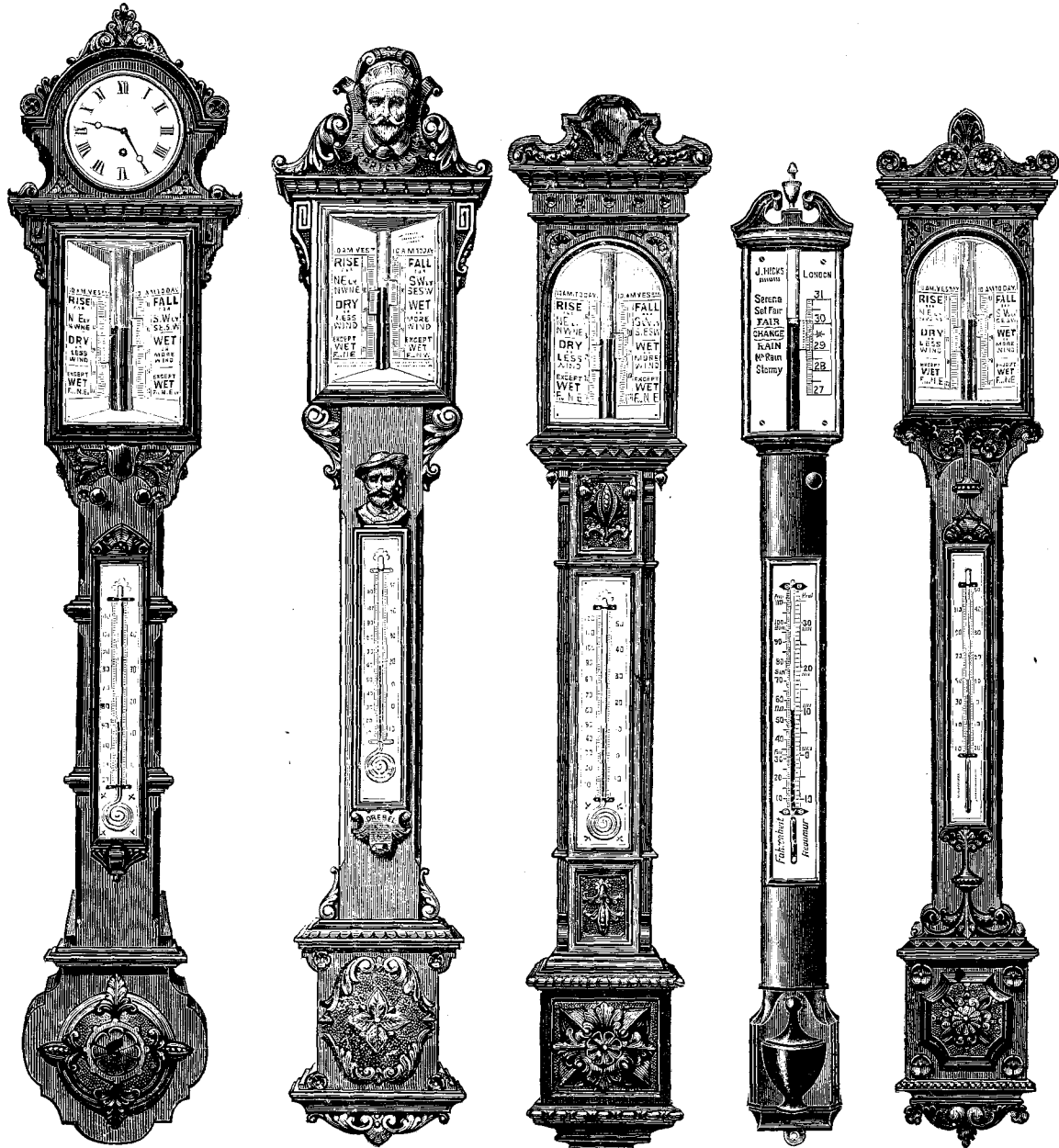
B 331



B 332

<p>No. B 330</p> <p><b>THE DINES' SELF RECORDING MERCURIAL BAROMETER</b> has been designed by W. H. Dines, Esq., F.R.S., to give a trace from which the height at any time may be determined to '005 inch. This end is attained by arranging the details of construction so that the friction of all the moving parts, and more particularly that between the pen and the paper, may be very small, and also by an automatic temperature correction. The pen is actuated by a float in the lower cistern, the motion being multiplied by a lever, so that a length of 1½ inches on the paper may correspond to a change of 1 in. in the height of the barometer. The float is in the form of a hollow cylinder sealed at the top and floating mouth downwards in the mercury. A rise of temperature lowers the level of the mercury in the lower cistern, but at the same time it expands the air in the float, and makes it swim higher in the mercury. The volume of air is so adjusted that there may be a complete compensation. There is an additional pen fixed to the frame, which draws a line of reference on each sheet of paper while it is on the clock drum, and for accurate measurement this line is taken as the zero line, since by this means the error that might be caused by placing the chart unequally on the drum, or by an incorrect printing of the charts, is avoided. The price, complete in glass case with lock and key, including supply of charts and ink, is..</p>	<p>£ s. d.</p> <p>33 15 0</p>
<p>B 331 <b>Mountain Barometer</b>, Captain George pattern, with detachable mercury cistern, separate iron container for carrying the mercury when travelling, complete with folding mahogany tripod stand .. .. .</p> <p>Spare Glass Tube for above in rubber-lined brass case .. .. .</p>	<p>10 10 0</p> <p>2 5 0</p>
<p>B 332 <b>OPEN SCALE BAROMETER.</b> In this instrument the tube is of syphon form, one limb is filled with mercury, and the other with glycerine. The specific gravity of glycerine being so much lighter than mercury, enables a reading to be given of 8 to 10 inches for each inch of mercury, and renders the use of a vernier quite unnecessary. The actual length of this instrument is about that of an ordinary Barometer. Price, in oak frame, with enamel glass scales .. .. .</p>	<p>5 18 6</p>

## PEDIMENT BAROMETERS



B 333

B 335

B 336

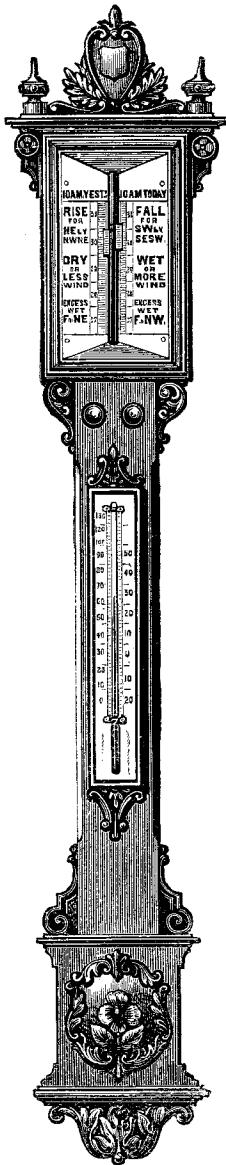
B 337

B 338

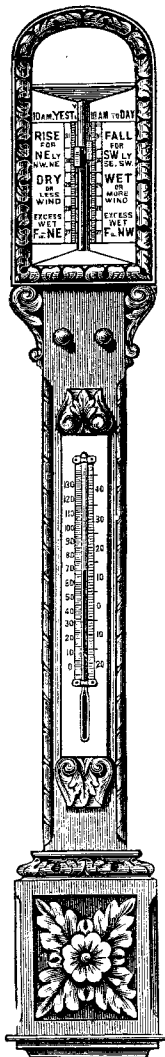
No. **B 333 FULL-SIZE BAROMETER** in elaborately carved oak frame, surmounted by superior eight-day timepiece with 5-in. dial, regulated from the front. The scales are in enamel, FITZROY words, double vernier with rack and pinion adjustments and portable screw. An extra-sensitive spiral Thermometer with Fahrenheit and Centigrade scales is attached, and the instrument will be found specially suitable for the library or entrance hall .. .. . 16 10 0

The above and following Barometers, where enamelled glass scales are used, may be had with red or black letters as desired.

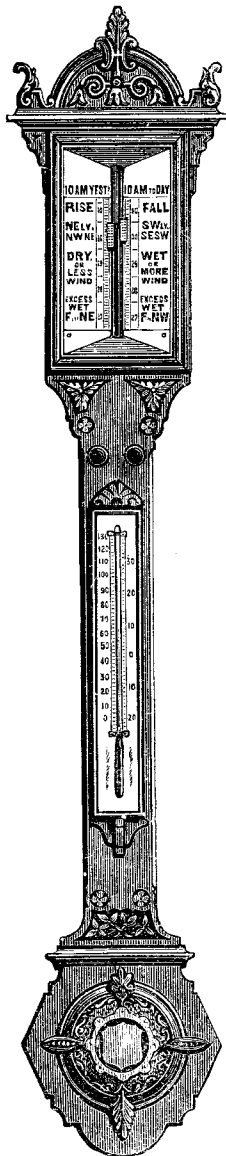
# PEDIMENT BAROMETERS



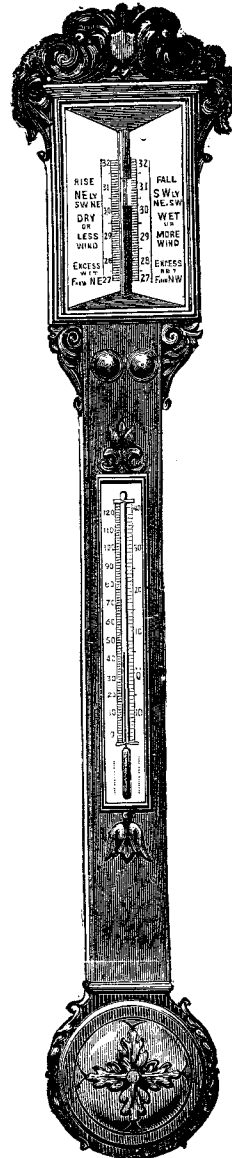
B 339



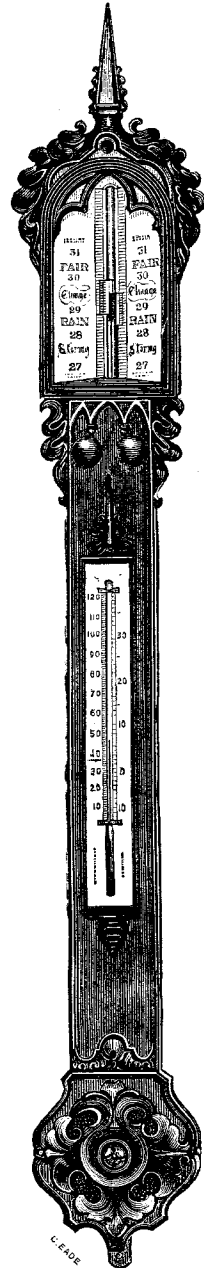
B 340



B 341



B 343



B 344

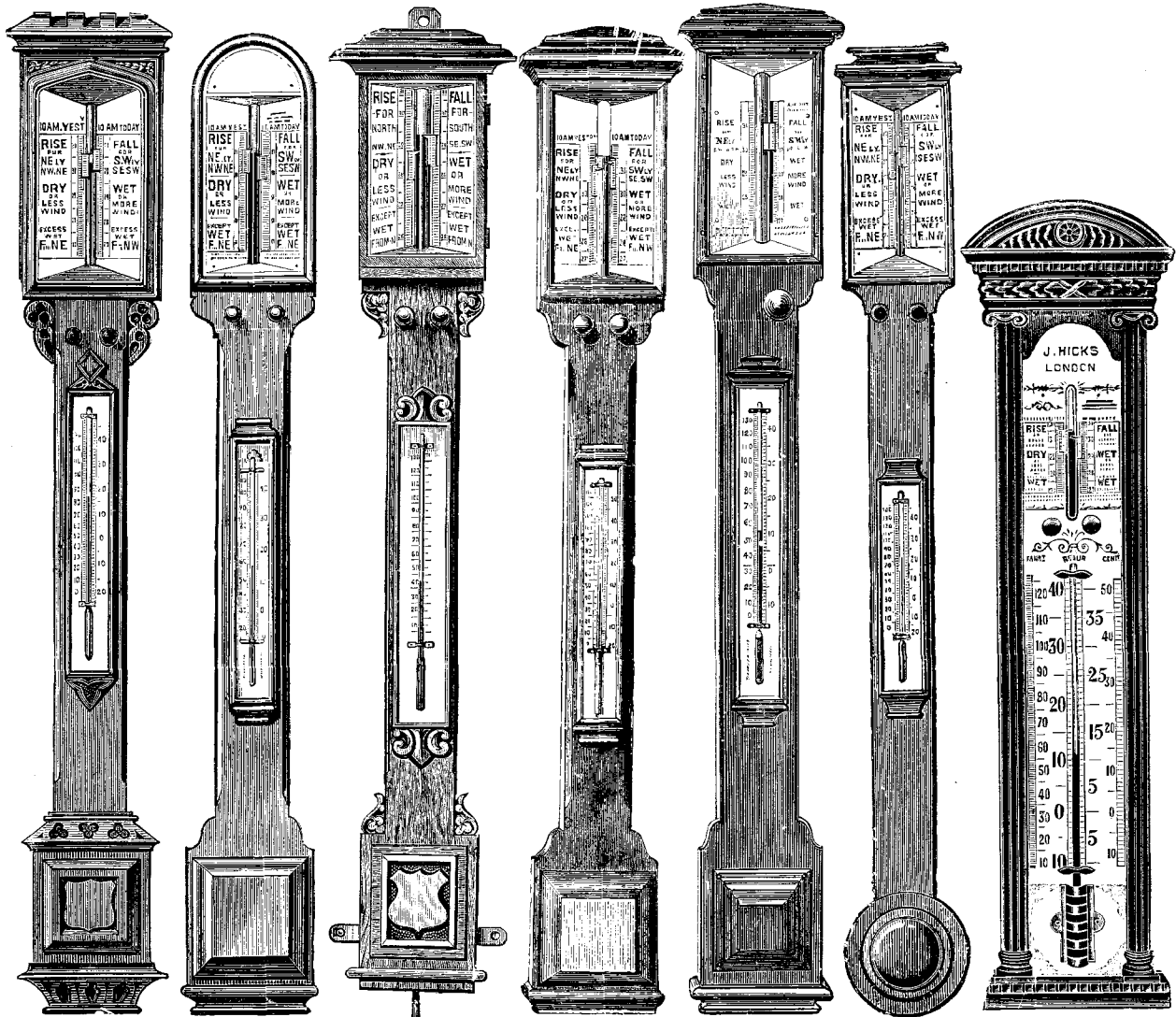
No. £ s. d.  
 B 334 **HIGHLY CARVED OAK FRAME BAROMETER**, tube,  $\frac{3}{4}$ -in. bore, ensuring freedom from error of capillarity, for hall or large buildings, enamelled or ivory scales, FITZROY words, and double vernier with rack and pinion adjustments, attached Thermometer, thick plate-glass fronts . . . . . 14 5 0



## PEDIMENT BAROMETERS

No.		£ s. d.
B 335	<b>TORRICELLI-DREBEL BAROMETER</b> (Registered). The frame of this instrument is elaborately carved in the Italian Renaissance style, and is surmounted by a carved head of Torricelli, under which are the words, in antique letter, "Torricelli, invt. 1643." A highly sensitive spiral Thermometer is attached, with FAHRENHEIT and CELSIUS Scales, and surmounted by a carved head of Drebel, the inventor of the Thermometer, with words, also in antique letter, "Drebel, invt. 1620," under the head. In addition to being a most handsome piece of furniture for the hall or library, the instrument thus assumes an educational character. It has a bold tube, supported by enamel scales, having FITZROY words and double vernier of enamelled glass, with rack and pinion adjustments and portable screw .. .. .	11 5 0
B 336	<b>LARGE RICHLY CARVED BAROMETER</b> , enamel or ivory scales, FITZROY words, double vernier with rack and pinion adjustments, large spiral attached Thermometer, and portable screw for convenience and safety in moving the instrument .. .. .	11 5 0
B 337	<b>BEST SOLID MAHOGANY BAROMETER</b> , double vernier, with metal pointers, rack and pinion adjustments, attached Thermometer, engraved metal scales, bow glasses, Chippendale style .. .. .	6 6 0
B 338	<b>BEST CARVED SOLID OAK BAROMETER</b> , elaborate design, scroll and shell top, enamel or ivory scales, FITZROY words—or "Fair," "Change," and "Rain"—double vernier with rack and pinion adjustments and attached Thermometer .. .. .	7 17 6
B 339	Do. do. do. enamel or ivory scales, FITZROY words—or, "Fair," "Change," and "Rain"—double vernier with metal pointers, rack and pinion adjustments and attached Thermometer .. .. .	7 7 0
B 340	Do. do. do. enamel scales, FITZROY words—or "Fair," "Change," and "Rain"—double vernier with metal pointers, rack and pinion adjustments and attached Thermometer .. .. .	6 15 0
B 341	<b>CARVED SOLID OAK BAROMETER</b> , enamel or ivory scales, double vernier with metal pointers, rack and pinion adjustments and attached Thermometer .. .. .	7 0 0
B 342	<b>BEST CARVED SOLID OAK BAROMETER</b> , enamelled or ivory scales, double vernier with metal pointers, rack and pinion adjustments and attached Thermometer .. .. .	7 0 0
B 343	Do. do. do. carved cross, enamelled or ivory scales, double vernier with metal pointers, rack and pinion adjustments and attached Thermometer .. .. .	7 0 0
B 344	Do. do. do. Gothic design, enamelled or ivory scales, double vernier with metal pointers, rack and pinion adjustments, attached Thermometer, plate-glass fronts .. .. .	6 15 0
B 345	Do. do. do. castellated top, enamelled or ivory scales, double vernier with metal pointers, rack and pinion adjustments, attached Thermometer, plate-glass fronts .. .. .	6 15 0
B 346	Do. do. do. same as B 345, but smaller size .. .. .	5 18 6
B 347	<b>CARVED SOLID OAK SEA COAST BAROMETER</b> , round top, enamel scales, double vernier, with metal pointers, rack and pinion adjustments, attached Thermometer .. .. .	5 7 6
B 348	<b>SEA COAST BAROMETER</b> , plain round top, same as above .. .. .	5 0 0
B 349	<b>SEA COAST OR FISHERY BAROMETER</b> , in solid oak, with brass fastenings, porcelain scale with lettering burnt in, double vernier, reading to 100th inch, extra large attached Thermometer, engine divided on stem, and figured on scale, which is very open, plate-glass door, to admit of removal of moisture from scale and tube .. .. .	5 12 6

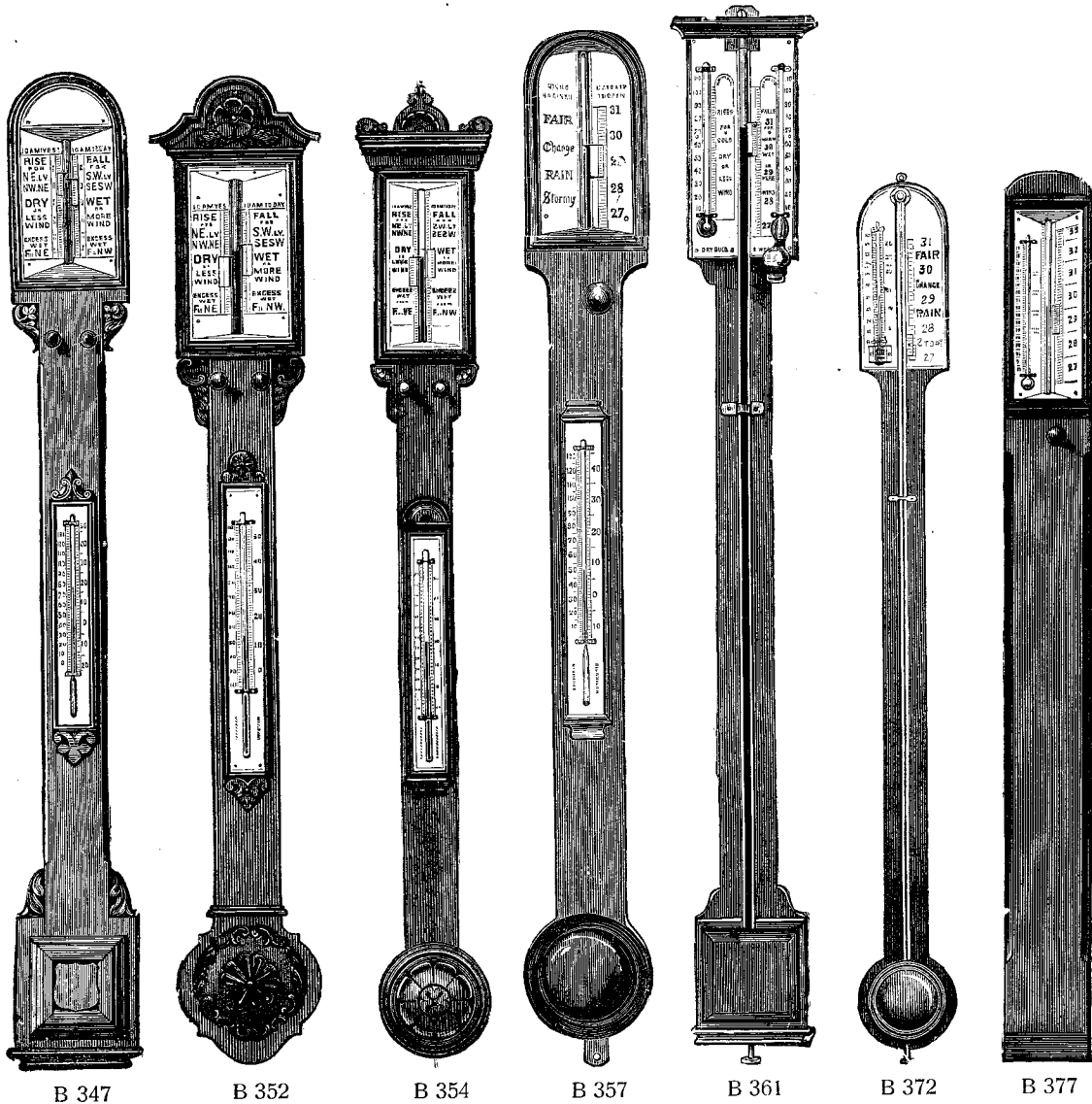
# PEDIMENT BAROMETERS



B 345                      B 348                      B 349                      B 351                      B 353                      B 358                      B 368

No.		£	s.	d.
B 350	<b>CARVED SOLID OAK BAROMETER</b> , for Sea Coast, square top, enamelled or porcelain scales, double vernier, with rack and pinion adjustments, attached Thermometer and plate-glass fronts .. .. .	5	0	0
B 351	<b>SOLID OAK BAROMETER</b> , plain frame as above .. .. .	4	15	0
B 352	<b>CARVED SOLID OAK BAROMETER</b> , enamel or ivory scales, double vernier, with rack and pinion adjustments and attached Thermometer .. .. .	5	0	0
B 353	<b>SOLID OAK BAROMETER</b> , for Sea Coast, square top, enamelled or porcelain scales, single vernier, with rack and pinion adjustments, and attached Thermometer and plate-glass fronts .. .. .	3	18	6
B 354	<b>SMALL CARVED OAK BAROMETER</b> , enamelled scales, double vernier, with rack and pinion adjustments and attached Thermometer .. .. .	3	12	6
B 355	Do. do. same as preceding, with single rack .. .. .	3	7	6

## PEDIMENT BAROMETERS



No.		£	s.	d.
B 356	<b>PLAIN WALNUT FRAME BAROMETER</b> , dome top, enamel scales, double vernier, with rack and pinion adjustments and attached Thermometer .. ..	3	12	6
B 357	Do. do. dome top, &c., same as preceding, with single vernier .. .. .	3	7	6
B 358	<b>SOLID OAK BAROMETER</b> for Sea Coast, small size, square top, ivory scales, double vernier, with rack and pinion adjustments and attached Thermometer ..	2	16	6
B 359	Do. do. small size as above, single vernier, with rack and pinion adjustments .. .. .	2	10	0
B 360	<b>SMALL ROUND TOP BAROMETER</b> in oak or rosewood, ivory scales, single vernier, with rack and pinion adjustments and attached Thermometer .. ..	1	13	6

## PEDIMENT BAROMETERS

No.		£	s.	d.
B 361	<b>FARMER'S BAROMETER</b> , on solid oak frame, ivory or enamel scales, sliding vernier, wet and dry bulb Thermometers, indicating temperature and moisture ..	2	0	0
B 362	Do. do. in carved oak frame, same as preceding ..	2	0	0
B 363	Do. do. small carved ivory scales ..	1	12	6
B 364	<b>SOLID OAK BAROMETER</b> , for Sea Coast, square top, middle size, ivory or enamel scales, double vernier, rack and pinion adjustments and attached Thermometer..	3	12	6
B 365	Do. do. for Sea Coast, square top, same size as preceding, single vernier, with rack and pinion adjustments ..	3	12	6
B 366	<b>CARVED WALNUT FRAME BAROMETER</b> , ivory or enamel scales, double vernier, with rack and pinion adjustments, circular flowered cap ..	3	7	6
B 367	Do. do. same as preceding, single vernier, with rack and pinion adjustments ..	3	3	0
B 368	<b>CARVED OAK "HALL" BAROMETER</b> , heavy frame, enamel glass scales, double verniers, rack and pinion adjustments, and 24-in. bold Thermometer with Fahrenheit, Centigrade and Reaumur scales ..	7	17	6
B 369	<b>INLAID MAHOGANY BAROMETER, Sheraton Pattern</b> , enamel scales, double vernier, with rack and pinion adjustments ..	6	5	0
B 370	<b>*THE "EXCHANGE" or "READING ROOM" BAROMETER</b> , in massive solid oak frame elaborately carved, with pillars at side, in Ionic design, very bold tube and broad enamelled glass scales, FITZROY words—or "Fair," "Change," and "Rain"—double vernier, with metal pointers and rack and pinion adjustments, spiral Thermometer with very legible FAHRENHEIT and Centigrade scales attached, and thick plate-glass fronts ..	16	10	0
	* This Barometer has an imposing appearance, and is well adapted for Public Institutions.			
B 371	<b>THE MODEL BAROMETER</b> , enamel scale, sliding vernier, tube visible through-out, with portable screw ..	1	1	0
B 372	Do. enamel scale, etc., as preceding, with attached Thermometer ..	1	4	0
B 373	Do. ivory scales, sliding vernier, and Thermometer ..	1	1	0
B 374	Do. best mounted, bold Tube, and enamel Thermometer ..	1	4	0
B 375	<b>THE SMALL COTTAGE BAROMETER</b> , in mahogany frame, ivory scales, sliding metal pointer ..	0	15	6
B 376	Do. in mahogany frame, ivory scales and pointer, with Thermometer ..	0	18	0

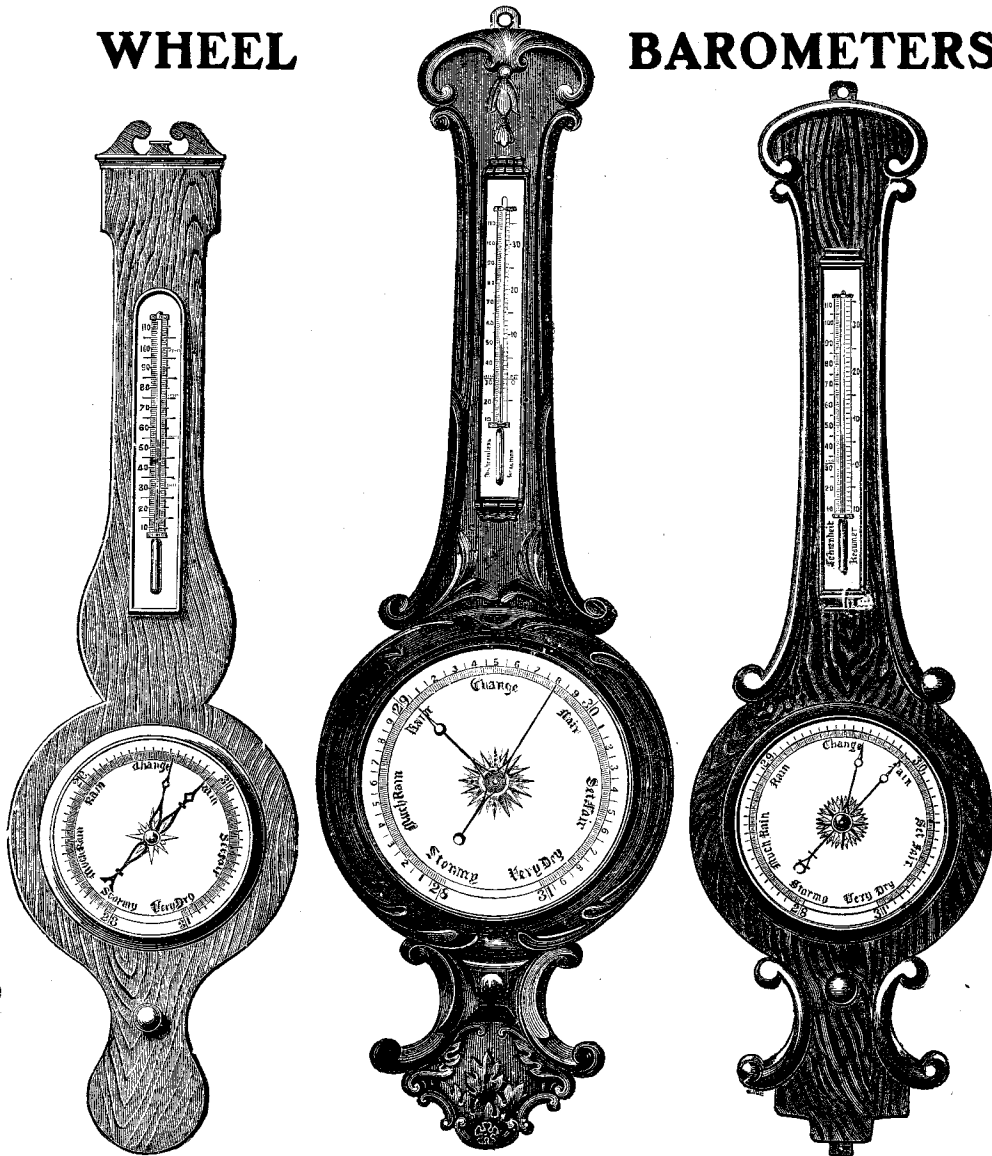
## MINERS' BAROMETERS

Close observation has shown that before an explosion in coal mines there occurs a diminution of atmospheric pressure, and so convinced have the Legislature become of the importance of this indication, that an Act of Parliament has been passed, with the object of averting the disastrous consequences of explosions, by rendering the use of the Barometer compulsory. £ s. d.

B 377	<b>MINERS' OR PIT BAROMETERS</b> , compact solid oak frame (screwed), compensated tube, ivory scale reading to 33 inches, attached enamel Thermometer, single vernier, with rack and pinion adjustments, strong glass face framed in bronze metal ..	1	16	0
B 378	Do. do. in compact solid oak frame, &c., same as preceding, round top, metal and glass face, scale reading to 33 inches, with portable screw ..	1	16	0
B 379	Do. do. open face, ivory or enamel scales, sliding vernier, attached Thermometer, India-rubber bag over cistern, the brasswork and cistern coated with marine glue, to prevent moisture penetrating, and reading to 34 inches ..	2	0	0
B 380	Do. do. same as preceding, scale reading to 32 inches..	1	16	6
B 381	Do. do. same as preceding, ordinary cistern, scale reading to 34 inches ..	1	11	6

**WHEEL**

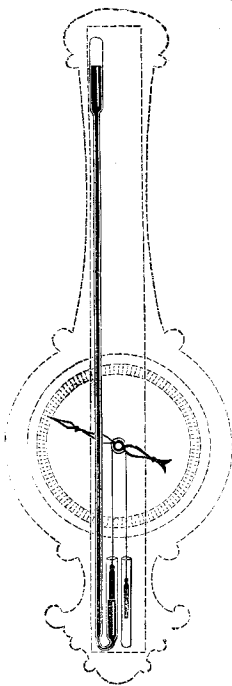
**BAROMETERS**



B 382

B 395

B 385



This is an instrument in which the varying height of a column of mercury is shewn by the movement of a needle on a divided circular dial. This is accomplished by adopting the syphon for the Barometer tube, which is concealed behind the dial and frame. An iron or glass float sustained by the mercury in the open branch is suspended by a counterbalance a *little* lighter than itself. The axis of the pulley has the needle attached to it, and consequently moves the needle with the rise and fall of the mercury. It is obvious, therefore, that if the atmospheric pressure increases, the float falls and the needle turns to the right, and if it diminishes the needle turns in the opposite direction. The divisions on the scale represent inches, tenths, and hundredths in the rise and fall of a column of mercury, and these can be read with great facility, as one inch occupies the space of six or more on this very open scale, according to size of dial. The wording is of course arbitrary, and indicates the probable weather that may be expected.

Important improvements have recently been effected in this form of Household Barometer, so that they may be recommended as good weather indicators, where facility of reading is a desideratum. They are all furnished with delicately balanced indices, which respond to the slightest variations of atmospheric pressure, and a great variety of now patterns of frames has been introduced, of which the following is a description:—

## WHEEL BAROMETERS

No.		£	s.	d.
B 382	<b>WHEEL BAROMETER</b> , 8-in. silvered metal dial, attached spirit Thermometer .. .. .	1	4	0
B 383	Do. do. 8-in. silvered metal dial, convex mirror, spirit level, oat-beard hygrometer, and attached spirit Thermometer .. .. .	1	4	0
B 384	Do. do. 8-in. silvered metal dial, "Dotti" or scroll pattern, 10-in. attached plain Thermometer, without beading .. .. .	1	14	0
B 385	Do. do. 8-in. silvered dial, "Dotti" pattern, beaded scroll, 10-in. attached plain Thermometer .. .. .	2	5	0
B 386	Do. do. same as preceding, but plate-glass front .. .. .	2	16	6
B 387	Do. do. 8-in. silvered dial, "Dotti" pattern, slightly carved scroll work, 10-in. enamel attached Thermometer .. .. .	2	16	6
B 388	Do. do. 8-in. silvered dial, chastely carved, plate-glass front, 10-in. enamel attached Thermometer .. .. .	3	10	0
B 389	Do. do. 10-in. silvered dial, convex mirror, spirit level, oat-beard hygrometer, and attached spirit Thermometer .. .. .	2	5	0
B 390	Do. do. 30-in silvered dial, "Dotti" pattern, no beading, attached plain Thermometer .. .. .	2	5	0
B 391	Do. do. 10-in. silvered dial, "Dotti" pattern, beaded scroll, attached plain Thermometer .. .. .	3	3	0
B 392	Do. do. 10-in. silvered dial, same as preceding, but plate-glass front .. .. .	3	12	6
B 393	Do. do. 10-in. silvered dial, best ring bevelled plate-glass front, Thermometer, &c., as preceding .. .. .	3	15	0
B 394	Do. do. 10-in. silvered dial, "Dotti" pattern, slightly carved scroll work, 10-in. enamelled attached Thermometer .. .. .	3	18	6
B 395	Do. do. 10-in. silvered dial, elaborately carved in any wood, 10-in. Thermometer .. .. .	5	0	0
B 396	Do. do. 10-in. porcelain dial, handsomely engraved ornamental centre, "Dotti" pattern, beaded scroll, best ring bevelled plate-glass front, and 10-in. enamel attached Thermometer on opal scale, FAHR. and Cent. scales .. .. .	4	4	0
B 397	Do. do. 10-in. silvered dial, handsomely carved solid oak frame, best ring bevelled plate-glass front, enamel attached Thermometer, FAHR. and Cent. scales, acorn and leaf pattern .. .. .	5	12	6
B 398	Do. do. 10-in. silvered or porcelain dial, handsomely carved in oak, circular centre, enamel tube Thermometer, FAHR. and Cent. scales .. .. .	5	0	0
B 399	Do. do. 12-in. silvered dial, oat-beard hygrometer, convex mirror, spirit level and attached Thermometer .. .. .	2	16	6
B 400	Do. do. 12-in. silvered dial, attached Thermometer .. .. .	2	16	6
B 401	Do. do. 12-in. silvered dial, "Dotti" or scroll pattern, enamel Thermometer .. .. .	3	18	6
B 402	Do. do. 12-in. silvered dial, "Dotti" pattern, beaded scroll, carved, enamel attached Thermometer .. .. .	4	4	0
B 403	Do. do. 12-in. silvered dial, "Dotti" pattern, carved scroll work, enamel Thermometer .. .. .	5	12	6
B 404	Do. do. 8-in. silvered dial, Mediæval design, square centre, elegantly carved in solid oak, enamel tube Thermometer, FAHR. and Cent. scales .. .. .	4	10	0
B 405	Do. do. 12-in. silvered dial, in handsomely inlaid mother-o'-pearl frame, attached Thermometer, enamelled FAHR. and Cent. scales .. .. .	4	10	0

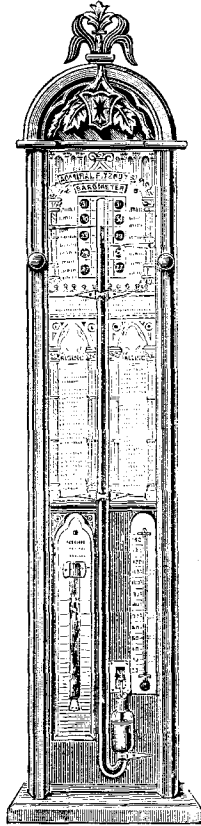
These instruments are supplied in rosewood, walnut, mahogany, or oak frames.

Steel or Glass Stopcocks to render Barometers portable, 4/6 extra.

Wheel Barometers intended for exportation should be expressly described as such, in order that the necessary precautions against injury may be adopted in packing.

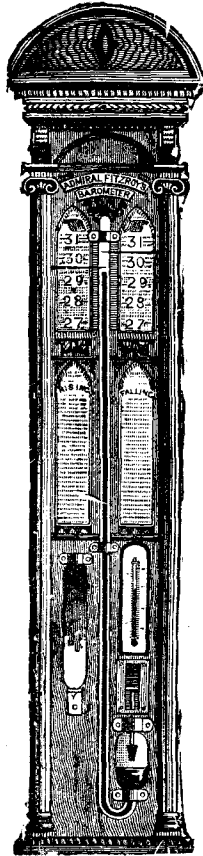


B 406 FITZROY BAROMETER, in handsome oak frame 37/6



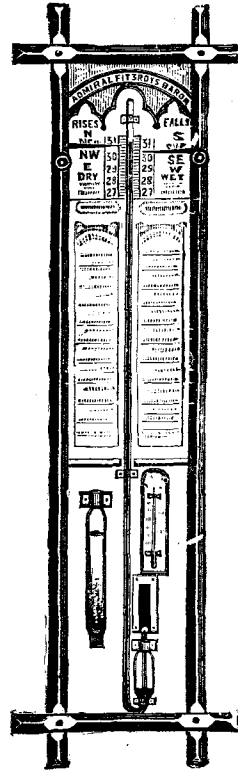
B 406

B 407 FITZROY BAROMETER, in nicely curved oak frame, with Thermometer and Storm Glass 70/-



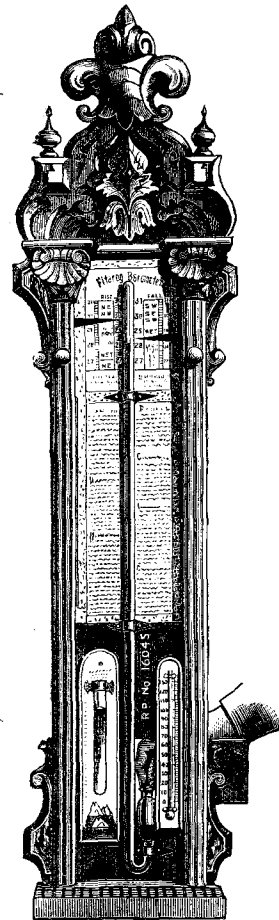
B 407

B 408 FITZROY BAROMETER, in Oxford frame, with Thermometer and Storm Glass 21/-



B 408

B 409 FITZROY BAROMETER, in beautifully carved frame, with Thermometer and Storm Glass 58/6



B 409

## Storm Glass or Chemical Weather Glass.

This instrument has been known for more than a hundred years, and, though the name of the inventor is unknown, tradition attributes the honour to an Italian sailor. It is simply a glass bottle, 10 inches long, containing a mixture of camphor, nitre, sal-ammoniac, alcohol and water. It has latterly fallen somewhat into disrepute, from want of due care being exercised in the preparation of the solution; but when properly prepared it will be "found useful for aiding, with the Barometer and Thermometer, in forecasting the weather."

The late Admiral Fitzroy, in speaking of this instrument, said: "Temperature affects the mixture much"; and, in order to facilitate observations under this head, J. J. Hicks has recently designed and registered an arrangement in which the stem of a Thermometer is immersed in the fluid, as shewn at B 419 thus imparting a higher value to the indications of the instrument.

The usual indications are as follows:—1st.—For Fine Weather, the substance will be low and smooth at the bottom. 2nd.—For Rain, the substance will rise gradually in the shape of feathers. 3rd.—For High Wind or Storm, the substance will rise as above, but much higher, partly at the top; sometimes white spots will appear in motion, particularly in the first part of the change—that denotes Storm.

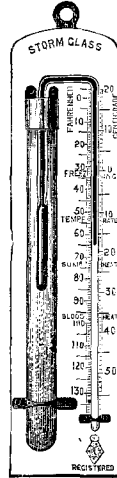
# Storm Glass or Chemical Weather Glass



B 410

Will correctly indicate

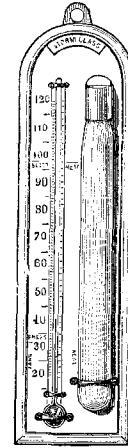
High Wind,



B 419

the coming Rain,

Storm or Tempest.



B 423

## STORM GLASSES

No.				£	s.	d.
B 410	<b>STORM BOTTLE</b>	(10-in.), 1-in. diameter, brass cap	.. .. .	0	4	0
B 411	Do.	do. (12-in.), 1½-in. diameter, brass cap	.. .. .	0	5	0
B 412	<b>STORM GLASS</b>	(8-in.), square top, boxwood scale	.. .. . per doz.	0	12	0
B 413	Do.	do. (8-in.), square top, boxwood scale, with plain. Thermometer	.. .. . per doz.	1	14	0
B 414	Do.	do. (9-in.), elliptic top, boxwood scale, enamel tube Thermometer, FAHRENHEIT scale	.. .. . per doz.	2	10	0
B 415	Do.	do. (10-in.), round top, boxwood scale, enamel tube Thermometer, FAHRENHEIT scale	.. .. . per doz.	3	7	6
B 416	Do.	do. (10-in.), round top, boxwood scale, enamel tube Thermometer, FAHRENHEIT and Centigrade scales	.. .. . per doz.	3	13	6
B 417	Do.	do. (12-in.), round top, boxwood scale, enamel tube Thermometer, FAHRENHEIT scale	.. .. . each	0	7	6
B 418	Do.	do. (12-in.), round top, boxwood scale, enamel tube Thermometer, FAHRENHEIT and Centigrade scales	.. .. . each	0	8	6
B 419	<b>HICKS' REGISTERED STORM GLASS</b>	(8-in.), having the bulb of the Thermometer immersed in the fluid, boxwood scale, enamel tube Thermometer,	.. .. . each	0	8	6
B 420	Do.	do. (10-in.)	.. .. . each	0	11	0
B 421	Do.	do. (12-in.)	.. .. . each	0	14	0
B 422	<b>STORM GLASS</b>	on best 12-in. porcelain scale, with attached Thermometer, and FAHRENHEIT and Centigrade scales	.. .. . each	0	14	0
B 423	Do.	do. on best 12-in. porcelain scale, with attached Thermometer single scale	.. .. . each	0	12	0

Printed directions with each instrument.

## THERMOMETERS

Though the invention of the Thermometer has been ascribed to various scientific men, it only assumed a practical shape in 1620, at the hands of Drebel, a Dutch physician. Halley substituted mercury for spirit in 1697; Reaumur modified the instrument in 1730, and Fahrenheit in 1749; Celsius improving it in 1742, by adding the scale now known as Centigrade.

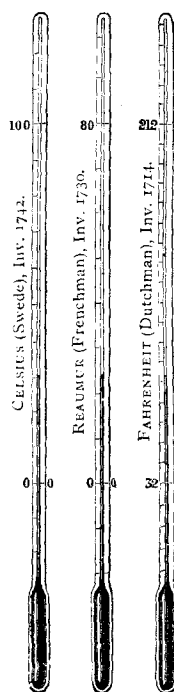
For many years it was exclusively used by chemists and men of science; it afterwards received numerous applications in the arts and manufactures; and, more recently, it is considered an essential in every household.

Thermometers, briefly described, are instruments for measuring degrees of heat by the contraction or expansion of fluids in enclosed tubes. The tubes, which are of glass, have spherical, elongated, or spiral bulbs blown on to one end; they have also an exceedingly fine bore, and, when mercury or spirit is enclosed in them, these fluids, in contracting and expanding with variations of temperature, indicate degrees of heat in relation to two fixed points, viz., the freezing and boiling points of water.

Care is taken to exclude all air before sealing, so that the upper portion of the tube inside shall be a perfect vacuum, and thus offer no resistance to the free expansion of the mercury.

In graduating or dividing the scales, the points at which the mercury remains stationary in melting ice and boiling water are first marked on the stem, and the intervening space divided into as many equal parts as are necessary to constitute the scales of Celsius, Fahrenheit, or Reaumur.

The following pages will be found to contain such a variety as will meet the requirements of all sections of the public.



**Graduation of Thermometers.**—When the fluid (either mercury or spirit) has been enclosed in the hermetically sealed bulbous tube, it becomes necessary, in order that its indications of elevation or depression of temperature may be comparable with those of other instruments, that a Scale having at least two fixed points should be attached to it. Consequently, as it has been observed that the temperature of melting ice or freezing water is always constant, the height at which the fluid *rests* in a mixture of ice and water has been chosen as one point from which to graduate the Scale. It has been further observed that with the Barometer at 29.922 the boiling-point of water is also constant, and when a Thermometer is immersed in pure distilled water heated to ebullition, the point at which the mercury in the tube remains immovable is, like the freezing-point, carefully marked, and is then calibrated and divided into as many equal parts as are necessary to constitute either of the three Scales at present in use, as shewn in the illustration.

The zero of the Scales of Reaumur and Centigrade is the freezing-point of water, marked, in each case, 0°, while the intervening space, up to the boiling-point of water, is divided, in the former case, into 80 parts, and in the latter to 100.

In the Fahrenheit Scale, the freezing-point is represented at 32°, and the boiling-point at 212°, the intervening space being divided into 180°, which admits of extension above and below the points named, a good Thermometer being available for temperature up to 620° Fahr.

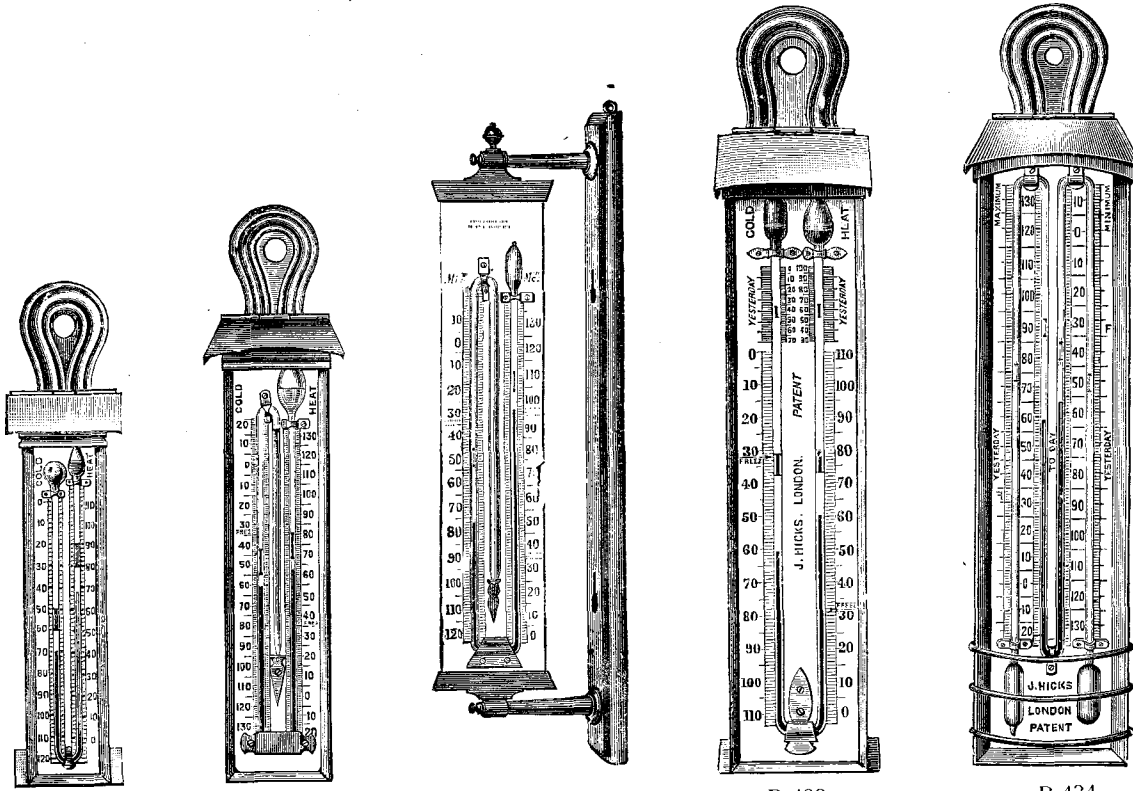
The use of the Reaumur Scale is confined almost exclusively to Russia and the north of Germany, while the Centigrade Scale is used throughout the rest of Europe. The Fahrenheit Scale is confined to England and her Colonies, and to the United States of America.

A variety of circumstances arise in which it becomes necessary to convert readings from one scale into those of the others, in which cases the following rules are to be observed:—

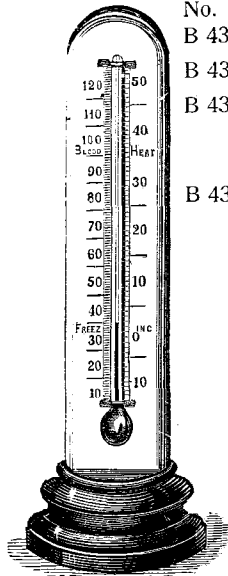
1. To convert Centigrade degrees into degrees of Fahrenheit, multiply by 9, divide the product by 5, and add 32.
2. To convert Fahrenheit degrees into degrees of Centigrade, subtract 32, multiply by 5, and divide by 9.
3. To convert Reaumur degrees into degrees of Fahrenheit, multiply by 9, divide by 4 and add 32.
4. To convert Reaumur degrees into degrees of Centigrade, multiply by 5, and divide by 4.

# Self - Registering Maximum and Minimum Thermometers

SHOWING THE GREATEST HEAT AND COLD.



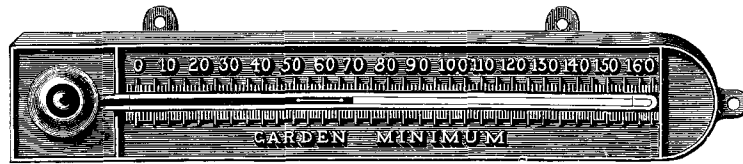
	Inches	With Ordinary Enamel Tubes.					With Magnifying Tubes, like B 427						
		8	10	12	14	16	20	8	10	12	14	16	20
B 424 Round top boxwood scale		5/-	6/3	8/9	11/6	—	—	6/9	8/6	10/9	13/-	—	—
B 425 Boxwood scale, in black japan case		5/3	6/9	10/3	12/6	—	—	7/3	8/9	13/-	14/3	—	—
B 426 Porcelain do. in white do.		11/3	13/9	17/-	18/9	—	—	12/6	14/6	17/6	19/-	—	—
B 427 Trans. glass do. in white do.		11/3	14/6	18/-	19/-	—	—	12/6	16/-	18/3	19/6	—	—
B 428 Porcelain or transparent glass on oak boards with brackets to revolve		—	21/-	24/-	27/6	30/-	37/6	—	22/-	26/6	28/9	30/9	42/3
B 429 Zinc scale in white japan case		5/6	8/3	12/-	13/6	—	—	7/6	9/9	12/3	14/9	—	—
B 430 Trans. glass scale on polished oak or mahogany back		17/-	19/-	21/3	23/9	—	—	18/6	21/-	23/9	27/-	—	—
B 431 Porcelain scale, with back plates top and bottom		—	—	—	—	—	33/9	—	—	—	—	—	39/6
B 432 Double registering, showing the temperature yesterday and to-day, glass scale		12/6	16/-	18/3	20/-	—	—	15/9	18/6	22/3	24/-	—	—
B 433 Do. do. boxwood scale		7/-	8/9	13/-	14/3	—	—	8/9	11/9	15/6	17/-	—	—
B 434 Double registering, with bulb reversed so as to render the thermometer less liable to get out of order during transit, with boxwood scales, 8-in., 12/3; 10-in., 17/-; 12-in., 21/3; 14-in., 26/-													
B 435 Do. do. do. with glass scale, 8-in., 14/9; 10-in., 19/-; 12-in., 23/9; 14-in., 28/-													



B 436

No.		£	s.	d.
B 436	<b>PEDESTAL THERMOMETER</b> , with ivory scale on ebony base	0	15	3
B 437	Do. do. with patent magnifying tube	0	17	6
B 438	<b>DRAWING ROOM THERMOMETERS</b> , opal glass scales, ordinary enamel tubes, on ebony or boxwood backs, 8-in., 9/3; 10-in., 11/3; 12-in. . . . .	0	15	3
B 439	Do. with patent magnifying tube, 8-in., 11/3; 10-in., 13/6; 12-in. . . . .	0	17	6

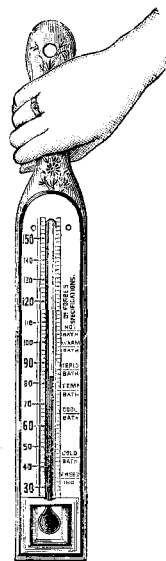
## Garden, Window and Porcelain Thermometers



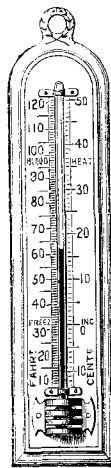
B 442



B 440



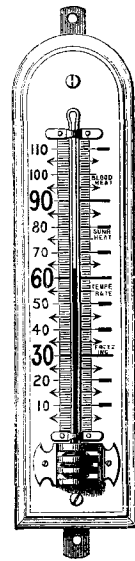
B 445



B 446



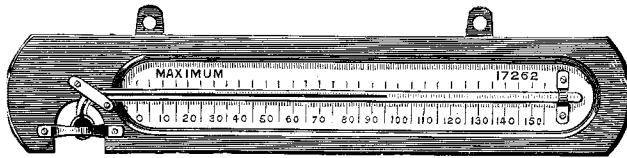
B 447



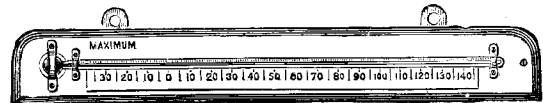
B 449

No.		£	s.	d.
B 440	<b>HOT-BED THERMOMETER</b> , 30-in. in mahogany frame, enclosed in brass tube, and extra thermometer on door for air temperature . . . . .	1	11	6
B 441	Do. 30-in., porcelain scale, in copper case, with brass tube . . . . .	0	17	0

No.		£ s d.
B 442	<b>GARDEN MINIMUM THERMOMETER</b> , solid zinc scale, enamel spirit tube, raised figures and divisions .. .. .	0 3 6
B 443	Do. do. 8-in. polished boxwood scale, enamel spirit tube .. .. .	0 2 3
B 444	Do. do. 10-in. do. do. do. .. .. .	0 3 6
B 445	<b>BATH THERMOMETER</b> , porcelain scale, and enamel tube, with Dr. Forbes' specification for the Bath legibly printed on .. .. .	0 3 6
B 446	<b>PORCELAIN THERMOMETER</b> , with metal guard, enamel tube, and double scale, 8-in., 8/6; 10-in., 9/6; 12-in., 11/3; 14-in., 13/-; 16-in., 19/6; 20-in. ..	1 8 0
B 447	<b>WINDOW THERMOMETER</b> , with ivory scale, and ordinary enamel tube, enclosed in glass tube, on mahogany frame, with copper roof, 8-in., 21/-; 10-in. ..	1 3 6
B 448	Do. with patent magnifying tube, 8-in., 22/6; 10-in. .. .. .	1 6 0
B 449	<b>PORCELAIN THERMOMETER</b> , with very legible scale and every thirty degrees indicated by larger figures and broader lines, moulded sides, metal guard and bold enamel tube, spirit 20-in. .. .. .	1 6 6

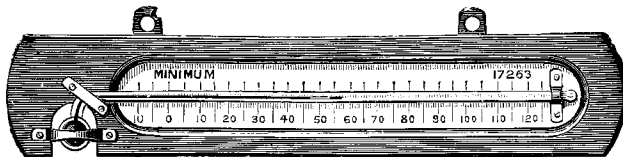


B 450



B 452

B 450	<b>BEST STANDARD MAXIMUM THERMOMETER</b> , engine-divided on stem, divided and figured on opal glass scale, mounted in solid mahogany frame, on any plan, as required .. .. .	1 1 0
B 451	<b>STANDARD MAXIMUM THERMOMETER</b> , divided on stem, with porcelain or opaque glass scale, on oak, 14-in. .. .. .	1 0 0
B 452	<b>MAXIMUM THERMOMETER</b> , 10-in. porcelain scale, on oak, engine-divided on stem and figured on scale .. .. .	0 11 6
B 453	<b>MAXIMUM THERMOMETER</b> , 10-in. divided and figured on porcelain scale .. .. .	0 10 6



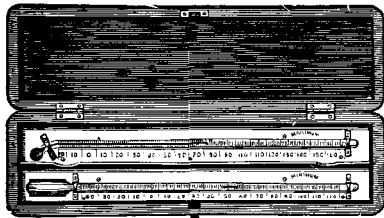
B 454



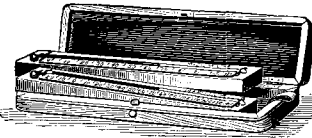
B 457

No.		£ s d.
B 454	<b>BEST STANDARD MINIMUM THERMOMETER</b> , engine-divided on stem, figured and divided on opal glass scale, mounted in solid oak frame .. .. .	1 1 0
B 455	<b>STANDARD MINIMUM THERMOMETER</b> , 14-in. porcelain scale, on oak, engine-divided on stem and figured on scale .. .. .	1 0 0
B 456	<b>MINIMUM THERMOMETER</b> , 10-in. porcelain scale, printed on scale .. .. .	0 4 0
B 457	Do. do. 10-in. porcelain scale, on oak, engine-divided on stem and figured on scale .. .. .	0 9 6
B 458	Do. do. 10-in. porcelain scale on oak .. .. .	0 8 6

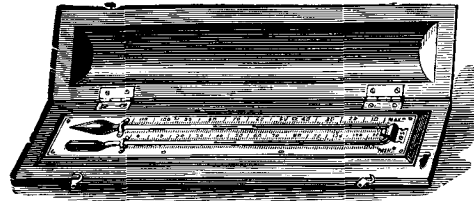




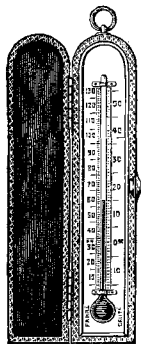
B 459



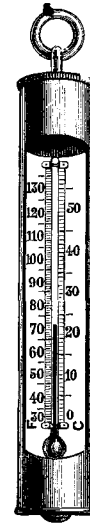
B 460



B 461



B 463



B 464

No.		£	s.	d.
B 459	<b>Livingstone's Maximum and Minimum Thermometers</b> , divided on stem, on ivory or metal scales, in mahogany or morocco case .. .. .	28/-	0	0
B 460	<b>Maximum and Minimum Thermometers</b> , for Alpine Tourists, 6-in. enamel tubes, engine-divided on stem, figured on raised German silver scale, on boxwood, in mahogany snap case .. .. .	1	14	0
B 461	<b>Dimenon Self-Registering Thermometer</b> , for tourists, silvered metal scale on mahogany backs, in solid mahogany case.. .. . 8-in., 29/-; 6-in., 26/-; 5-in.	1	4	0
B 462	Do. do. same as preceding, ivory scales, in morocco case with snap 8-in. 20/-; 6-in., 16/6; 5-in.	0	14	0
B 463	<b>Ivory Scale Thermometers</b> , enamel tube, double scale, in snap morocco case, 3-in. 6/9; 4-in., 7/3; 5-in., 7/9; 6-in.	0	9	0
B 464	<b>German Silver Revolving Thermometers</b> , enamel tube, ivory scale, on boxwood or ebony black, 3-in., 8/6; 3½-in., 9/6; 4 in., 10/9; 4½-in. .. .. .	0	11	6

## THE KATA-THERMOMETER

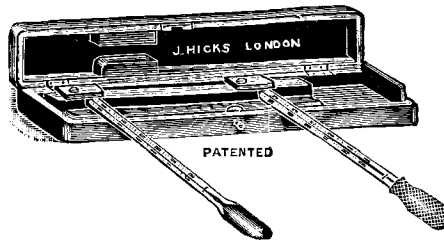
(WET AND DRY BULB)

or Comfort Meter

Invented by Professor LEONARD HILL, F.R.S.



PROF. HILL'S KATA THERMOMETER.



### Construction.

B 465 The Kata-Thermometers are constructed of large bulbed spirit thermometers; marks are made on the stem at each 110°, 100° and 90°F. Another mark is made just above the bulb. The bulb of one is covered with a finger-stall, taken from a muslin glove. This is the wet bulb instrument. The finger-stall holds the least amount of water sufficient for the taking of an observation.

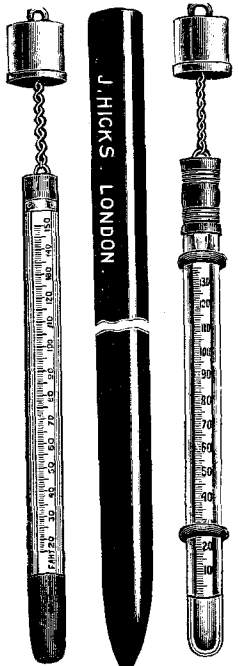
Price, complete in mahogany case .. .. . £1 11 6

# CHEMICAL THERMOMETERS



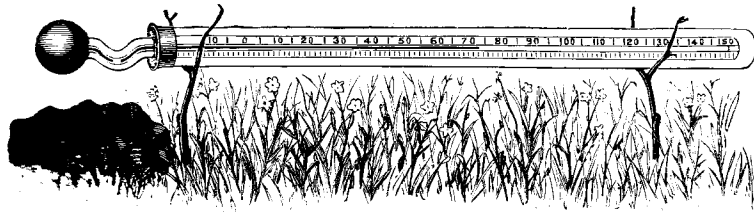
B 472

No.										£	s.	d.
B 466	<b>STANDARD THERMOMETER</b>		enamel tube, scale engine-divided on silvered metal raised piece, 0 to 220° Fahr., enclosed in hinged morocco case, 18-in. long	..	..	..	..	..	..	2	2	0
B 467	Do.	do.	COMPARATIVE, enamel tube engine-divided, mounted on silvered metal or porcelain scale, attached to mahogany or oak back	..	..	..	..	..	..	1	11	6
B 468	Do.	do.	divided and figured on stem to one-fifth of a degree, from 0 to 220° Fahr., 18-in. long, in metal case, lined with rubber	..	..	..	..	..	..	2	2	0
B 469	Do.	do.	divided and figured on stem to one-twentieth of a degree, very open range, say any 20 or 30 degrees that may be required	..	..	..	..	..	..	1	15	0
B 470	Do.	do.	divided on stem and figured on boxwood, scale 0 to 120° Fahr., 12-in. long	..	..	..	..	..	..	0	18	6
B 471	<b>TRAVELLERS' SET OF FOUR ALPINE THERMOMETERS</b>		comprising one each Maximum, Minimum, Solar Radiation, and Ordinary Thermometers, tubes divided and figured on their stems, in mahogany case	..	..	..	..	..	..	1	17	6
B 472	<b>HICKS' MERCURIAL THERMOMETER</b>		to 900° Fahr., guaranteed, 18-in. long, divided and figured on its stem	..	..	..	..	..	..	1	5	0
B 473	Enamel tube, divided and figured on stem, in round wooden case	} 0 to 220° Fahr. each.	8-in.	10-in.	12-in.	14-in.	16-in.	18-in.	..	..	..	..
			5/6	5/9	6/3	6/6	6/9	9/9	..	..	..	..
B 474	Do.	0 to 400°	..	..	5/9	6/3	6/6	6/9	7/9	10/6	..	..
B 475	Do.	0 to 650°	..	..	6/3	6/6	6/9	7/9	8/9	11/3	..	..
B 476	<b>THERMOMETERS FOR SUBSOIL TEMPERATURES</b>		Symon's Pattern, for lowering into an iron pipe to any depth. Designed expressly to obviate all the difficulties found in obtaining subsoil temperatures. Thermometer engine-divided on the glass tube, and figured on round polished boxwood scale, attached to copper cap fitting over top of pointed iron tube to be driven into the ground. For indicating temperatures 1-ft. below the surface	..	..	..	..	..	..	1	2	6
B 477	Do.	do.	4-ft.	do.	do.	..	..	..	..	1	11	0
B 478	Do.	do.	6-ft.	do.	do.	..	..	..	..	1	14	6
B 479	Do.	do.	as made for the Meteorological Office. Tube engine-divided on stem, and hermetically sealed in stout outer glass cylinder and mounted in boxwood frame, with copper cap and chain, and including pointed iron tube. For taking subsoil temperatures at 1-ft.	..	..	..	..	..	..	1	7	0
B 480	Do.	do.	do.	4-ft.	..	..	..	..	..	1	13	0
B 481	Do.	do.	do.	6-ft.	..	..	..	..	..	1	16	6



B 476                      B 479

Any other lengths or sizes may be had at similar prices to the preceding.



### SOLAR RADIATION THERMOMETERS.

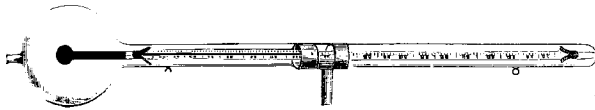
B 482

Black Bulb in open air (as illustrated), 18/6

B 482

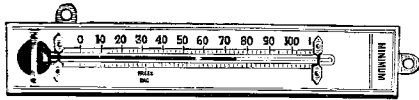
B 483 Black Bulb and Stem in vacuo, self-registering, on brass stand .. .. . 34/-

B 484 Do. do. without stand .. .. . 30/-



B 483

### MINIMUM THERMOMETERS



B 486

B 485 Boxwood Scales, Straight Plain Tube, polished each 8 in. 10d; 10-in. 1/6

B 486 Do. do. Enamel Tube (as illustration), 8-in. 1/-; 10-in. 1/9

B 487 Bevelled Edge and Bent Enamel Tubes each 8-in. —; 10-in. 4/-

B 488 Do. do. with Florescent Spirit Tube each 8-in. 1/6; 10-in. 2/3

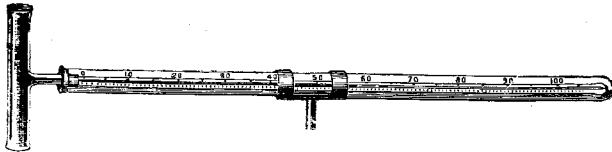
B 489 Do. New Mercurial .. .. . each 8-in. —; 10-in. 4/6

B 490 Zinc Scale, especially made for use in winter .. .. . „ 8-in. 3/6; 10-in. —

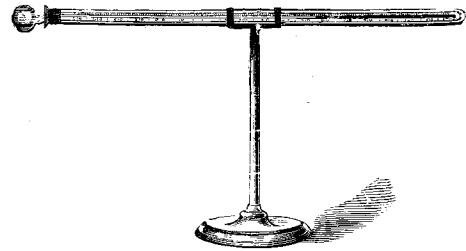
B 491 Best Opal Scale, Tube divided on Stem, in polished oak frame .. .. . each 21/-

(National Physical Laboratory Certificate, 2/- extra nett)

B 492 Best Porcelain Scale on Oak Back, divided on Stem, figured on Scale .. .. . each 10-in 9/6



B 493



B 495

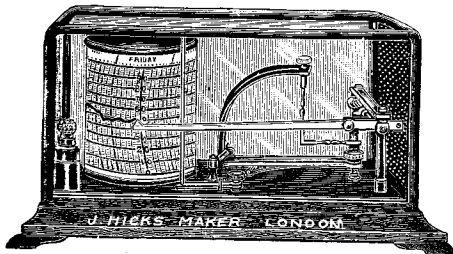
B 493 Hicks' Patent "Cylinder Jacket" Terrestrial Radiation Minimum Thermometer, on brass stand .. .. . 21/-

B 494 Do. do. do. do. do. without stand, 18/6

B 495 Terrestrial Minimum Thermometer, on stand, for the grass .. .. . 15/-

B 496 Do. do. do. do. small size .. .. . 12/-

### SELF-RECORDING THERMOMETERS



B 497

B 497 Self-Recording Thermometer, in oak, mahogany, or walnut case with glass sides, complete with ink and supply of charts for one year .. .. . 5 15 0

B 498 Do. do. with drawer, having separate compartments for used and unused charts .. .. . 6 10 0

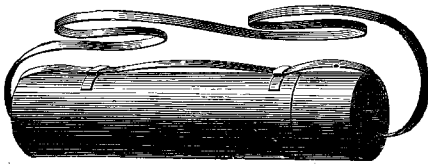
B 499 Self-Recording Thermometer and Self-Recording Barometer, mounted together under the one glass case, as B 256 .. .. . 13 10 0

B 500 Do. do. in strongly made copper case, Admiralty pattern, with springs at bottom, for use in refrigerating chamber, and ranging from zero to 100° Fahrenheit, complete with supply of charts for one year and bottle of ink .. .. . 6 0 0

B 501 Do. do. smaller size, 8-in. by 5-in. by 4-in. .. .. . 6 6 0

# BOILING-POINT THERMOMETERS

No. B 502 **WOLLASTON'S BOILING-POINT THERMOMETER** is shewn in section in the margin, and consists of a delicate 12-in Thermometer with scale engine-divided and figured on stem from 180° to 212°, each degree being subdivided to 0.1°. To avoid errors from the

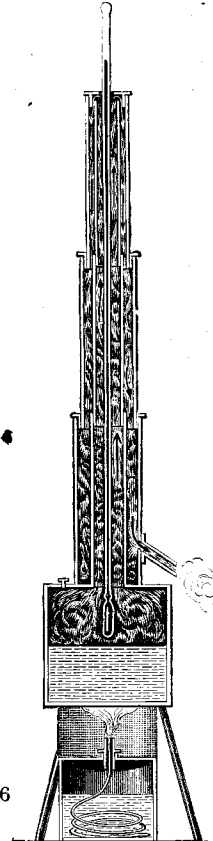


Case of B 502

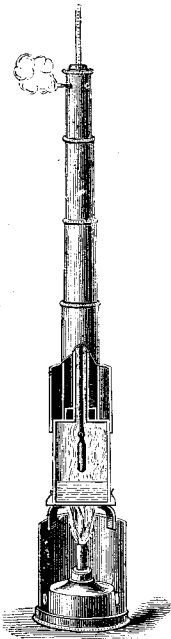
cooling influence of atmospheric currents, the Thermometer is suspended from an india-rubber washer to within an inch and a half of the water inside a *double* three-draw telescope chamber, to prevent currents of air affecting the temperature, and thus

the Thermometer is surrounded by the vapour of boiling water only. The steam ascends the inner chamber, escaping by a hole at the top into the outer one, which it descends to reach the open air through the tube at the side. The copper boiler on tripod stand is supplied with water through a small opening at the top to about one-third its capacity, the spirit lamp is then ignited. The mercury will soon be seen to ascend, and the division on the stem at which it becomes stationary shews the temperature, and a reference to the tables, supplied with each instrument, will give the elevation in feet above sea level.

The temperature of the surrounding air, as indicated by an extra Thermometer, should be noted at the time of making the experiment. The Thermometer is packed in a light metallic case lined with india-rubber, and the whole is enclosed in leather case with straps, as shewn in B 502 .. £5 7 6



B 502



B 504

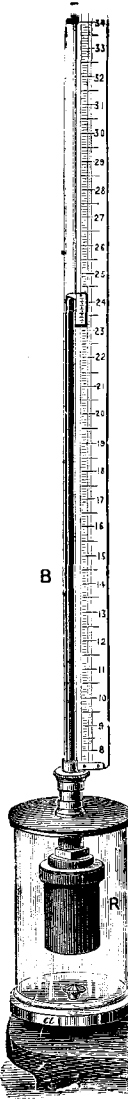
- No. B 503 **EXTRA THERMOMETERS** in metal case .. .. .
- No. B 504 **POCKET HYPOMETRICAL APPARATUS.** This is a more portable form of the **Wollaston** Boiling-Point Thermometer and, on account of its simplicity, much used by Alpine travellers; it is cheap and efficient, and forms a trustworthy check on the Aneroid Barometer. The illustration shews the instrument with the telescope portion drawn out for use. The lamp is protected from wind by a perforated japanned tin case covered with wire gauze. With one Thermometer divided to 1-5ths of degrees, in sling leather case to contain two Thermometers .. .. .
- No. B 505 **EXTRA THERMOMETERS** in metal case .. .. . each

£ s. d.  
1 3 6

3 10 0

0 17 0

## Apparatus for Testing Aneroids

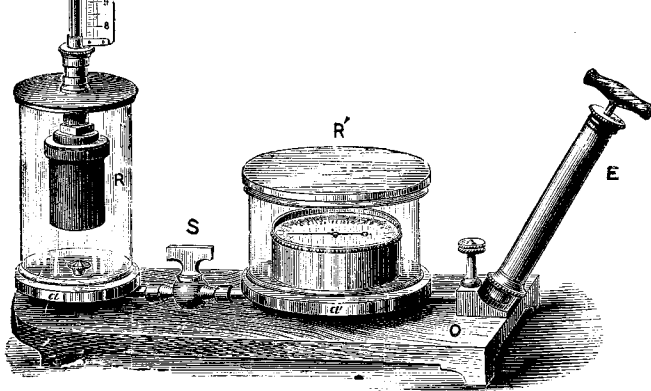


No. B 506 This consists of a Standard Mercurial Barometer (B) with engine-divided metal scale, each inch of which is compensated for capacity; the cistern being enclosed in the receiver (R), which communicates by the tube and Stop-cock (S) with the larger receiver (R) containing the Aneroid, while undergoing the process of testing. It will thus be seen that the two receivers virtually form one chamber, the compartments of which are simultaneously exhausted of air by the powerful exhausting syringe (E). The baseboard (O) and the circular plates (AA) are the same as in an ordinary air-pump. In using the apparatus, all joints should be made absolutely air-tight in the usual manner by the application of a little lard—the Aneroid to be tested is placed in the receiver (R), and the exhaustion commenced. If the scale of the Aneroid be rightly divided, and the works in accord with those divisions, the pressure in inches which they indicate should coincide tenth for tenth with the divisions on the mercurial scale as the mercury falls or rises

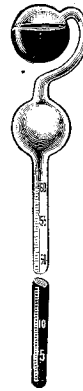
£ s. d.

13 10 0

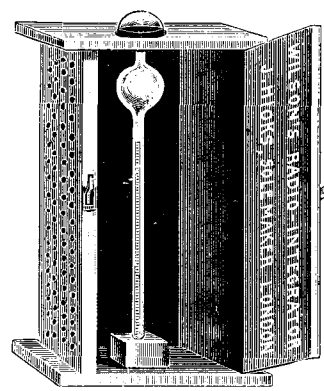
## The Radio-Integrator



B 506



B 508



B 507

This simple instrument consists of a glass bulb partially filled with alcohol, the rest of the interior space being vacuous, and joined by a bend to a lower bulb and graduated tube. It was designed by the late Dr. W. E. Wilson, F.R.S., to record the total amount of Solar Radiation received daily by the ground. Based on the fact that the latent heat of vaporisation of alcohol is constant at all ordinary air temperatures, the amount of alcohol which distils from the upper bulb into the lower bulb and graduated stem is directly proportional to the amount of Solar Radiation. Every cubic cm. that distils over into the stem is equal to 179 gram calories received by the surface of the alcohol. When set up for observation the instrument is arranged vertically, as illustrated above, thus exposing the surface of the alcohol to the Solar Rays. The tube, on the other hand, is protected from direct radiation by being enclosed on a screen with perforated sides. It will be seen that as the alcohol distils off under the action of the Solar Radiation it condenses into the graduated tube below, which is divided to read from zero to 60 c.cm., and is kept at the shade temperature by the protecting screen.

£ s. d.

The Radio-Integrator is so constructed that, where necessary, it can easily be fitted into the ordinary Stephenson's thermometer screen.

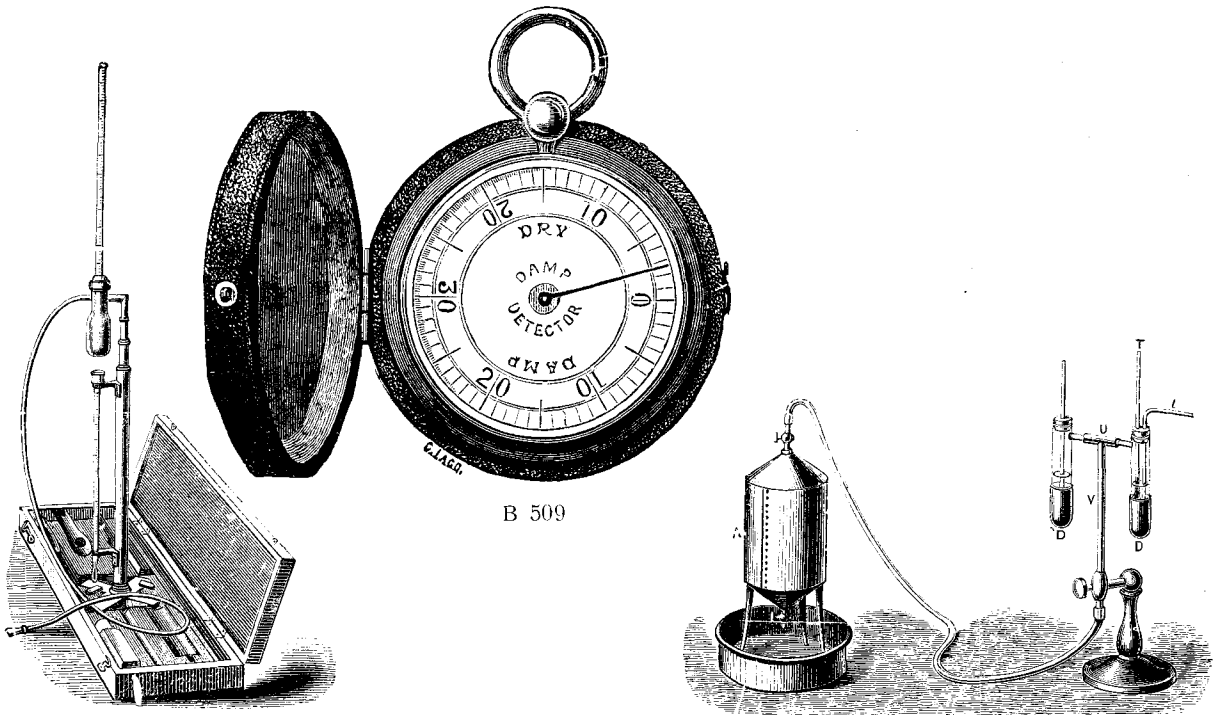
No.								
B 507	Price, complete with Screen, as illustrated	..	..	..	..	..	..	3 7 6
B 508	Price, without Screen	..	..	..	..	..	..	2 2 0

## HYGROMETERS

These instruments are employed for estimating the amount of moisture in the air. In our climate the air is never completely dry, nor completely saturated with moisture, and the amount of aqueous vapour held in suspension is very variable. This fact has important bearings on many branches of industry, as also on the hygienic qualities of the atmosphere. The consideration that a certain amount of moisture in the air is necessary to the continuance of health, will suggest the importance of maintaining that due proportion in the atmosphere of sick rooms, where the artificial heat so injudiciously used often disturbs the healthful hygrometric conditions of the air.

Hygrometers may be thus classified:—

1. Hygrometers of Absorption.—Saussure's Hair, Oatbeard, Catgut, Seaweed, Grass, Chloride of Calcium.
2. Hygrometers of Condensation.—Regnault's, Daniell's, Dyne's.
3. Hygrometers of Evaporation. Leslie's, Mason's Hygrometer, Wet and Dry Bulb Thermometer or Psychrometer.



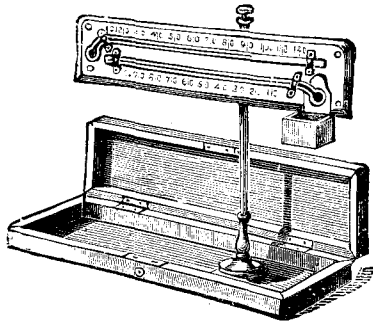
B 510

B 511

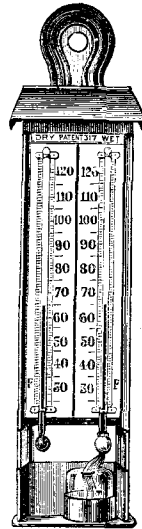
No.		£ s. d.
B 509	<b>DAMP DETECTORS</b> for Tourists, Commercial Travellers, &c., to test moisture and avoid the consequences of sleeping in damp beds. In morocco case .. ..	0 6 6
B 510	<b>REGNAULT'S HYGROMETER</b> acts by the condensation of moisture on its external surface. It consists of a very thin and highly polished silver tube or bottle, into the neck of which is inserted a very delicate Thermometer. The bottle has a lateral tubular opening, to which is attached a flexible tube with an ivory mouthpiece. Ether is poured into the silver tube in sufficient quantity to cover the bulb of the Thermometer. The ether is then agitated by breathing through the flexible tube until, by the rapid evaporation thus produced, a condensation of moisture takes place, readily observable on the bright polished silver surface, and the temperature indicated by the Thermometer at that moment is a dew point. Complete in case ..	3 18 6



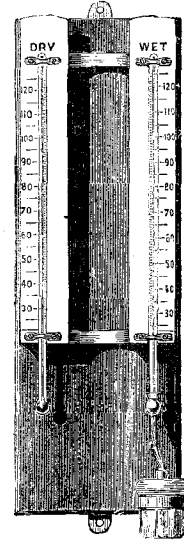
# HYGROMETERS



B 513



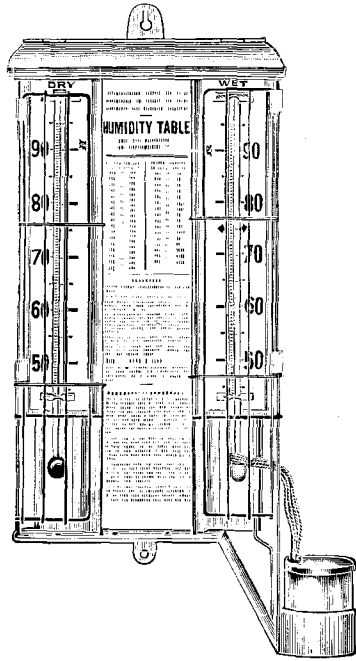
B 514



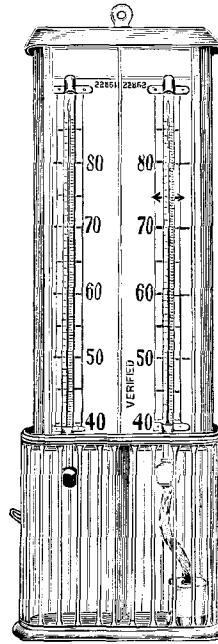
B 516

No.		£ s. d.
B 511	<b>REGNAULT'S HYGROMETER with ASPIRATOR.</b> An exceedingly thin silver cup (D), highly polished on the outside, is cemented to a tube of glass (M), the mouth of which is closed by a cork having three openings. The central opening receives the stem of a Thermometer (T), while one of the side openings is filled by the tube (b) communicating with the outer air. In the third opening, a tube (V) is adapted, connected by a caoutchouc tube with the aspirator (A), which is full of water and placed at some distance from the Hygrometer; this tube (V) only just enters the tube, while the tube (b) passes . . . . .	8 5 0
B 512	<b>DYNE'S HYGROMETER</b> , for shewing the dew-point by direct observation, by means of iced water and black glass. This arrangement enables the observer to dispense with the use of ether, and shews the dew-point with great distinctness ..	1 14 0
B 513	<b>MASON'S HYGROMETER</b> , enamel tubes, engine-divided on stem, figured on German silver scales, very compact, with stand and water cistern, in mahogany case ..	2 0 0
B 514	<b>HYGROMETER</b> , as used in factories and warehouses to determine amount of moisture; very strong and legible, and well protected from damage, in copper case .. .. . 10-in., 19'6; 12-in.	1 5 0
B 515	Do. do. do. in japanned tin case .. .. „ 17/-; „	1 2 0
B 516	Do. do. better quality, mounted on oak or mahogany back, tubes divided on stem and figured on the scales .. .. . large size, each	1 15 0
B 517	Do. do. do. .. .. . medium „ „	1 10 0
B 518	Do. do. do. .. .. . small „ „	1 3 6

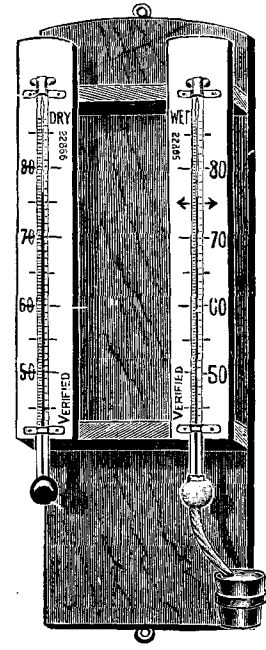
# HYGROMETERS



B 519



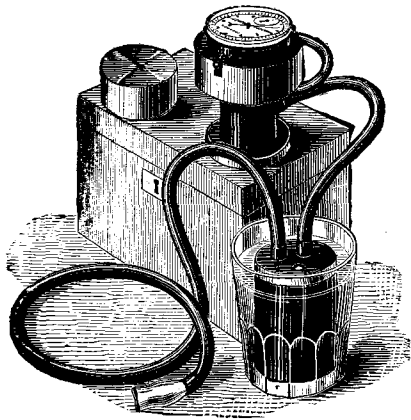
B 520



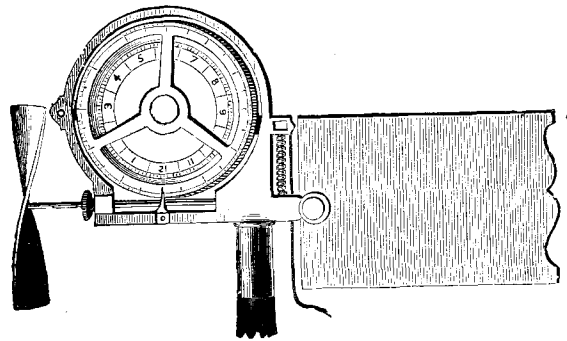
B 522

**For use in Cotton Mills and Coal Mines, under Home Office Order, dated March 18th, 1912, etc.**

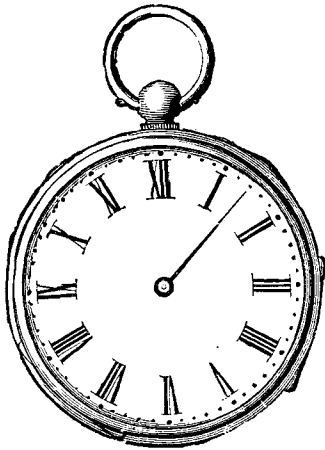
No.		£ s. d.
B 519	In white japanned case with roof, $12\frac{1}{2} \times 7$ ins., tube engine-divided on the stem, mounted on enamel glass scales and protected by hinged wire guards. Tables and instructions fitted in centre of case, with glass cover. Metal covered water bottle and National Physical Laboratory Certificate of Accuracy .. .. .	1 10 0
B 520	In white japanned case with roof, $17 \times 6\frac{1}{2}$ ins., tube engine-divided on the stem and mounted on enamel glass scale with guard in front. Complete with National Physical Laboratory Verifications .. .. .	1 8 0
B 521	Do. do. if mounted on polished oak board similar to B 522 .. .. .	1 8 0
B 522	Thermometer similar to B 508, $17\frac{1}{2} \times 6\frac{1}{2}$ ins., but mounted on polished oak board, with National Physical Laboratory Certificate of Accuracy .. .. .	1 8 0



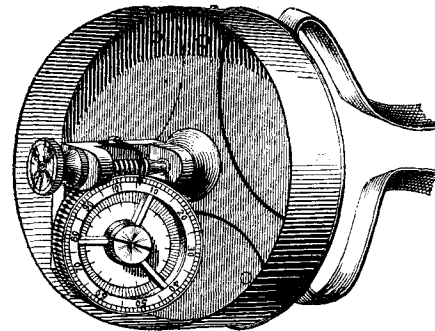
B 523



B 524



B 525



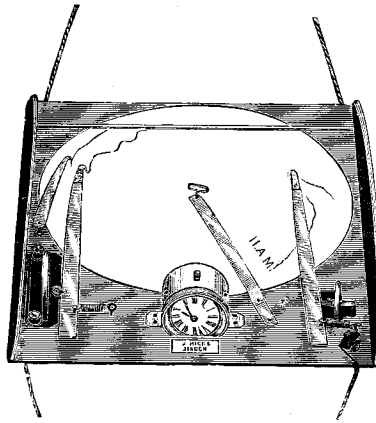
B 526

No.		£ s. d.
B 523	<b>PORTABLE MEDICAL SPIROMETER.</b> The measurement of the vital capacity is obtained by measuring the velocity of the expired current during the time of expiration, and the instrument is arranged so as to reduce the velocity of the current to cubic measure .. .. .	5 18 6
B 524	<b>CURRENT METER.</b> Constructed specially for use in small rivers and streams to shew the rate of flow of tide. Suitable also for reservoirs .. .. .	6 0 0
B 525	<b>PEDOMETER.</b> In size and appearance this instrument closely resembles a watch, and enables the wearer to measure the distance he has walked. It is simply constructed, can be adjusted with ease to suit the length of step, and is very accurate. Full directions are supplied with each instrument, which is particularly suitable to athletes and tourists .. .. . from 7/6 to	1 10 0
B 526	<b>TROCHEAMETER.</b> This instrument is used for registering the revolutions up to 10,000 of carriage or machinery wheels. It is simply but strongly constructed and contained in a stout copper case fitted with a leather strap to attach it to the wheel. It will be found a very correct indicator of the distance travelled by a coach or carriage .. .. .	3 12 6
B 527	Do. with 3 wheels, reading to 50,000 revolutions .. .. .	5 12 6

## DINES' METEOROGRAPH

### FOR USE WITH KITES

Instruments for recording the climatological conditions of the upper air have hitherto been found so expensive that anything like a general interest in the science has been rendered almost impossible.



B 528

W. H. Dines, Esq., F.R.S., however, has designed the combination of instruments illustrated above, and the questions of ultimate cost having been carefully considered by the manufacturer, it is hoped that the subject may be more generally taken up.

### DESCRIPTION OF METEOROGRAPH

The pens write on a chart of 11 inches in diameter instead of on a drum. The chart lies flat on a piece of thin wood, and turns about a pin passing through its centre. It is driven by contact near its circumference with a small milled wheel, which is driven in its turn by a clock. A roller, mounted on a spring on the other side, presses the paper against the milled wheel, and ensures sufficient friction. The pens describe arcs of circles on the chart, the chords of the arcs being roughly coincident with the radii of the chart. It will thus be seen that the time scale being angular, is not uniform, but depends on the positions of the pen.

The barograph pen is actuated by an aneroid box made of thin metal, and sealed with some air at atmospheric pressure, inside. The corrugated face of the box is very yielding, and hence the volume of the enclosed air is dependent chiefly on the external pressure and on its own temperature. The arrangement necessitates a large correction for temperature, but the result has proved satisfactory, since independent observations of the height of the kite have mostly agreed with the heights given by the Meteorograph within  $2\frac{1}{2}$  per cent., instead of the 5 per cent. previously given by the exhausted boxes.

The hygrograph depends on the extension of a bundle of human hairs, protected from rain and spray, 6 ins. (15 cm.) long, multiplied eightfold by a lever. Although the scale is short it is probable that this arrangement enables the relative humidity to be determined to about 5 or 10 per cent.

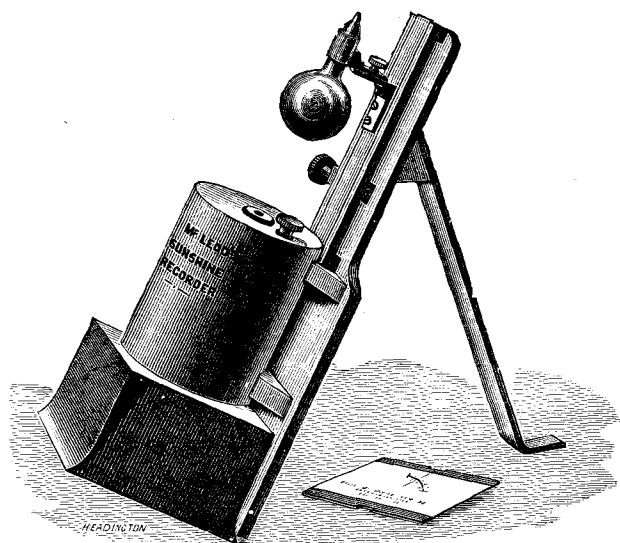
The thermograph depends on the expansion of spirit enclosed in a thin copper spiral tube, 3-16th inch diameter and 4 ft. long; this communicates with a small aneroid box also full of spirit, and its expansion and contraction actuates the pen. The scale is obtained by direct comparison with a mercurial thermometer, and is about  $40^\circ$  to one inch ( $1^\circ$  C. to  $1\frac{1}{2}$  mm.). The arrangement gives a powerful control over the pen, so that blurring, due to the shaking of the Meteorograph, seldom occurs.

The anemometer pen is actuated by a lever at the back of the instrument, controlled by a cylindrical spring adjusted to resist a wind pressure of 1,800 grains.

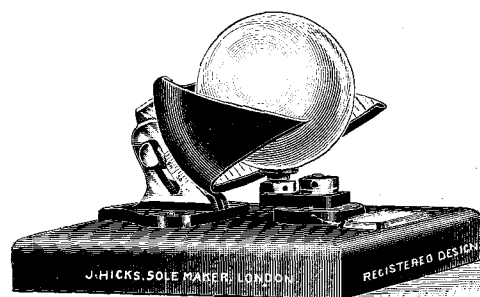
B 528 Price of Meteorograph, as illustrated, with all the latest improvements . . . . . £4 7 6

Charts, extra 9/- per dozen.

# SUNSHINE RECORDERS



B 529



B 530

**B 529 McLEOD'S SUNSHINE RECORDER.** This is the invention of Prof. McLeod, and consists of a cylindrical metallic camera, opposite to the lens of which is a thin glass sphere silvered inside. The sphere is mounted on a slide provided with rack and pinion for focussing the image of the sun on the sensitised paper placed in the base. When in use the axis of the instrument has to be fixed parallel to the axis of the earth, that is to say, the instrument must be placed with its vertical plane in the meridian and inclined with the sphere upwards so that the axis of the camera makes an angle with the horizontal equal to the latitude of the place at which it is set up. The support of the instrument is constructed by the maker to suit the latitude; the observer has merely to place the instrument in the meridian .. .. .  
Sensitised paper for one year .. .. .

£ s. d.

7 12 6  
0 17 6

**B 530 IMPROVED CAMPBELL-STOKES' SUNSHINE RECORDER.** Designed by R. H. Curtis, Esq., F.R. Met. Soc., with adjustments for both lens and bowl.

In the original pattern of the Campbell-Stokes' Burning Sunshine Recorder no arrangement was made for readily centering the lens in the bowl, or for adjusting the bowl for the latitude of the place at which it was to be used; and these omissions have not only proved themselves a source of much trouble to observers using this form of instrument, but they have in some instances resulted in the instrument becoming unjustly discredited as a recorder of sunshine.

In several instances which could be mentioned, an obviously too small record of sunshine has been regarded as an essential fault of this type of instrument, whereas it was simply due to the fact that the lens had not been properly placed in the bowl.

Purchasers of these Recorders, finding the pedestal on which the lens is placed permanently fixed, and unprovided with any means of adjustment, have assumed, as they were entitled to do, that the adjustments had been properly ensured by the makers before they left their hands, and any fault in this respect, which, with a lens of such short focus as is used, need be but a very small one to sensibly affect the record, has in some cases not been discovered until the instrument has been in use for some time.

Until now no satisfactory attempt has been made to remove this serious defect, and the adjustable pedestal now introduced has been designed to meet the want, and get rid of a difficulty which has not seldom been a source of much error and annoyance.

To render observations of bright sunshine strictly comparable *inter se*, it is desirable that all Recorders should be essentially similar, and to this end the Meteorological Office and the Royal Meteorological Society have adopted the specification, as to size of lens and bowl, suggested by Mr. R. H. Curtis, F.R. Met. Soc., in the Quarterly Journal of R. Met. Soc., vol. xxiv., 1898.

The adjustable pedestal now introduced by Mr. Curtis renders it quite easy to ensure that the lens shall be so adjusted in the bowl that the sun's image shall be properly focussed upon the strip of card whenever in the day the sun is shining, and thus yield the amount of record.

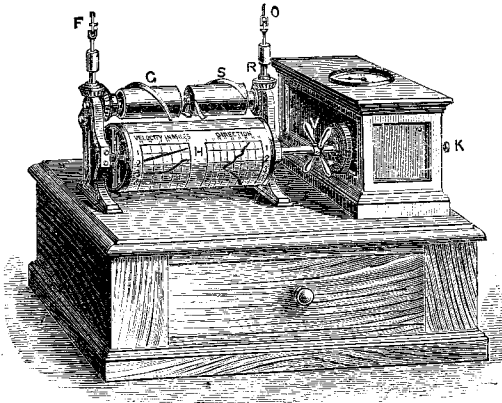
At the same time an improved adjustment for latitude is provided, by means of which the instrument can be accurately set for the latitude of the station without recourse to the clumsy and very unsatisfactory plan of tilting the base, as has to be done in instruments of the old pattern.

In planning these adjustments care has been taken to ensure rigidity and stability. The movable parts can be readily secured, and are then neither able to slip nor liable to become weakened by exposure to weather.

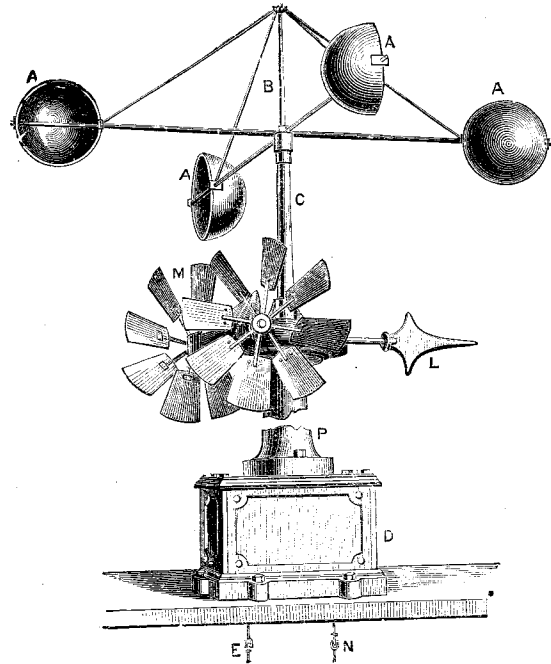
The adjustable bowl has been supplied to the Meteorological Office as its standard pattern.

	£	s.	d.
Price of Sunshine Recorder, complete with Charts .. .. .	12	7	6
„ Extra Charts, per year's service .. .. .	1	15	0
„ Brass Ring to adjust the lens in the bowl .. .. .	0	12	0

**Anemograph, or Self-Recording Wind Gauge.**



B 531 Portion for Interior of Observatory.

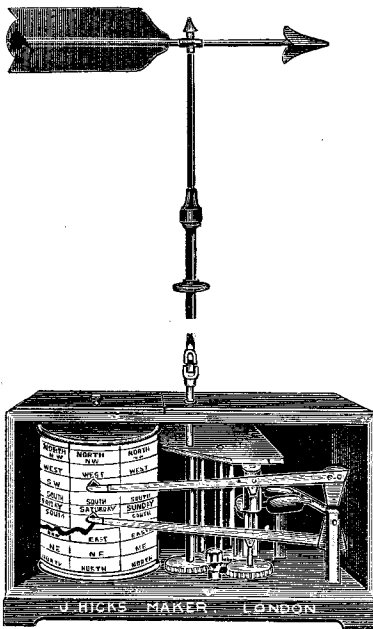


B 531 Portion for Exterior of Observatory.

No. B 531

**Anemograph, or Self-Recording Wind Gauge.** The purpose of this instrument is to register the velocity and direction of the wind from day to day. It consists, first of a set of hemispherical cups and vanes, which are exposed on the roof of the house; and, secondly, of the recording apparatus, which may be placed in the hall or library, or elsewhere inside the house. The motion imparted to the hemispherical cups by the wind is communicated to the steel shaft B, which, passing through the hollow shaft C, and having at its lower end an endless screw, works into a series of wheels in the iron box D, which reduces the angular velocity 7,000 times. At the required distance, the motion, having emerged at E, is connected with F, where, by means of bevelled wheels, it moves the spiral brass registering pencil C, which is arranged so that each revolution records 50 miles of velocity on the prepared paper H. The direction of the wind is indicated by the arrow L, which is kept in position by the fans M. These communicate, by an endless screw and train of wheels, through the shaft C and the box D to the recording apparatus, which consists of a spiral brass pencil, which, in one revolution, records variations through the cardinal points of the compass on the same prepared paper as that which receives the record of velocity. The paper is held on the drum by two small clips, and may be readily changed by unclamping the cross V, without disturbing the drum or any other part of the instrument. Price, complete, with all the improvements up-to-date, including two 24-ft. lengths of brass tube shafting for connecting the recording instrument to the outer part. The copper cups are of 9-in. diameter, the radius of the cup arms being 24-in. The recording instrument is supplied with sterling silver spirals, one year's supply of charts is likewise included . . . . .

£ s. d.



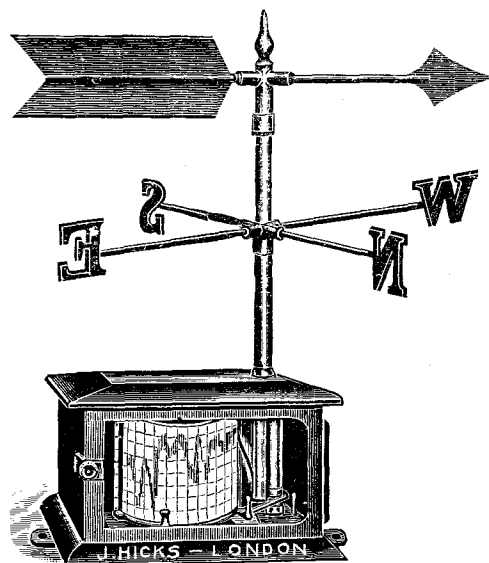
B 532.

**B 532 Patent Wind Direction Recorder.** This is simple in construction, not liable to get out of order, and records the direction of the wind at all points throughout the day. The vane is mounted on the roof, or some similarly elevated position, and suitably connected to the recorder placed in the hall, or elsewhere. Price, exclusive of fixing . . . . .  
Extra Charts, per year's service . . . . .

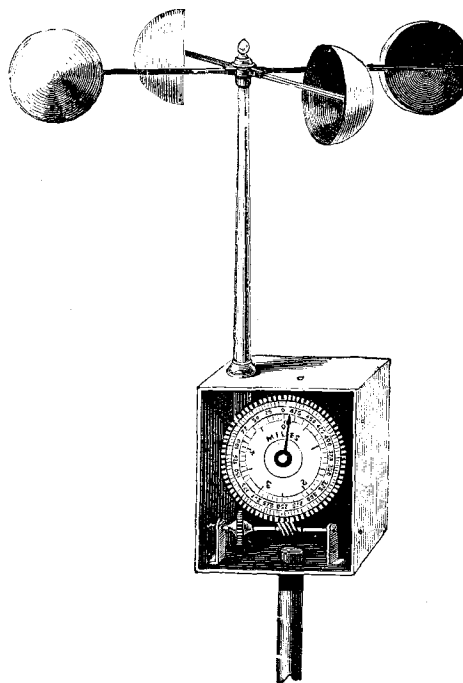
160 0 0

12 10 0  
0 15 0

# ANEMOMETERS



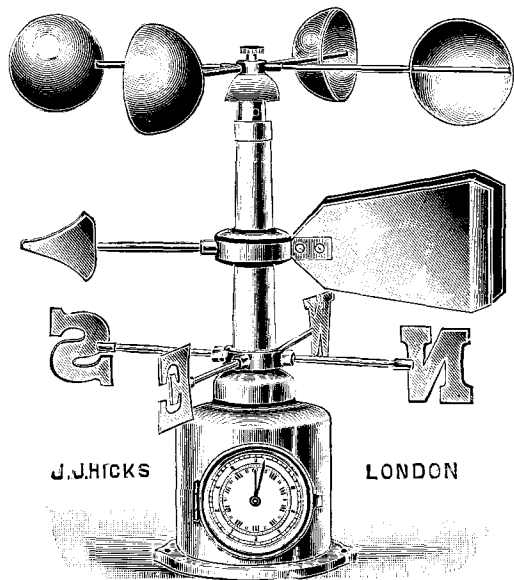
B 533



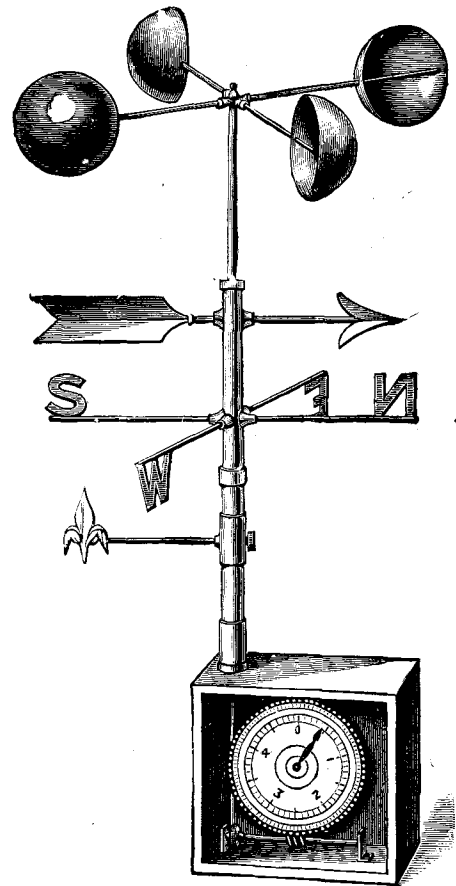
B 534

No.		£	s.	d.
B 533	<b>IMPROVED WIND DIRECTION RECORDER.</b> Needing neither pen nor ink, this form is specially suitable for use where it is necessary for the recorder to be left exposed to the weather. The record is made by metallic contact on a specially prepared chart. Price, complete with supply of Charts .. .. .	10	10	0
	Extra Charts, per year's service .. .. .	1	2	6
B 534	<b>BECKLEY'S ANEMOMETER.</b> As the illustration shews, this is a simpler form of Robinson's Anemometer. The cups are retained, but the index portion of the instrument consists of two graduated circles divided respectively into 10ths and 100ths. There is a fixed index at the top of the dial, which, as the toothed wheel revolves, marks on the inner dial the miles and 10ths of miles the wind has travelled, while a movable index indicates on the outer dial the passage of every five miles .. .. .	6	10	0
	Do., with wind vane and letter points .. .. .	8	10	0
B 535	<b>BECKLEY'S IMPROVED ANEMOMETER.</b> In this form the hands can both be brought back to zero when desired, and ball bearings are fitted to the central shaft ; Anemometer, with letter points and wind vane .. .. .	9	0	0

## Improved Anemoscope or Wind Vane



B 535



B 536

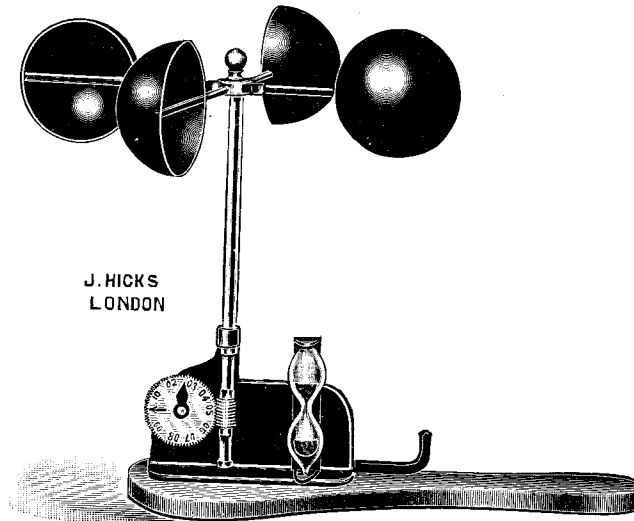
No.				£	s.	d.
B 536	<b>IMPROVED ANEMOSCOPE or WIND VANE.</b>	Designed by the late				
		G. M. Whipple, Esq., B.Sc., Superintendent of the Kew Observatory. The object of this instrument is to prevent the errors which sometimes observers make, arising from the foreshortening of the common wind vane when it stands nearly in the line of sight. This is effected by making the vane turn the ordinary letters, N.S.E.W., and by fixing rigidly at right angles to the line of sight a pointer; so that it then only becomes necessary to notice what letter or letters are nearest to the pointer in order to read off the direction. The vane is mounted on the tube of the ordinary Counting Robinson Anemometer, which is lengthened for the purpose	..	..	..	9 10 0
	Do.	do.	do.	Larger size	..	11 15 0

In fixing the Anemoscope the base of the instrument should be firmly secured, with its dial facing the position most suitable to the observer. When this is done, the pointer at the bottom of the pillar of the instrument should be moved round to where the observer can see it most distinctly, and then secured to the pillar by its clamping screw. The vane or arrow-head should then be unclamped from the tube carrying the letters N.S.E.W., and the pointer of the vane turned and held to the north; the lower portion carrying the letters should now be turned round until the letter N is directly over the lower pointer. The vane must now be secured by the clamp screw to the tube carrying the letters, and when this is done the Anemoscope is ready for observation. In taking an observation one has only to observe which letter is above the fixed pointer, this being the direction the wind is blowing at the time.

NOTE.—See also Wind Indicator, illustrated and described on back cover.



## Russell's Hand Anemometer

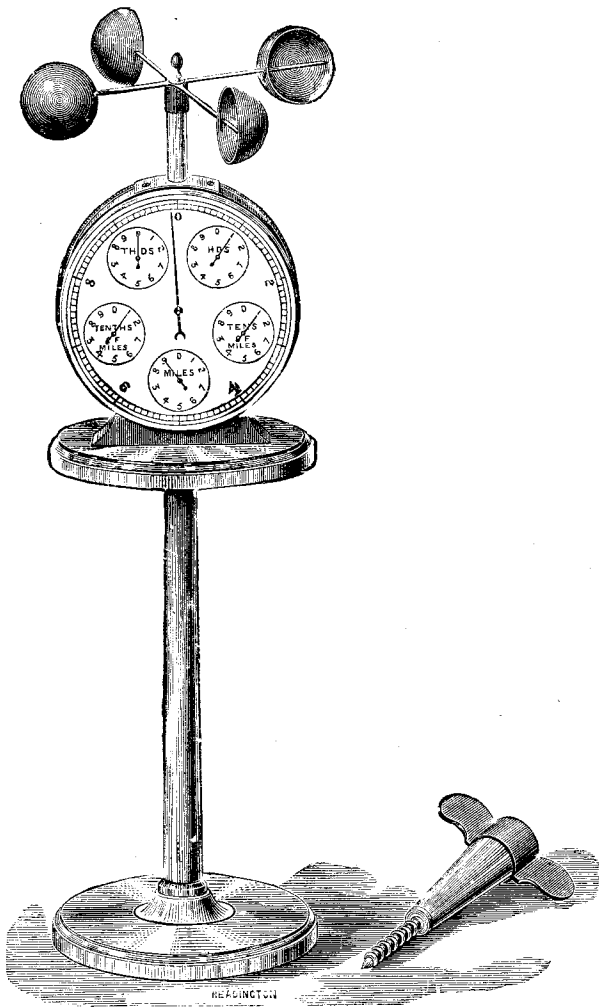


B 537

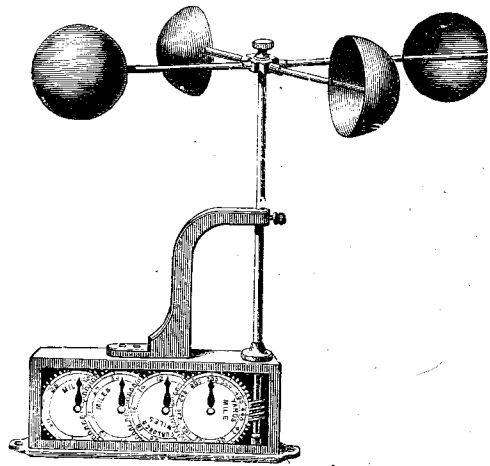
No.		£ s. d.
B 537	<b>RUSSELL'S HAND ANEMOMETER.</b> In this instrument we have a set of cups of the kind known as "Robinson," mounted on a light steel spindle, made to work as freely as possible, a dial wheel which indicates the quantity of wind measured, and a two minutes' sand-glass, ingeniously mounted, so that a slight motion of the finger instantly inverts it. This instrument was designed expressly for use in the hand, and to meet a want that has been long felt by observers, and which Fitzroy, at page 42 of his "Weather-Book," thus expresses:—"There is great necessity for a cheap and effective instrument for the register either of the velocity or of force, so as to be entirely independent of estimations." Two things were deemed essential in the instrument—"Trustworthiness" and "cheapness." The first was ensured by adopting Robinson's cups, which are now acknowledged by scientific men to be the best for anemometers. The second, by making it as simple as possible, and having machines to make the several parts, so that uniform results might be readily obtained. A long series of experiments has shewn that the instrument is perfectly trustworthy, and that the results obtained are comparable with those from larger instruments on the same principle. In ordinary cases, holding the instrument in the hand for two minutes will give the force of the wind, but if the observer wishes to measure the force of a gust lasting only a few seconds, he can do so, by noting the number of hundredths of a mile recorded and the number of seconds the gust lasts, then multiply the hundredths recorded by 36, and divide by the number of seconds. Suppose, for example, he holds it up for six seconds, and it records 7 hundredths, then $7 \times 36$ , divided by 6 = 42 miles per hour. Price .. .. .	2 15 0
B 538	Do. do. with three time glasses of 10, 15 and 30 seconds' duration, as used for obtaining the windage allowance in gun-firing ..	3 10 0

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# ANEMOMETERS



B 539



B 540

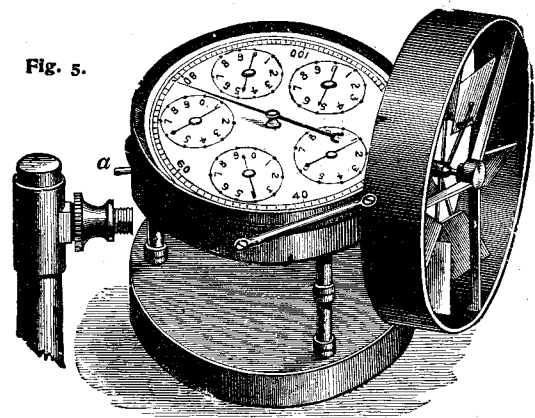
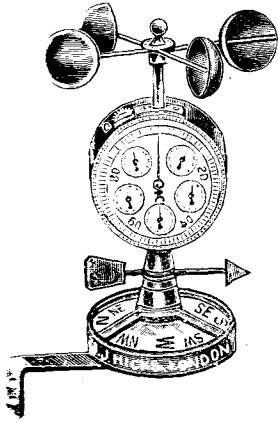


Fig. 5.

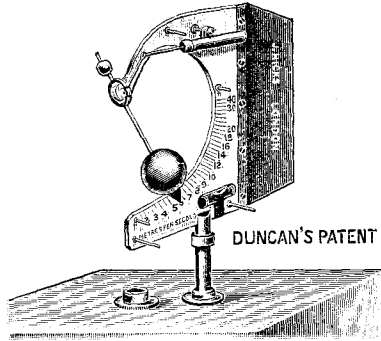
B 541

No.		£ s. d.
B 539	<b>PEDESTAL ANEMOMETER.</b> The face of this ingenious instrument closely resembles that of the 5-dial Air Meter, and is similarly constructed, with the exception of the fan-wheel being replaced by four hemispherical cups placed at the top. The instrument is attached to a brass stand, in which form it will be found particularly convenient in many places. It is quite portable, and is packed in a small mahogany case, the stand being unscrewed .. .. .	6 10 0
B 540	<b>ROBINSON'S ANEMOMETER.</b> Invented in 1850 by Dr. Robinson, of Armagh. It has attained just celebrity, being a highly accurate and reliable instrument for taking the velocity of the wind. Its value has been much appreciated by the Government and the chief Meteorological Offices of this country .. .. .	6 10 0

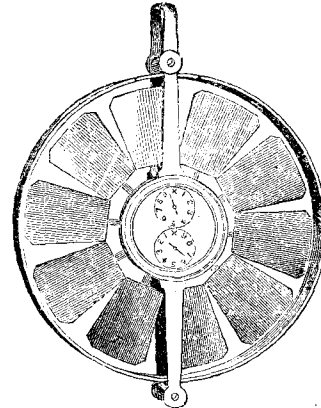
# ANEMOMETERS



B 543



B 544



B 546

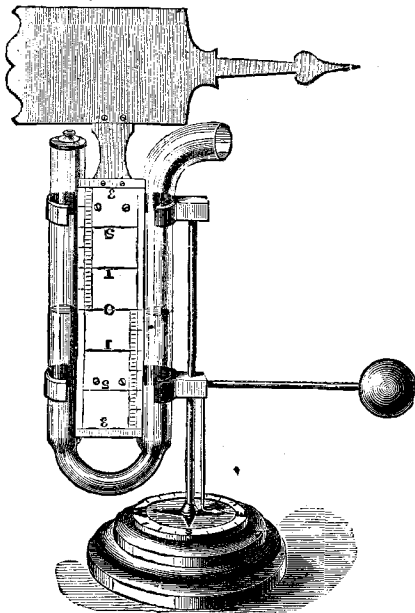
		£	s.	d.
B 541	<b>PORTABLE AIR METER</b> , for measuring air currents in sewers, mines, hospitals, etc. The face is similar to B 539, but a fan-wheel is here used, which acts first on the long hand, which records on the larger or outer dial, and then successively by a train of wheels on the indices of 5 small dials. It is an excellent pocket companion and guide for tourists, and records the velocity up to 10,000,000 feet, or 1,893 miles .. .. .	5	0	0
B 542	Do. do. with two small dials recording to 1,000 feet ..	3	15	0
B 543	<b>PORTABLE ANEMOMETER, with Wind Vane and Luminous Compass.</b> This ingenious instrument consists of a vertical box with a dial, upon which are divided circles and indices, divided into 100ths of a mile, tenths of miles, miles, etc., a vertical pillar carrying 4 hemispherical cups with axis which terminates with an endless screw, which works a series of wheels in the box; when the current acts upon the cups the axis revolves and the revolutions are recorded by the hands or indices on the dials. The large dial is divided into 100 parts, the 5 smaller ones are each divided into 10 parts, one revolution on each dial is equal to 10 of the one preceding. To set the indices, throw the instrument out of gear by pressing up the small lever at top of box, move the milled edged wheel at the side of it until the hands point to zero; then put the instrument into gear again by pressing the small lever down. Below the dial of the Anemometer is an arrow-head for indicating the direction of the wind. Below that again is a luminous Compass, enclosed in a metal box, having a lifter at the side for lifting the Compass dial off its point when not in use. When the Compass is put into action, the cardinal points take up their proper position, therefore, wherever the arrow points will be the direction of the wind. Each instrument has packed in its case a small arm which, when screwed to the projection under the Compass, any desired position can be obtained for observation, thus rendering it peculiarly suitable for use on aeroplanes, etc. Packed complete in mahogany case, 7-in. x 5-in. x 5-in., with strap and buckle .. .. .	6	10	0

Sand timers to Nos. B 541 and B 542, 8/6 extra.

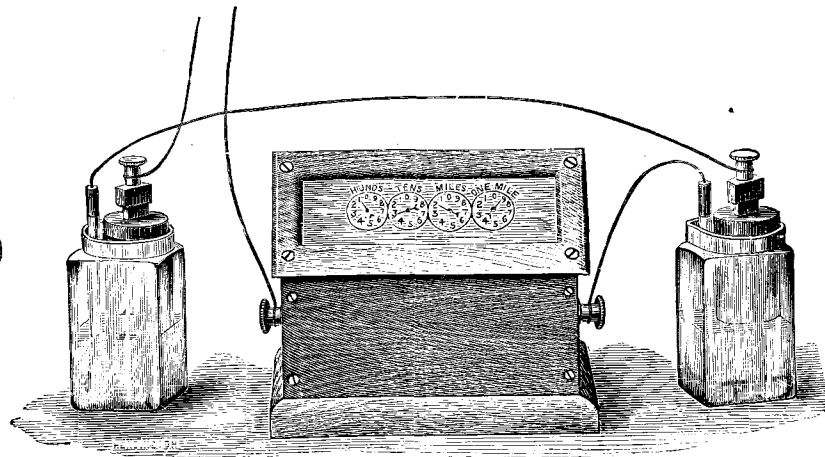
## ANEMOMETERS

No.		£ s. d.
B 544	<b>DUNCAN'S PATENT.</b> This is a great improvement on all existing forms of Portable Anemometers, as it <i>instantaneously</i> records the velocity of the wind in miles per hour. For riflemen and gunners, naval men, aviators and engineers, it will prove exceedingly useful. Below is the report regarding a recent test:—	
	<p>“ NATIONAL PHYSICAL LABORATORY, “ TEDDINGTON.</p> <p>“ This instrument is of the pendulum type, and is provided with a dash-pot for damping oscillations.</p> <p>“ It was set up in the 4-ft. wind channel, and was adjusted so that its indications were correct at a speed of the current of 18 miles per hour. Under these conditions the fluctuations of the readings were hardly appreciable. The instrument was then set up in the open air in a wind of from 15 to 20 miles per hour. Its behaviour under these conditions was satisfactory, and it appeared that its indications could be relied upon to within one or two miles per hour.”</p> <p style="text-align: right;">“ T. E. STANTON, <i>Acting Director.</i>”</p>	
	Complete in mahogany cabinet .. .. .	9 10 0
B 545	<b>BIRAM'S ANEMOMETER.</b> A clever and trustworthy “ tell-tale ” instrument for registering currents of air in mines, and thus shewing if the proper amount of ventilation is being maintained. In heavy gun or rifle practice the pocket size of this instrument affords most useful information. It is well but simply made, and full directions for use are supplied with each instrument. 2-in diameter, reading to 1,000 ft., in nickelled hunter case in outer morocco case .. .. .	4 10 0
B 546	Do. 3-in. do. do. do. in morocco case .. .. .	5 0 0
B 547	Do. 4-in. do. do. do. in wooden case .. .. .	5 7 6
B 548	Do. 5-in. do. do. do. do. .. .. .	5 10 0
B 549	Do. 6-in. do. do. do. do. .. .. .	5 15 0
B 550	Do. 4-in. do. do. 100,000 ft. do. .. .. .	5 10 0
B 551	Do. 6-in. do. do. do. do. .. .. .	6 0 0
B 552	Do. 6-in. do. do. 10,000,000 ft. do. .. .. .	6 10 0

# ANEMOMETERS



B 553



SCALE ABOUT 1-6TH.

B 554

No.

B 553

**LIND'S ANEMOMETER, OR WIND GAUGE,** ranks amongst the earliest forms of instruments designed to estimate the force of the wind. It consists of a glass syphon, the limbs of which are parallel to each other, mounted on a vertical rod, on which it freely oscillates by the action of the vane which surmounts it. The upper end of one limb of the syphon is bent outward at right angles to the main direction, and the action of the vane keeps this open end of the tube always towards the quarter from whence the wind blows. Between the limbs of the syphon is placed a scale, graduated from 0 to 3 inches and 10ths, the zero being in the centre of the scale. When the instrument is used it is only necessary to fill the tube with water to the zero of the scale and then expose it to the wind. The natural consequence of wind acting on the surface of the water is to depress it in one limb and raise it in the other, and the sum of the depression and elevation is the height of a column of water which the wind is capable of sustaining at the time of observation. Sudden gusts of wind are apt to produce a jumping effect on the water in the tube, and to diminish this the bend of the syphon is contracted. A brass compass dial at the foot shews the direction of the wind .. ..

£ s. d.

2 15 0

B 554

**HICKS' ELECTRIC ANEMOMETER.** The figure shews the registering portions of the apparatus, together with batteries and arrangement of wires to connect with the set of Robinson's cups, similar to B 536, which is fixed on the roof of the building or other elevated situation, and furnished with a toothed-wheel and pin to make and break the contact at given distances, as shewn on the recording plate. The registration is effected by a train of wheels, indicating from a portion of a mile to 1,000 (and upward if desired) as shewn on dials, and receives its motion by means of a lever and claw attached to the armature of an electro magnet working in a ratchet-wheel, the electro magnet being worked by a contrivance in the upper part of the apparatus; this part of the instrument is enclosed in a polished mahogany case, with terminals for connecting wires. It will thus be seen that this apparatus affords exceptional facilities for placing the registering arrangement in the library, dining-room, or other convenient place of observation .. ..

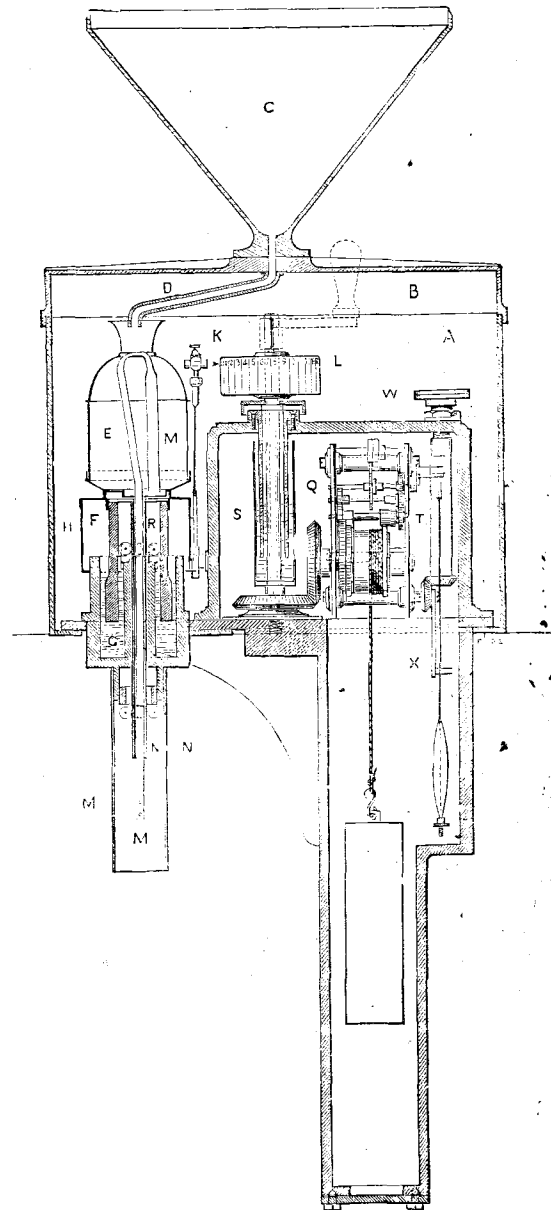
11 10 0

## PLUVIOMETERS, OR RAIN GAUGES

Pluviometers, or Rain Gauges, are instruments for estimating the amount of rainfall; and when the influence of rain upon the growth and quality of crops and upon the sanitary condition of large cities is considered, it seems hardly possible to overestimate the commercial and social importance of accurate statistics on this interesting branch of weather observation.

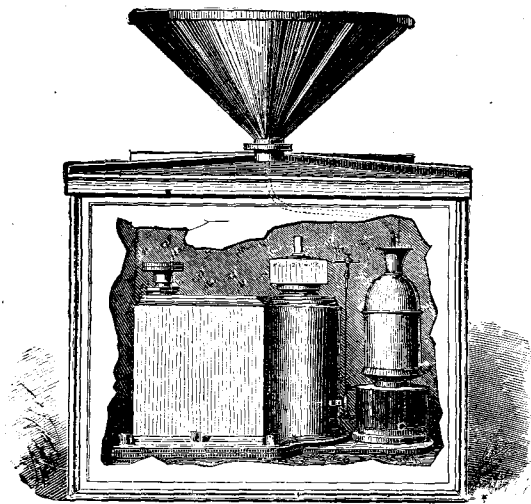
The most important point in connection with the use of the Rain Gauge is its position and height from the ground, and this will become at once apparent when it is remembered that a fall of rain measuring 1.10 inches in depth by the Rain Gauge is nearly equivalent to 40 hogsheds per acre. Accordingly, 10 inches is the height at which meteorologists have agreed the edge of the Rain Gauge should be placed from the ground. The spot chosen should be perfectly level, and at least as far distant from any building or tree as the building or tree is high. It is also important that the Rain Gauge should be well supported in order to avoid its being blown over by the wind; and should frost follow a fall of rain, the instrument should be conveyed to a warm room to thaw before measuring the collected contents. The graduated glass furnished with each instrument should stand quite level when measuring the rain, and the reading taken midway between the two apparent surfaces of the water.

Luke Howard, in his "Climate of London," says: "It must be a subject of great satisfaction and confidence to the husbandman to know, at the beginning of a summer, by the certain evidence of meteorological results on record, that the season, in the ordinary course of things, may be expected to be a dry and warm one, or to find, in a certain period of it, that the average quantity of rain to be expected for the month has fallen. On the other hand, when there is reason, from the same source of information, to expect much rain, the man who has courage to begin his operations under an unfavourable sky, but with good ground to conclude, from the state of his instruments and his collateral knowledge, that a fair interval is approaching, may often be profiting by his observations, while his cautious neighbour who waited for the weather to settle may find that he has let the opportunity go by. This superiority, however, is attainable by a very moderate share of application to the subject, and by the keeping of a plain diary of the barometer and rain gauge, with the hygrometer and vane, under his daily notice."

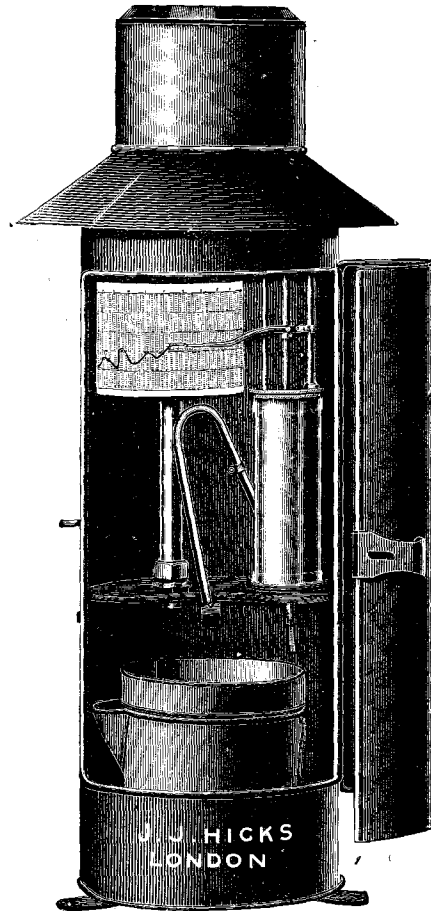


B 557

# PLUVIOMETERS, OR RAIN GAUGES



B 557



B 558

No.

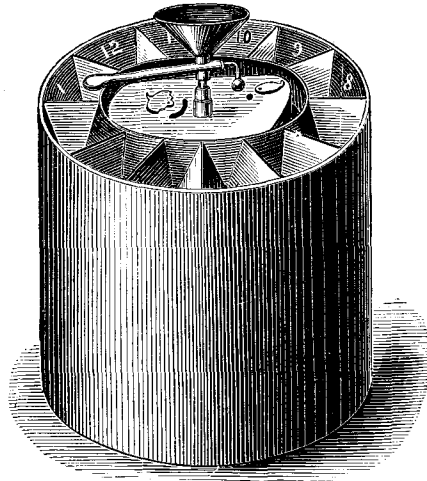
£ s. d.

B 557

**Beckley's Pluviograph, or Self-Recording Rain Gauge** (Hicks' Patent, as used at the Meteorological Stations). This instrument possesses the exceptional merit of recording, with equal precision, all rainfalls, from a slight summer shower to a heavy storm of rain. It requires no special erection, and may be placed in a hole in the ground with the receiving surface raised only a few inches above its level. The perspective view above, and the sectional engraving on page 75, illustrate the construction of the instrument, a detailed description of which, with instructions for use, is furnished to each purchaser. The funnel (C) has a receiving surface of 100 square inches, protected by a lip  $1\frac{1}{4}$  inches deep, to retain the splashes. The rain flows into the copper receiving vessel (E), which, floating in a cistern of mercury (G), sinks and draws down with it the pencil (K), which records the event on a cylinder (L), covered with waterproof paper and moved by the clock (Q). When the receiving vessel is full the syphon (M) comes into action, rapidly drawing off the whole of the water, the vessel rising almost at a bound; the action being recorded by a vertical line on the cylinder. The prepared paper, bearing the time scale, should be renewed once in every 24 hours, which may be readily done by raising the hinged lid of the cast iron box (A). Precautions are adopted to prevent injury to the clock and delicate portions of the instrument from moisture by adopting mercurial socket joints, which allow freedom of motion while they exclude the air. The whole outer casting and turned and enamelled funnel are of cast iron. With Stonyhurst improvement

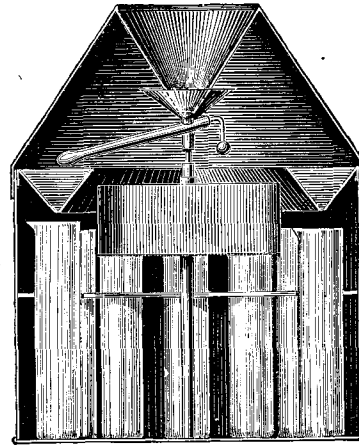
60 0 0

# PLUVIOMETERS, OR RAIN GAUGES



B 559

SCALE ABOUT 1-7TH.



B 559

SCALE ABOUT 1-7TH.

No.  
B 558

**SELF-RECORDING RAIN GAUGE** has a receiving surface 6 inches in diameter, from which the collected rain flows through a metal pipe into a cylindrical receptacle underneath. This is furnished with a float with rod attached, which, passing through the lid, is held in position by an upper guide arm supported by a pillar fixed to the lid. Attached to the float rod is an arm carrying the recording pen. When the chamber has received half-an-inch of rainfall the pen will be found at the top of the chart, the attached syphon coming into action and emptying the chamber, causing the pen to descend to the zero line, when the Rain Gauge is again ready to record. The chart is drawn to shew half-an-inch of rain and divided to hundredths of an inch—it should be changed daily. The clock should be wound once a week. In changing the chart turn the lid carrying the pen-arm to the right until it nearly touches the outer metal case, when the drum can be easily lifted from its spindle. Price, complete with charts .. .. .

£ s. d.

17 10 0

## Stutter's Self-Recording Rain Gauge (Hick's Patent)

The Rain Gauge here described is a step in the direction of cheapness without sacrificing efficiency. B 559 represents the instrument with its cover and receiving funnel taken off.

In the centre is an eight-day clock, with its upright spindle bearing a small funnel with a horizontal tube, which revolves once in twelve hours, passing successively over the mouth of the twelve compartments on the rim of the instrument. Beneath each compartment, which is funnel-shaped, is placed a tube, as shewn in B 559.

The rain is received by the outer funnel, drips into the smaller revolving funnel, and running along the horizontal tube falls into the compartment corresponding to the hour of the day. So that all rain falling, for example, between two and three o'clock, will be found in the tube marked 2.

In taking an observation the dome is taken off, the inner ring with its twelve divisions is lifted out and each tube inspected, those that contain rain are lifted out, read off, and the hour noted.

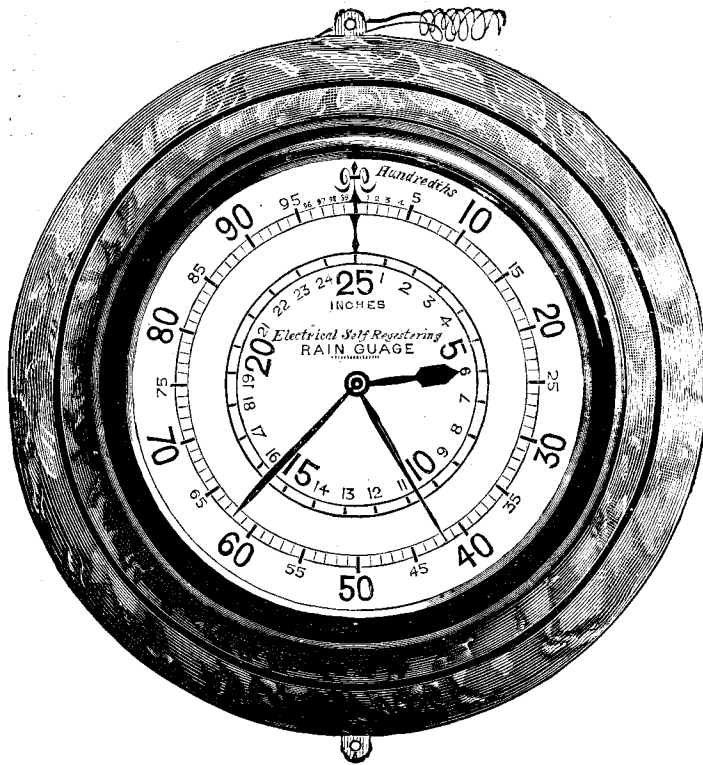
Each tube can contain half-an-inch of rain. Any overflow runs into a vessel beneath and can be measured; the tube which has overflowed shews the hour.

B 559	<b>STUTTER'S SELF-RECORDING RAIN GAUGE</b> , with twelve divisions and tubes, requiring <i>two</i> daily observations .. .. .	9 10 0
B 560	Do. do. with twenty-four divisions and tubes, requiring but one daily observation .. .. .	12 10 0
B 561	Do. do. with openings in the outer case for examining the tube without disjuncting the instrument .. .. .	13 13 0

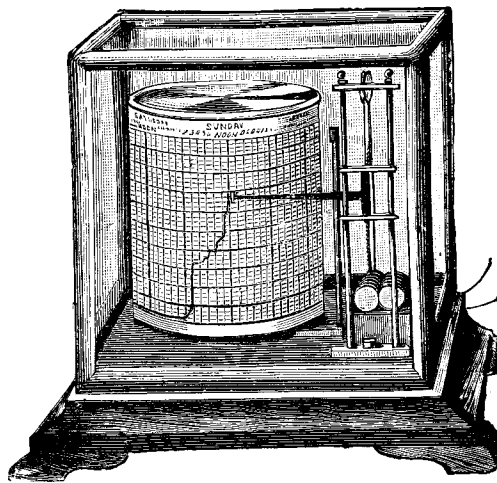
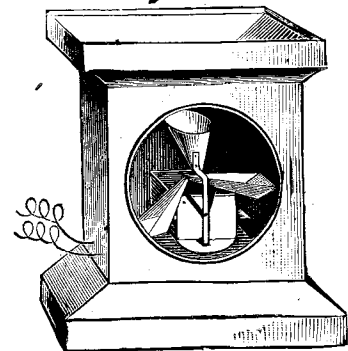
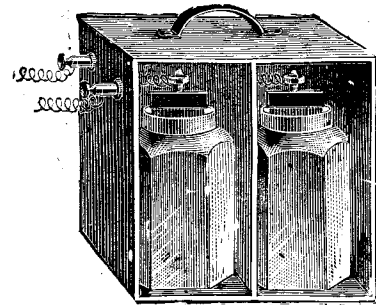


# ELECTRICAL RECORDING RAIN GAUGES

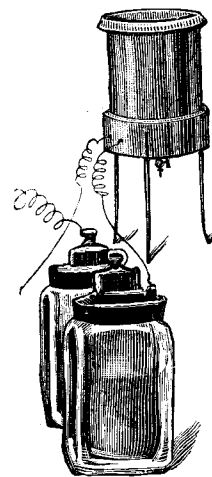
Both these designs are intended to meet a want among Meteorologists, viz., an Instrument to accurately register the rainfall, while the record can be followed by an observer within doors. The actual rate of rainfall is easily followed in either of these patterns—in the case of B 562, by watching the rate at which the hands travel, and in B 565, the pen leaves an indelible record upon the chart. B 562 consists of the receiver, set of batteries in box, and the Indicating Dial, which will register our British rainfall for any average year. The Self-Recording Rain Gauge, or "Pluviograph," consists of receiver, set of batteries and recorder on a polished oak base, with a plate-glass cover in oak frame. All that is required is to re-wind the clock once a week, preferably before noon on Monday, replace the used chart by another, and see that the pen is well supplied with ink. The chart shows 1 inch of rainfall from bottom to top in 50ths of an inch, but the pen is actuated .5 each 1-100th is completed, and therefore moves twice in each subdivision on the chart. When an inch of rain has descended the pen is automatically released and falls to zero.



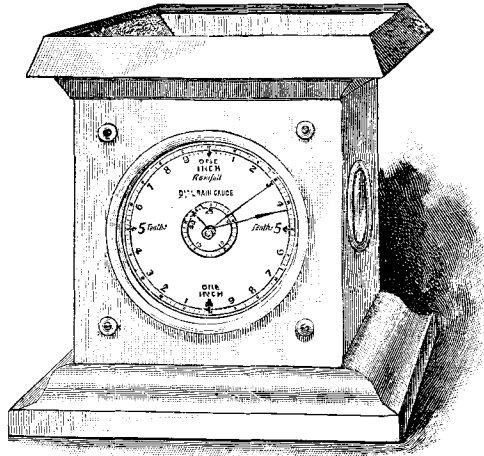
B 562



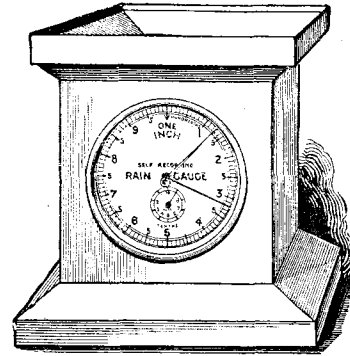
B 565



## RECORDING RAIN GAUGES



B 566



B 568

No.

**B 566 THE DIAL RAIN GAUGE.** This Rain Gauge has a receiver with an area of 100 square inches. The rain which passes through the receiver falls into a bucket, divided into two parts. After the rain has filled one side it falls over and empties itself, the other half of the bucket coming into position to receive the water. This moves forward the hand one division of the dial, representing .01 of an inch of rainfall, and so on.

The Gauge is quite automatic and requires no attention.

It registers up to 25 inches, has an index, which can be set by hand, fitted to record the result of the last observation made.

The dial of opal glass is very distinct, the receiver is secured by two thumbscrews, so that the wind cannot move it, and over the small inlet there is a cover to prevent the passing through of falling leaves, &c.

The Gauge can be fixed by the two stout brass plates at the base to any required support.

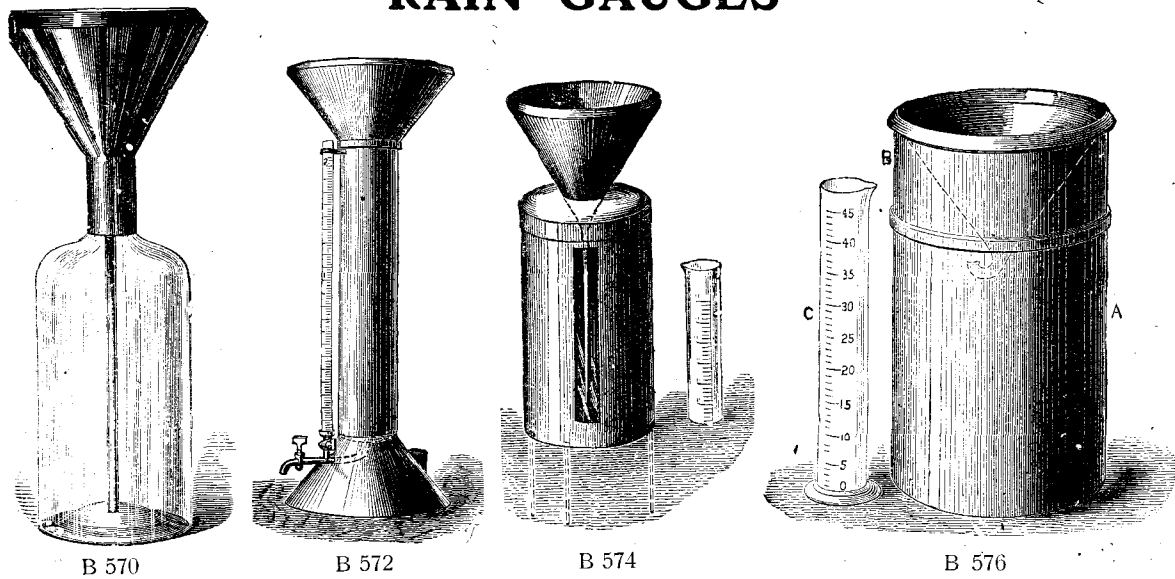
**B 568** This Rain Gauge has a receiver with an area of 64 square inches. The principle and general design are the same as in the larger Gauge, No, 566, but finished in a simpler form, and registers up to 10 inches. The receiver is fitted with two spring catches to prevent it being blown off.

No.										£	s.	d.
B 562	Electric Self-Registering Dial, 10-inch	..	..	..	..	..	..	..	..	20	0	0
B 563	Do. do. do. 6-inch	..	..	..	..	..	..	..	17	10	0	
B 564	Do. do. do. 5-inch	..	..	..	..	..	..	..	16	10	0	
B 565	Self-Recording Rain Gauge, or "Pluviograph"	..	..	..	..	..	..	..	27	10	0	
B 566	Self-Registering Dial Rain Gauge, plain zinc	..	..	..	..	..	..	..	10	0	0	
B 567	Do. do. do. polished copper	..	..	..	..	..	..	..	15	0	0	
B 568	Do. do. do. zinc	..	..	..	..	..	..	..	6	6	0	
B 569	Do. do. do. bright copper	..	..	..	..	..	..	..	7	10	0	

## RAIN GAUGES

B 570	<b>HOWARD'S RAIN GAUGE,</b> consisting of glass bottle with 5-inch copper funnel inserted in neck and glass jar graduated to $\frac{1}{100}$ th of an inch	..	..	..	..	..	..	..	0	10	6
B 571	Do. do. do. with japanned tin funnel	..	..	..	..	..	..	..	0	7	6
B 572	<b>HOWARD'S PEDESTAL RAIN GAUGE,</b> 12-inch diameter, with glass tube graduated to $\frac{1}{10}$ th and $\frac{1}{100}$ th of an inch, shewing amount of rainfall by direct observation and furnished with a tap for emptying the Gauge, in copper	..	..	..	..	..	..	..	3	15	0
B 573	Do. do. do. in japanned tin	..	..	..	..	..	..	..	2	5	0

# RAIN GAUGES



No.		£	s.	d.
B 574	<b>SYMON'S RAIN GAUGE.</b> This resembles Howard's, but has the advantage of being enclosed in outer metal jacket, in copper .. .. .	0	11	6
B 575	Do. do. do. in japanned tin .. .. .	0	6	0
B 576	<b>GLAISHER'S RAIN GAUGE.</b> The diameter of the funnel is eight inches, and it has a curved tube at its lowest end to preserve the last few drops of rain. The receiving vessel is partly sunk in the ground to keep contents cool, a graduated vessel to 1/16th of an inch supplied with it, in copper .. .. .	1	2	6
B 577	Do. do. do. in japanned tin .. .. .	0	10	6
B 578	<b>METEOROLOGICAL OFFICE RAIN GAUGE,</b> made of copper only, 22 inches high; the funnel has very tall sides and is 10 inches deep and 8 inches diameter. There is a copper receiving pot, 12 inches high, and a graduated glass measure .. .. .	1	17	6
B 579	Do. do. do. as made for the Meteorological Office. This is of stout copper, stands 22 inches high, has a receiving surface 8 inches diameter, a copper pot with handle, 12 in. by 5 in., and the bottom of the gauge is splayed out to a diameter of 13 inches, with graduated glass trial jar .. .. .	2	5	0
B 580	Do. do. do. as supplied to the Transvaal Government. The copper funnel has a receiving surface 5-in. diameter fixing on to a galvanized iron body, 15 in. by 7 in., containing a copper can 12 in. by 6 in., with wire handle. It stands 22 inches high. With graduated trial jar .. .. .	1	5	0
B 581	<b>ADMIRALTY RAIN GAUGE,</b> similar to B 578, but 2 inches shorter, with three brass legs 12 inches long, and brass tap, in copper only .. .. .	2	5	0
B 582	<b>SNOWDON RAIN GAUGE.</b> This is similar in shape to the Meteorological Office pattern, but the collecting funnel is of 5-in. diameter. The Gauge is intended to be placed almost entirely below the earth's surface, in copper .. .. .	1	4	0
B 583	Do. do. do. in galvanized iron .. .. .	0	15	0
B 584	<b>LIVINGSTONE'S POCKET RAIN GAUGE,</b> for Tourists and Travellers, with a 3-in. receiving surface and corresponding graduated glass. In copper ..	1	1	0

INDEX.

	PAGE
Airmeters .. .. .	70, 71
Anemograph, Recording .. .. .	66
Anemometers .. .. .	32, 33, 66 to 73
Do. Beckley's .. .. .	32, 33, 67, 68
Do. Biram's .. .. .	71, 72
Do. Duncan's .. .. .	71, 72
Do. Hick's Electrical .. .. .	73
Do. Lind's .. .. .	73
Do. Pedestal .. .. .	70
Do. Portable .. .. .	71
Do. Robinson's .. .. .	70
Do. Russell's .. .. .	69
Apparatus for Testing Aneroid Barometers .. .. .	59
Barometers, Mercurial .. .. .	31 to 49
Do. do. Farmer's .. .. .	45, 46
Do. do. Fitzroy .. .. .	49
Do. do. Gay Lussac.. .. .	39
Do. do. Marine .. .. .	34, 35
Do. do. Miners' .. .. .	45, 46
Do. do. Mountain .. .. .	33, 39, 40
Do. do. Open Range .. .. .	37, 39, 40
Do. do. Pediment .. .. .	31, 41 to 46
Do. do. Recording .. .. .	40
Do. do. Standard .. .. .	32, 33, 36 to 39
Do. do. Spiral Tube.. .. .	36 & 38
Do. do. Wheel .. .. .	47, 48
Capt. George's Mountain Barometer .. .. .	40
Current Meter .. .. .	63
Collegiate Meteorological Set .. .. .	31
Damp Detector .. .. .	60
Dines' Meteorograph .. .. .	64
Dines' Recording Mercurial Barometer .. .. .	40
Glass Cases for Standard Barometers .. .. .	38, 39
Hygrometers .. .. .	31 to 33, 60 to 62
Do. Dines' .. .. .	61
Do. Mason's .. .. .	31 to 33, 61, 62
Do. Regnault's .. .. .	60 to 61
Hypsometrical Apparatus .. .. .	58
Kata-Thermometer .. .. .	55
Meteorograph, Dines' .. .. .	64
Meteorological Instruments, Sets of .. .. .	31 to 33
Pedometers .. .. .	63
Radio-Integrator, Wilson's .. .. .	59

	PAGE
Rain Gauges .. .. .	31 to 33, 74 to 79
Do. Admiralty .. .. .	79
Do. Electric .. .. .	77, 78
Do. Glaisher's .. .. .	32, 33, 79
Do. Howard's .. .. .	78, 79
Do. Howard's Pedestal .. .. .	78, 79
Do. Livingstone .. .. .	79
Do. Meteorological Office .. .. .	79
Do. Recording .. .. .	74 to 78
Do. Snowdon .. .. .	79
Do. Stutter's .. .. .	76
Do. Symon's .. .. .	31 & 79
Spirometer .. .. .	63
Stephenson's Screen.. .. .	32, 33
Storm Glasses .. .. .	49, 50
Sunshine Recorders .. .. .	65
Sympiesometers .. .. .	33
Thermometers, Bath .. .. .	53, 54
Do. Boiling Point .. .. .	58
Do. Chemical .. .. .	56
Do. Dimenunon .. .. .	55
Do. Description of .. .. .	51
Do. Drawing Room .. .. .	53
Do. Earth or Subsoil .. .. .	32, 33, 59
Do. Garden .. .. .	53, 54
Do. Grass Minimum .. .. .	32, 33, 57
Do. High Range .. .. .	59
Do. Hot-bed .. .. .	53
Do. Hypsometrical .. .. .	58
Do. Marine .. .. .	55
Do. Maximum .. .. .	31 to 33, 54, 55
Do. Minimum .. .. .	31 to 33, 54, 55, 57
Do. Pedestal .. .. .	53
Do. Pocket .. .. .	55
Do. Porcelain .. .. .	53, 54
Do. Revolving .. .. .	55
Do. Screen .. .. .	32, 33
Do. Self-Recording .. .. .	57
Do. Six's Maximum and Minimum .. .. .	52
Do. Solar Maximum .. .. .	32, 33, 57
Do. Standard .. .. .	56
Do. Travellers' .. .. .	55, 56
Do. Window .. .. .	53, 54
Trocheameters .. .. .	63
Wilson's Radio-Integrator .. .. .	59
Wind Direction Recorder .. .. .	66, 67