

CATALOGUE.

SECTION F.

METEOROLOGICAL INSTRUMENTS

BAROMETERS—THERMOMETERS

RAIN GAUGES

J. H. STEWARD, LTD.

Opticians and Scientific Instrument Makers

406, STRAND, LONDON, W.C.2

ESTABLISHED 1852.

PHONE TEMPLE BAR 1867.

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J. H. Steward, Ltd., have held the appointment of Official Opticians and Meteorologists to the National Rifle Association since 1861.

NOTICE.

This is the **F Section** of our catalogue and cancels all previous editions.

An Index is printed on the last page.

A list of other sections of the catalogue will be found inside the cover

Ordering.—When ordering, the letter F and the number printed against the instrument required should be quoted.

Telegraphic code messages will be found printed on page 35.

Any instrument not specified in the catalogue can be constructed or obtained for clients. Estimates furnished on application.

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STANDARD MERCURY BAROMETERS.

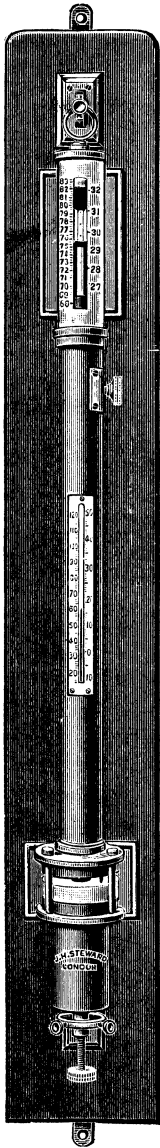


Fig. 1.

The "Fortin" Standard Barometer. The glass tube containing the mercury is surrounded by a metal outer tube with a window through which the summit of the mercury can be viewed. The verniers are so arranged that a reading can be taken free from error of parallax. The barometrical scale is engraved on metal and an ivory point inside the cistern constitutes the zero of the scale. The ivory point can be viewed through the glass portion of the cistern, and before a reading is taken, the level of the mercury in the cistern is adjusted by a screw at the bottom of the barometer, so that the tip of the ivory point just touches the surface of the mercury. The barometer is suspended from a metal bracket, and hangs free with its lower end passing through a metal ring on which there are three screws for fixing the barometer in a perfectly vertical position. Opal glass reflectors placed behind the scale and the cistern facilitate setting the vernier and mercury before making an observation, and the barometer can be rotated bodily so as to place it in the most favourable light for reading. A standard thermometer with Fahrenheit and Centigrade scales is attached to the barometer.

The unit of measurement employed for the barometrical scale is either the inch, the millimetre or the millibar, which can be read by vernier to 0.002 inch, 0.05 millimetre or 0.1 millibar respectively. The barometer is supplied with any two of these scales as required. Fig. 1.

- F 1400.—**The "Fortin" Standard Barometer**, bore of tube 0.4 inch (10 mm.) diameter. Double scale with any two of the scales mentioned: inch, millimetre, or millibar **£16 15 0**
- F 1401.—.....**ditto**..... bore of tube 0.5 inch (12.7 mm.) diameter **18 10 0**
- F 1402.—.....**ditto**..... bore of tube 0.6 inch (15 mm.) diameter **26 10 0**
- F 1403.—.....**ditto**..... bore of tube 0.75 inch (19 mm.) diameter **36 0 0**
- F 1404.—N.P.L. Certificate for either of the above "Fortin" Barometers **1 15 0**

- F 1405.—**The “ Educational ” Standard Barometer** with adjustable cistern on the Fortin principle. Bore of tube 0.25 inch (6.4 mm.). Double scale inches and millimetres reading by vernier to 0.01 inch and 0.1 mm. respectively. Attached thermometer with Fahrenheit and Centigrade scales. The barometer hangs freely from a metal bracket attached to a board with opal glass reflectors behind the scale and cistern..... **£8 10 0**
- F 1405a.—N.P.L. Certificate **1 15 0**

- F 1406.—**The “ Kew ” Standard Barometer**, constructed on a different principle to the Fortin barometer, the scale being graduated so as to allow for different levels of the mercury in the cistern, making it unnecessary to adjust the latter before taking a reading. The barometer is suspended on gimbals at the end of a short arm and assumes a vertical position. It is attached to the wall by a fitting supplied for the purpose. The vernier is arranged so that readings taken from the summit of the mercury are free from error of parallax. The attached thermometer has Fahrenheit and Centigrade scales. The tube has a bore of 0.3 inch (7.6 mm.) The barometer is furnished with a single scale graduated either in inches, millimetres or millibars reading by vernier to 0.002 inch, 0.05 mm. or 0.1 millibar respectively..... **£13 0 0**

- F 1406a.—N.P.L. Certificate **1 15 0**

For use at high altitudes or in mines below sea level, the barometrical scale can be arranged as required. Price on application.

- F 1407.—**Marine Standard Mercury Barometer**, as used by the Admiralty. The barometer is constructed and graduated so that no adjustment of the mercury in the cistern is necessary, and any oscillation of the mercury in the tube due to motion of the vessel is prevented. The barometer is suspended in gimbals at the extremity of a metal arm, and swings free, remaining vertical when the vessel rolls. The scale is graduated on metal and can be read to 0.002 inch by means of the vernier which is actuated by rack and pinion. A standard thermometer is attached to the barometer **£13 0 0**

- F 1407a.—N.P.L. Certificate **1 15 0**

If preferred the scale can be divided to millimetres or millibars.

- F 1408.—**Mountain Standard Mercury Barometer** for measuring the difference in altitude between any two places by comparing the difference in the barometrical readings. The barometer is constructed on the Fortin principle described on page 2, with an extended scale graduated from 32 down to 15 inches, which is a sufficient range for measuring altitudes up to about 18,000 feet above sea level. A standard thermometer is attached to the barometer and a metal tripod is supplied for supporting the barometer when taking a reading. For transport the barometer is carried in a leather case with shoulder straps and the tripod is strapped outside. Price of barometer, with tripod and case..... **£25 10 0**

If preferred the scale can be divided to millimetres or millibars.

STANDARD THERMOMETERS.

Standard Maximum and Minimum Thermometers for registering the highest and lowest temperature reached during a given period. Before being hung in the requisite horizontal position the thermometers are first set, the maximum thermometer being swung sharply with the bulb downwards, causing any separated mercury in the tube to re-enter the bulb, and the minimum thermometer being held vertically with the bulb uppermost, when the index needle will slide down to the end of the spirit. The highest temperature reached will be indicated by the extremity of the mercury in the tube of the maximum thermometer and the lowest temperature by the end of the needle furthest from the bulb of the minimum thermometer.

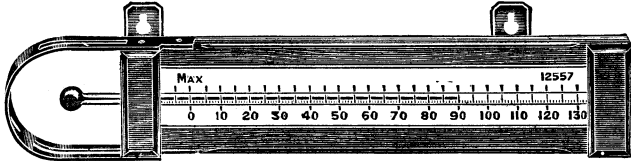


Fig. 2.

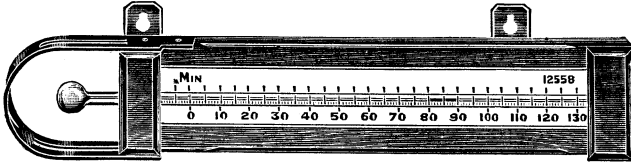


Fig. 3.

F 1409.—**Standard Maximum Thermometer**, 12-inch scale divided on glass stem to every degree Fahrenheit, with figures on opal glass mounted in oak frame..... Fig. 2 **£1 12 6**

F 1410.—**Standard Minimum Thermometer** to match No. F1409..... Fig. 3 **1 12 6**

F 1411.—N.P.L. Certificate, per thermometer **3 0**

These thermometers can be supplied with the Centigrade scale instead of the Fahrenheit scale at the same price.



Fig. 4.



Fig. 5.

F 1412.—**Standard Maximum Thermometer**, 8-inch scale divided on glass stem to every degree Fahrenheit with figures on porcelain plate mounted on oak Fig. 4 **£1 1 0**

F 1413.—**Standard Minimum Thermometer** to match No. F1412..... Fig. 5 **1 1 0**

F 1414.—N.P.L. Certificate, per thermometer **0 3 0**

These thermometers can be supplied with the Centigrade scale instead of the Fahrenheit scale at the same price.

STANDARD THERMOMETERS.

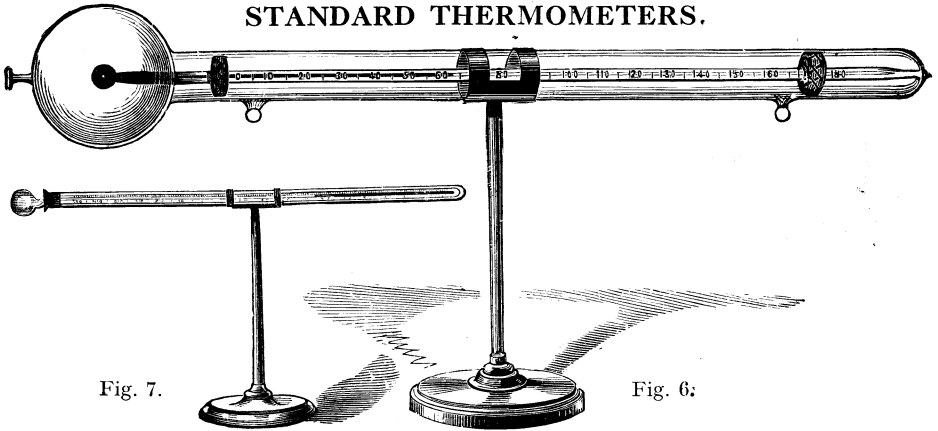


Fig. 7.

Fig. 6.

- F 1415.—**Solar Radiation Thermometer** in vacuo for measuring the maximum intensity of the sun's radiation during a given period. Either Fahrenheit or Centigrade scale with the degrees and figures etched on the glass stem. Fig 6, but without the stand..... £2 0 0
- F 1416.—N.P.L. Certificate for F 1415 6 6
- F 1417.—**Terrestrial Radiation Thermometer** or Grass Minimum Thermometer for estimating radiation from the earth's surface and for indicating ground frost. Fahrenheit or Centigrade scale etched on the glass stem. Fig. 7, but without the stand..... £1 5 0
- F 1418.—N.P.L. Certificate for F 1417 3 0
- F 1419.—**Stand** as illustrated for either F 1415 or F 1417..... 12 6

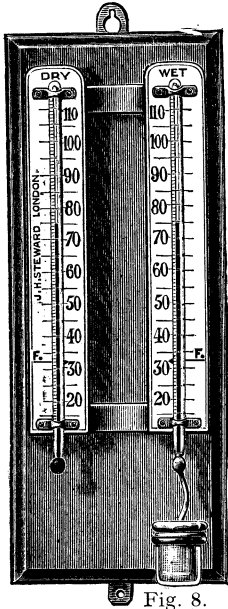


Fig. 8.

- F 1420.—**Standard Hygrometer** with wet and dry bulb thermometers. By using the data obtained from the two thermometers in connection with Glaisher's Hygrometrical Tables, the degree of the humidity of the air is determined, also the temperature of dew point and other hygrometrical conditions. The scales either Fahrenheit or Centigrade are etched on the glass stem. Mounted on mahogany. Fig. 8..... £2 17 6
- F 1421.—N.P.L. Certificate for F 1420! 7 0
- F 1422.—**Glaisher's Hygrometrical Tables** 3 6

Earth Thermometers for measuring the temperature of the soil at different depths. Fahrenheit or Centigrade scale etched on the glass stem to every degree and enclosed in an outer glass jacket with the bulb embedded in paraffin wax and rendered insensitive to sudden change of temperature when the thermometer is withdrawn for observations. The thermometer is attached to a chain and supplied with a metal earth barrel of the requisite depth with metal cap.

- F 1423.—**Earth Thermometer** for
 depth of 1 foot £2 3 6
- F 1424.—.....for depth of 2 feet... 2 7 6
- F 1425.—.....for depth of 4 feet... 2 13 6

Other depths at proportionate prices.

- F 1426.—N.P.L. Certificate for Figs. F 1423, F 1424, F 1425 Each 0 3 0

RAIN AND SNOW GAUGES.

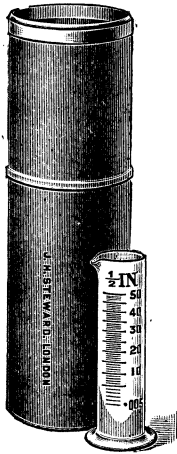


Fig. 9.

The "Snowdon" Rain Gauge. Deep funnel with bevelled brass rim to prevent splashing, and to collect snow. Metal receiving can and "Camden" glass measure graduated to 100th of an inch, with the first division sub-divided to measure 0.005 inch. The rain gauge is made in two sizes, with the funnel either 5 inches or 8 inches diameter. Fig. 9.

F 1427.—5-inch "Snowdon" Rain Gauge, made of galvanized iron with "Camden" glass measure.	£1 5 0
F 1428.—.....ditto.....made of copper.....	1 15 0
F 1429.—8-inch "Snowdon" Rain Gauge, made of galvanized iron with "Camden" glass measure.	£2 7 6
F 1430.....ditto.....made of copper	3 10 0
F 1431.—5-inch "Snowdon" Rain Gauge of extra capacity, holding about 18 inches of rain. For use in localities which are visited at long intervals, or in countries where rainfall is very great. Made of galvanized iron. Glass measure graduated to 100ths of an inch.....	£2 15 0
F 1432.....ditto.....made of copper	3 15 0
F 1433.—M.O. Certificate of accuracy for either of above Rain Gauges	3 6

Metric Measure. The "Snowdon" Rain Gauges can be supplied with the glass measure graduated to tenths of a millimetre at the same price.

RAIN GAUGE MEASURES.

F 1434.—Glass Measure, ordinary pattern, to hold $\frac{1}{2}$ inch of rain, divided to .01 inch. For 5-inch Rain Gauge.....	£0 5 6
F 1435.—.....ditto.....for 8-inch Rain Gauge	0 7 6
F 1436.—Glass Measure, "Camden" pattern, to hold $\frac{1}{2}$ inch of rain, divided to .01 inch with the first division sub-divided to .005 inch for measuring small quantities. For 5-inch Rain Gauge.....	£0 7 6
F 1437.—.....ditto.....for 8-inch Rain Gauge	0 12 6
F 1438.—Glass Measure, "Conical" pattern, to hold $\frac{1}{2}$ inch of rain, divided to .01 inch with the first division sub-divided to .005 inch. The bottom of this measure is cone shape without a base, which facilitates reading small quantities of rain. For 5-inch Rain Gauge...	£0 7 6
F 1439.—.....ditto.....for 8-inch Rain Gauge	0 12 6
F 1440.—Metric Glass Measure to hold 10 millimetres of rain, divided to .1 mm. For 5-inch Rain Gauge. Ordinary pattern	£0 7 6
F 1441.—Metric Glass Measure to hold 10 millimetres of rain, divided to tenths of a millimetre, with the first division sub-divided to 0.05 mm. For 5-inch Rain Gauge. Conical pattern	£0 7 6
F 1442.—.....ditto.....for 8-inch Rain Gauge	0 12 6

REGISTERING RAIN GAUGES.

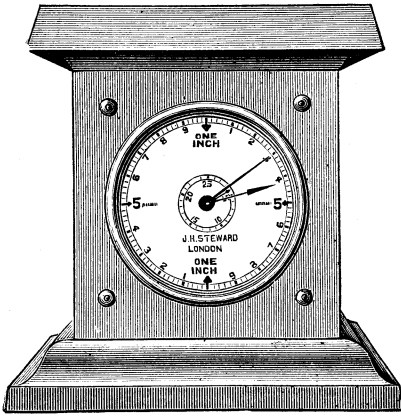


Fig. 10.

Registering Rain Gauge for indicating the quantity of rainfall. Rain passes from the funnel into a receiver consisting of a tilting bucket made in two sections and geared to the registering mechanism. Each section of the bucket holds $\cdot 01$ inch of rain and when one section is full the bucket tilts, and in doing so empties the section and moves the index hand forward one division on the dial representing $\cdot 01$ inch of rainfall. At the same time the other section of the bucket is brought into position to receive the rain, and when full the mechanical action is repeated. Fig. 10.

- F 1443.—**8-inch Registering Rain Gauge** with dial graduated to register every $\cdot 01$ inch up to 12 inches. Japanned metal case..... **£5 10 0**
- F 1444.....ditto..... copper case **£6 10 0**
- F 1445.—**8-inch Registering Rain Gauge**, to register every $\cdot 01$ inch up to 100 inches, for use in localities that are visited at long intervals or where rainfall is very heavy. Copper case..... **£9 0 0**
- F 1446.—**8-inch Recording Rain Gauge**. A tilting bucket is geared to a pen which traces the amount of rainfall on a graduated paper attached to a metal drum which is driven round by clockwork once in seven days. The total amount of rain fallen during the week is recorded and the time during which it fell. The paper is graduated to $\cdot 02$ inch and can be mentally sub-divided. The case is japanned metal **£17 0 0**
- F 1447.—Set of 52 chart forms for No. F 1446 **8 0**
- F 1448.—**The Automatic Siphon Rainfall Recorder** measures and records on a graduated paper the amount of rain that has fallen during a given period and indicates the duration of the fall. The clock driven drum to which the graduated paper is attached can be supplied to revolve either once in 24 hours or once a week. For recording the duration of light showers, a drum to revolve once in 24 hours is recommended. The chart forms can be supplied graduated to parts of an inch or to millimetres. Price, including 50 chart forms..... **£18 0 0**

When ordering a Siphon Rainfall Recorder, state whether the drum is required to revolve once in 24 hours or once a week, and whether the chart forms are required graduated to parts of an inch or to millimetres.

SUNSHINE RECORDERS.

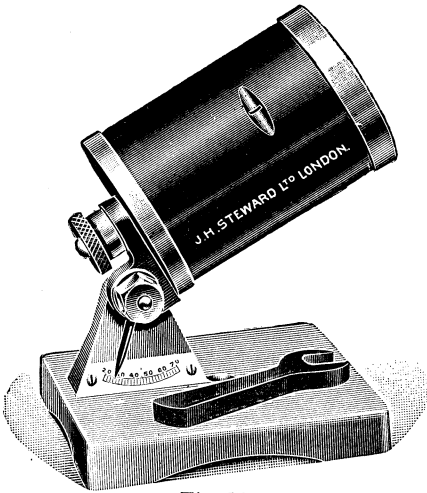


Fig. 11.

F 1451. — The "Campbell-Stokes" Sunshine Recorder, consisting of an optically worked glass sphere mounted with its centre coinciding with the centre of a metal hemispherical bowl. A prepared card on which a time scale is printed is placed in the bowl and the sun's rays passing through the glass sphere are focussed on the card, and as the earth rotates a trace is scorched on the card which records the duration of sunshine, the sun being its own time-keeper. The instrument is adjustable for use in different latitudes. Owing to changes of the declination of the sun, three series of prepared cards are necessary for summer, winter and the times of the equinoxes.

F 1452. — The "Campbell-Stokes" Sunshine Recorder, adjustable for use in any latitude.

Fig. 12 £16 10 0

F 1453. —.....ditto.....of more simple construction, adjustable for use in latitudes between 45° and 65° £15 10 0

F 1454. — A year's supply of time cards for either F 1452 or F 1453 £2 5 0

F 1449. — The "Jordan" Sunshine Recorder for registering photographically the duration of sunshine. The instrument consists of a metal cylindrical box or camera mounted on a base and adjustable for use in any latitude between 20° and 70°. The camera is set up in the meridian of the place of observation and a sensitised paper chart on which a time scale is printed is inserted in the camera. Sunlight entering by an aperture traces a dark blue band on the paper by reason of the earth's rotation. The sun thus keeps the time of its own record and the resulting chart is fixed by rinsing the sensitised paper in plain water.

Fig. 11 £3 0 0

F 1450. — 100 sensitised papers with time scale £0 7 6



Fig. 12.

CLIMATOLOGICAL EQUIPMENT.

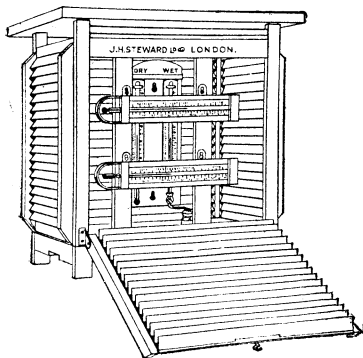


Fig. 13.

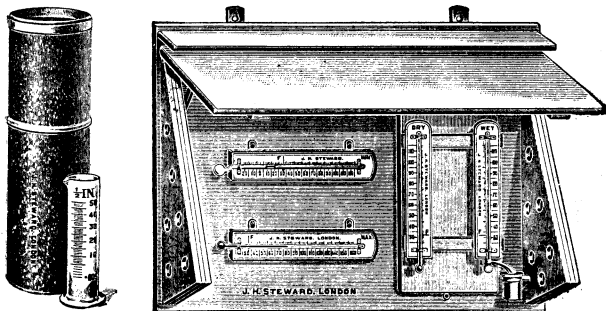
F 1455.—The “Stevenson” Thermometer Screen for obtaining standard “shade” temperatures. The screen is made of seasoned wood coated with white paint. The four sides are double louvered so as to permit free circulation of air whilst effectually shielding the thermometers from sun and rain. A pair of maximum and minimum thermometers and a wet and dry bulb hygrometer can be supported on the uprights in a position leaving sufficient air space between the thermometers and the sides of the screen; and arranged so that all the thermometers can be read without removing them from the upright. Fig. 13 (without thermometers) **£5 10 0**

EQUIPMENT OF A NORMAL CLIMATOLOGICAL STATION.

F 1456.—“Kew” Mercury Barometer, No. F 1406	£13 0 0
F 1457.—N.P.L. Certificate for same	1 15 0
F 1458.—Maximum Thermometer, No. F 1409	1 12 6
F 1459.—N.P.L. Certificate for same	3 0 0
F 1460.—Minimum Thermometer, No. 1410.....	1 12 6
F 1461.—N.P.L. Certificate for same	3 0 0
F 1462.—Hygrometer with wet and dry bulbs, No. F 1420 ...	2 17 6
F 1463.—N.P.L. Certificate for same	7 0 0
F 1464.—Stevenson’s Thermometer Screen, No. 1455	5 10 0
F 1465.—Copper Snowdon Rain Gauge and Measure, No. F 1428.....	1 15 0
F 1466.—Solar Radiation Thermometer, No. F 1415	2 0 0 0
F 1467.—N.P.L. Certificate for same	6 6 6
F 1468.—Terrestrial Radiation Thermometer, No. F 1417...	1 5 0 0
F 1469.—N.P.L. Certificate for same.....	3 0 0 0
F 1470.—Earth Thermometer for 1 foot depth, No. F 1423...	2 3 6 6
F 1471.—N.P.L. Certificate for same	3 0 0 0
F 1472.—Earth Thermometer for 2 foot depth, No. F 1424...	2 7 6 6
F 1473.—N.P.L. Certificate for same	3 0 0 0
F 1474.—Jordan’s Sunshine Recorder, No. F 1449	3 0 0 0
F 1475.—100 sensitised papers for same	7 6 6 6

Any of the above instruments can be purchased separately.

F 1476.—“Educational” Outfit for a Climatological Station consisting of a pair of standard maximum and minimum thermometers, type F 1412 and F 1413. Wet and dry bulb hygrometer type F 1420. Snowdon



rain gauge with Camden glass measure F1427. Wall screen to contain the thermometers as illustrated, Fig. 14 ... **£8 0 0**

F 1477.—N.P.L. Certificate for the 4 thermometers if required **£0 15 0**

Fig. 14.

ANEMOMETERS.

F 1479.—The "Robin-
son" Cup
Anemometer.

The cups are spun round by the wind and revolve a spindle which actuates the registering mechanism at its lower extremity. The number of miles of wind passing the anemometer is indicated on a dial up to 500 miles, and the velocity is calculated by noting how many revolutions are indicated in a given time.

Fig. 15 £10 0 0

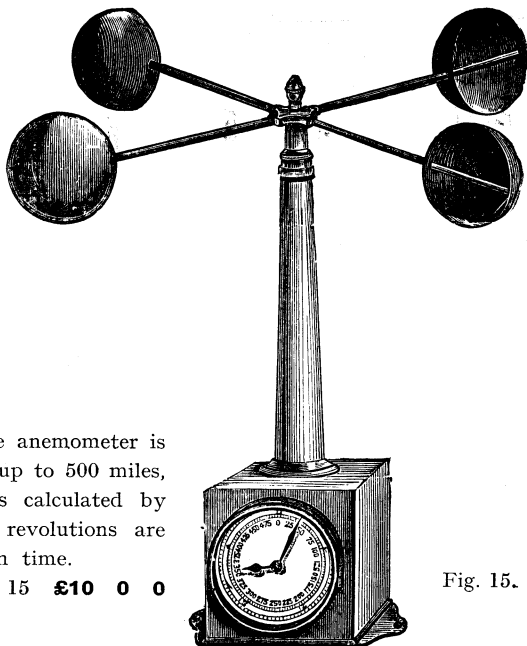


Fig. 15.

F 1480.—The Electric Cup Anemometer with electrical transmission and bell which rings at every 25 revolutions of the cups. The interval between two rings of the bell indicates 139 feet of wind, and the velocity is calculated by timing the interval between two rings. Price complete with switch, bell, battery, and 50 feet of insulated wire..... £9 0 0

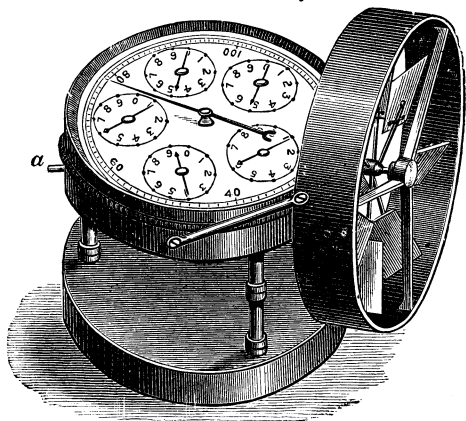


Fig. 16.

F 1481.—Portable Anemometer for registering the velocity of wind up to 35 miles per hour. The dial is divided to every foot up to 100,000 feet and velocity is calculated by noting how many feet are indicated in a given time. Starting, stopping and zero setting actions.

Fig. 16 £6 6 0

F 1657.—Chronograph.

See page 34.

PORTABLE ANEROIDS.

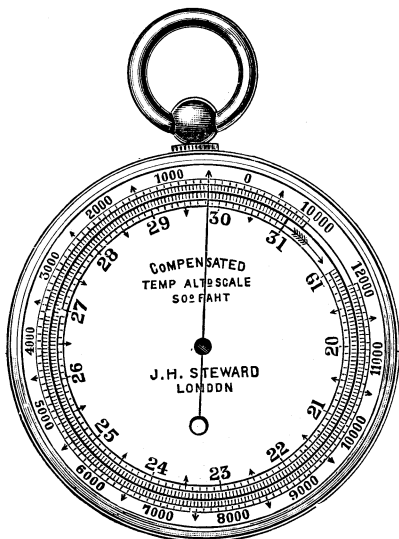


Fig. 17.

The Portable Aneroid is a very compact barometer which can be carried in any position without fear of derangement. By its indication changes of weather can be foretold, and the height of mountains measured. Also the difference in level between two stations can be determined, and the height of an aeroplane above its starting point. The mechanism is of the most modern construction, and is designed on the same principle as the mechanism of the Hypsometric Aneroid described on page 15, which permits the employment of an equally divided moveable altitude scale, obviating calculations. The movement is compensated, and is not affected by temperature, the instrument being actuated solely by the pressure of the atmosphere. The scales are divided on silvered metal, the fixed inner or pressure scale representing inches of mercury, and the moveable outer scale, feet of altitude, as stated for each instrument. The aneroids are also

made with metric scale as enumerated.

The smaller size known as a "watch" aneroid is 2 inches diameter, and the larger or "pocket" aneroid is 2 3/4 inches diameter. The latter has more open and legible scales.

F 1482.—	Watch Aneroid , with altitude scale of 6,000 feet, divided to every 50 feet, in snap morocco case.....	£4 5 0
F 1483.—	...ditto... 8,000 feet, divided to every 50 feet	4 7 6
F 1484.—	...ditto...10,000 feet ,, ,, 50 feet. Fig. 17	4 10 0
F 1485.—	...ditto...12,000 feet ,, ,, 50 feet	4 15 0
F 1486.—	...ditto...15,000 feet ,, ,, 100 feet	5 0 0
F 1487.—	...ditto...20,000 feet ,, ,, 100 feet	5 10 0
F 1488.—	Pocket Aneroid , with altitude scale of 6,000 feet, divided to every 25 feet, in morocco snap case.....	£5 0 0
F 1489.—	...ditto... 8,000 feet, divided to every 25 feet	5 5 0
F 1490.—	...ditto...10,000 feet ,, ,, 25 feet	5 10 0
F 1491.—	...ditto...12,000 feet ,, ,, 50 feet	5 15 0
F 1492.—	...ditto...15,000 feet ,, ,, 100 feet	6 0 0
F 1493.—	...ditto...20,000 feet ,, ,, 100 feet	6 15 0
F 1494.—	Watch Aneroid , with altitude scale of 2,000 metres, divided to every 70 metres, in morocco case	£4 5 0
F 1495.—	...ditto...3,000 metres divided to every 20 metres ...	4 10 0
F 1496.—	...ditto...4,000 metres ,, ,, 20 metres ...	4 15 0
F 1497.—	...ditto...5,000 metres ,, ,, 20 metres ...	5 0 0
F 1498.—	...ditto...6,000 metres ,, ,, 20 metres ...	5 10 0
F 1499.—	Pocket Aneroid , with altitude scale of 2,000 metres, divided to every 10 metres, in morocco case	£5 0 0
F 1500.—	...ditto...3,000 metres divided to every 10 metres ...	5 10 0
F 1501.—	...ditto...4,000 metres ,, ,, 20 metres ...	5 15 0
F 1502.—	...ditto...5,000 metres ,, ,, 20 metres ...	6 0 0
F 1503.—	...ditto...6,000 metres ,, ,, 20 metres ...	6 15 0

PORTABLE ANEROIDS.

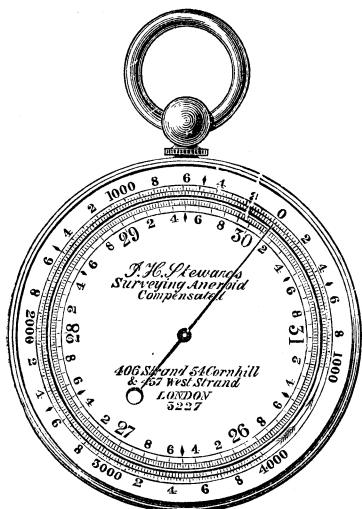


Fig. 18.

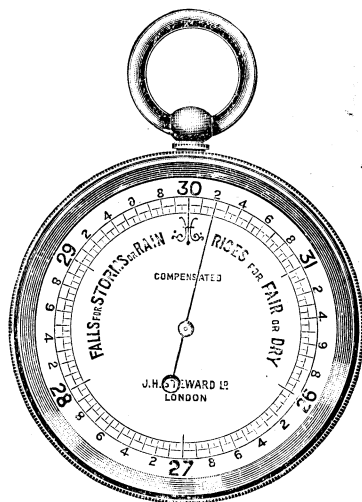


Fig. 19.

“**Open Range**” **Portable Aneroids** for the measurement of heights and for weather forecasting. These aneroids are of the same construction and quality as those described on page 11, and the mechanism is compensated. They are intended for use in country where altitudes do not exceed 4,000 feet above sea level, consequently the scale is very open. The altitude scale is divided to every 10 feet. They are made in two sizes, the “watch” size, 2 inches diameter, and the “pocket” size, 2 $\frac{3}{4}$ inches diameter.

- F 1504.—“**Open Range**” **Watch Aneroid** with altitude scale of 4,000 feet, in morocco snap caseFig. 18 **£5 0 0**
- F 1505.—.....**ditto**.....for weather forecasting only, without altitude scaleFig. 19 **£4 4 0**
- F 1506.—“**Open Range**” **Pocket Aneroid**, with altitude scale of 4,000 feet, in morocco snap caseFig. 18 **£5 15 0**
- F 1507.—.....**ditto**.....for weather forecasting only, without altitude scaleFig. 19 **£5 0 0**

HIMALAYAN ALTIMETER.

- F 1507a.—**The Himalayan Altimeter** is a pocket aneroid barometer of similar construction to the aneroids described on page 11, but with an extended altitude scale for measuring heights up to 25,000 feet. The scale is divided to every 100 feet, but can be sub-divided by means of the index hand to 50 feet and less. The movement is compensated and is not affected by temperature. The mounts are aluminium. Diameter of instrument 3 inches, weight 8 ozs. Price, including leather case with shoulder strap **£9 0 0**

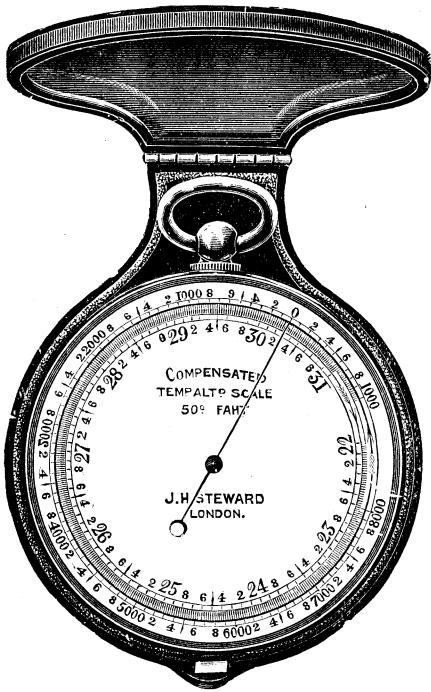


Fig. 20.

COMBINED
ANEROID, COMPASS
AND THERMOMETER.



Fig. 21.

Aneroid, Compass and Thermometer combined in a velvet lined morocco case, opening back and front. The compass and thermometer can be detached from the back of the aneroid as shown. Figs. 20 and 21. The aneroid is of the same construction and quality as those described on page 11, and the mechanism is compensated. The altitude scale for measuring heights up to 8,000 feet above sea level is divided to every 20 feet, and is moveable. The inner scale of inches is the usual barometrical pressure scale for weather forecasting. The compass has a floating pearl dial, which can be seen in twilight. The thermometer has Fahrenheit and Centigrade scales.

F 1508.—**Combined Aneroid, Compass and Thermometer.** Pocket size, 2 $\frac{3}{4}$ inches diameter..... £8 10 0

F 1509.—.....ditto....., watch size, 2 inches diameter..... 7 5 0

The aneroid can be supplied to measure heights above 8,000 feet at an extra cost of 5/- for every additional 2,000 feet.

THE "POPULAR" WATCH ANEROIDS.

The "Popular" Watch Aneroids are reliable and of sound construction, and can be recommended for weather forecasting and also for measuring heights when the maximum accuracy is not required. The movement is not compensated and is affected to some extent by temperature. These aneroids are made in the "watch" size only, 2 inches diameter.

- F 1510.—The "Popular" Watch Aneroid with rotary altitude scale for measuring heights up to 8,000 feet divided to every 100 feet; and for weather forecasting. Snap leatherette case. Fig. 22 **£2 0 0**
- F 1511.—.....ditto..... with scale to 10,000 feet **£2 5 0**
- F 1512.—.....ditto..... with scale to 12,000 feet **£2 10 0**
- F 1513.—The "Popular" Watch Aneroid for weather forecasting only, without the altitude scale similar to Fig. 19. Snap leatherette case. **£1 15 0**

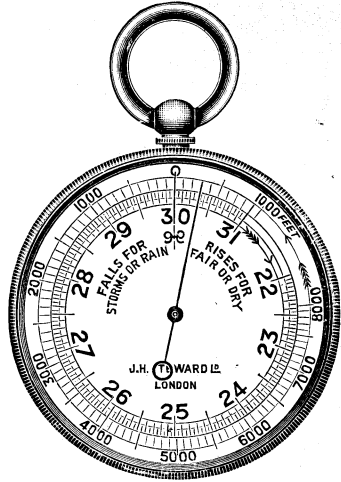


Fig. 22.

THE AERO-ALTIMETER.

The "Steward" Aero-Altimeter as supplied to H.M. Government for use on aeroplanes. The mechanism has been constructed to reduce the effect of vibration to a minimum and is compensated so as to be unaffected by temperature. The altitude scale is very legible, and is divided to every 200 feet with a bold numeral at each 1,000 feet. It can be set to zero by rack and pinion. The leather strap is sufficiently long to go round the coat sleeve. Size, 2 inches diameter, $\frac{3}{8}$ inch thick. Weight about 4 ozs.

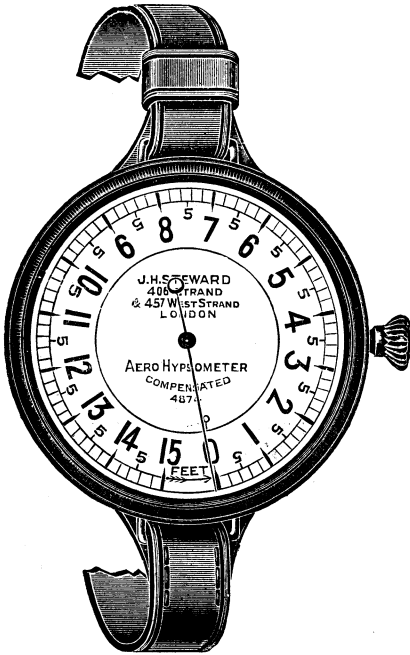


Fig. 23.

- F 1514. — Aero - Altimeter, altitude scale to 10,000 feet above sea level **£5 0 0**
- F 1515.—.....ditto.....scale up to 15,000 feet. Fig. 23 **£5 10 0**
- F 1516.—.....ditto.....scale up to 20,000 feet ... **£6 10 0**

Aero - Altimeter for higher altitudes than 20,000 feet made to order.

THE STEWARD HYPSONOMETRIC ANEROID.

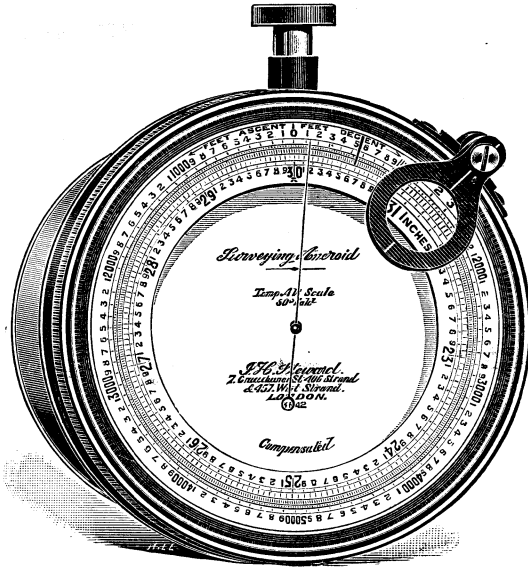


Fig. 24. The Hypsometric Aneroid, with altitude scale to 10,000 feet.

The scales of aneroids constructed in the usual way are of necessity irregularly divided, and to measure altitudes with accuracy various calculations have to be made. These operations, which cause delay and form a source of error, are eliminated by the special construction of the Hypsometric Aneroid, which permits the employment of an altitude scale, divided into equal parts, and forming a complete circle with an adjustable zero, the scale of ascents being to the left of zero and the scale of descents to the right. The operation of measuring an altitude is thus reduced to the greatest simplicity, the altitude being read direct from the altitude scale to as close as 5 feet without the application of a vernier, and without any calculations. By a special arrangement of the reading lens there is no error of parallax, and the movement being compensated, changes of temperature do not affect the reading.

The aneroid is carried in a specially designed sling case, and it can be set and used without removing it from the case. The altitude scale is rotated by rack and pinion, and when set, automatically locks so that it cannot shift in transit. A pointer on the circumference can be set to any reading for reference. A swing thermometer for ascertaining the mean temperature of the air at the time of observation is fitted in the case, and also a card of instructions. The diameter of the dial is 3½ inches.

F 1517.—	Steward Hypsometric Aneroid , with Swing Thermometer, in leather sling case. Altitude scale to 6,000 feet above sea level, divided to 10 feet and reading to 5 feet	£12 10 0
F 1518.—	ditto10,000 feet, reading to 5 feet. Fig. 24	12 15 0
F 1519.—	ditto15,000 feet, reading to 10 feet	13 10 0
F 1520.—	ditto20,000 feet, reading to 10 feet	14 10 0
F 1521.—	ditto2,000 metres, reading to 2 metres	12 10 0
F 1522.—	ditto3,000 metres, reading to 2 metres	12 15 0
F 1523.—	ditto5,000 metres, reading to 5 metres	13 10 0
F 1524.—	ditto6,000 metres, reading to 5 metres	14 10 0

BAROGRAPHS.

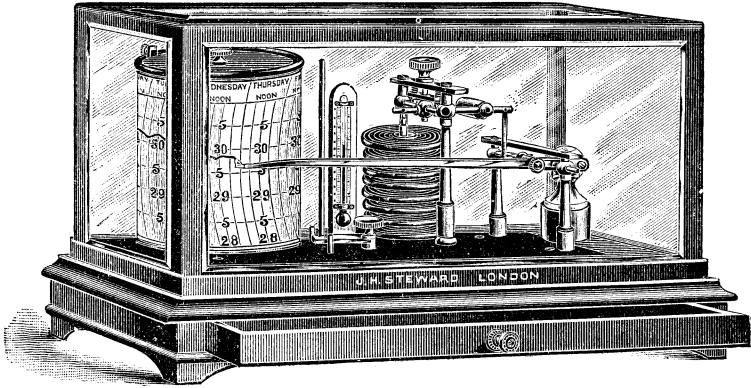


Fig. 25.

The Barograph is a Self-Recording Barometer and consists of an aneroid barometer combined with a metal drum, which is driven round by clockwork, and timed to make one revolution in a week. A paper chart is secured to the drum and is graduated horizontally and vertically, the horizontal graduations corresponding to the ordinary barometer scale of 28 to 31 inches, and the vertical curved graduations indicating days of the week and hours for one week. A long arm attached to the aneroid carries a pen at its extremity which is brought into contact with the paper chart. The arm is actuated by the aneroid, and as the drum revolves the pen inks a continuous line on the paper, which indicates the height of the barometer at any time during the week and at the same time shows when any change of atmospheric pressure took place. Such a record is invaluable for weather forecasting.

The charts are usually graduated to inches and 10ths of an inch, but they can also be supplied with either millibar or metric graduations.

Unless ordered otherwise, a barograph is sent out with the charts graduated to inches and 10ths of an inch with a range of 28 to 31 inches.

F 1525.—**Barograph** of best quality, compensated so as not to be affected by temperature. The case can be either mahogany or light or dark oak, with drawer in the base to contain a supply of chart papers. The top and four sides are bevelled plate glass, giving a full view of the chart. Dimensions, base 14 by 8½ inches, height 8¼ inches. Price with bottle of ink and supply of charts for one year..... **£11 11 0**

F 1526.—**Extra Charts** for 52 weeks. Per set..... **5 6**

F 1527.—**Thermometer** mounted on the base of barograph as illustrated Fig. 25 if required. Extra **12 6**

BAROGRAPHS.

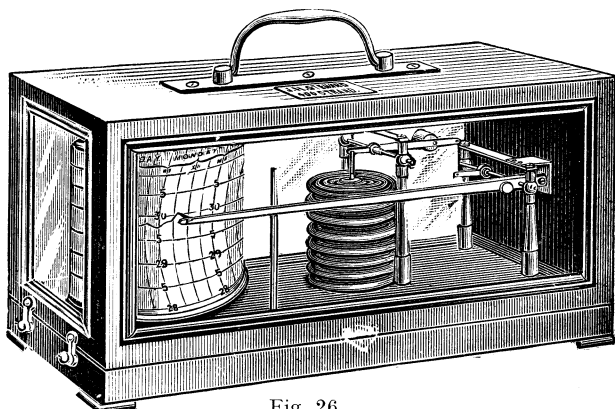


Fig. 26.

- F 1528.—**Marine Barograph** of best quality, the mechanism being the same in every respect as No. F 1525, and compensated so as not to be affected by temperature. Extra strong mahogany case with glass on three sides giving full view of the chart. Metal handle by which the barograph can be suspended from the cabin ceiling. Dimensions, base $12\frac{1}{2} \times 6$ inches, height 7 inches. Complete with supply of 52 charts and bottle of ink Fig. 26 **£10 10 0**
- F 1529.—**Suspender** for suspending the barograph from the cabin ceiling, with arrangement for neutralising the motion of the vessel and keeping the barograph in a horizontal position..... **£0 17 6**
- F 1530.—**Extra Charts** per set of 52 **5 6**

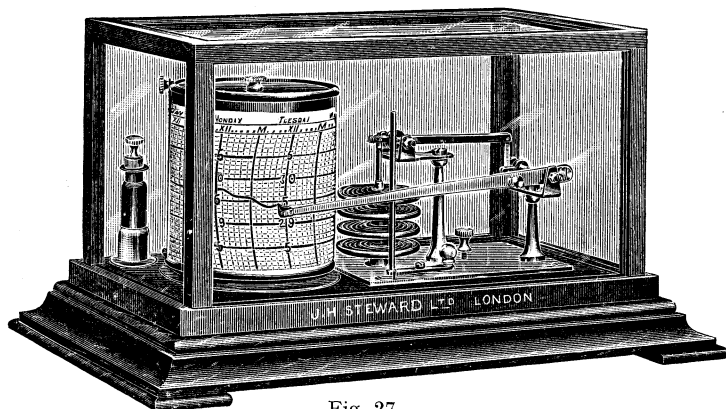


Fig. 27.

- F 1531.—**Educational Barograph** of simple but sound construction. The clock drum makes one revolution in a week, and a continuous record is clearly marked, showing every change of the barometer. Case either mahogany or oak, with sheet glass on top and four sides, giving full view of the chart. Dimensions, base $12\frac{1}{2} \times 3\frac{3}{4}$ inches, height $7\frac{1}{2}$ inches. With bottle of ink and set of 52 charts..... Fig. 27 **£6 15 0**
- F 1532.—**Extra Charts** per set of 52 **5 6**

BARO-THERMOGRAPH.

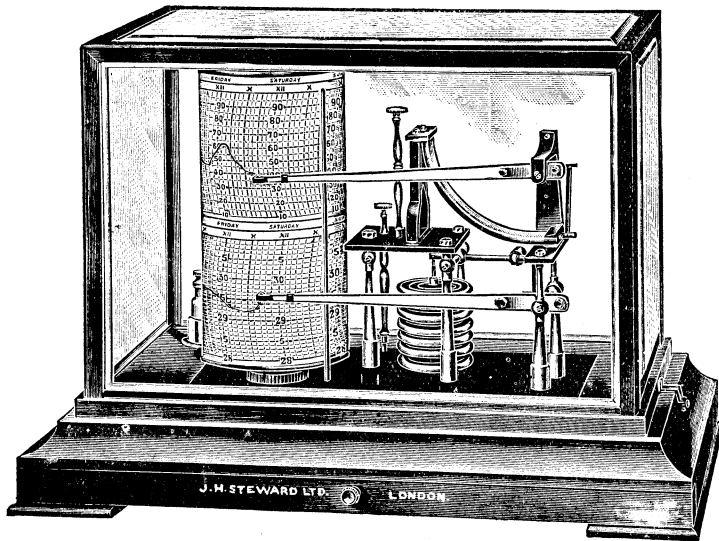


Fig. 28.

F 1533.—The **Baro-Thermograph** is a barograph combined with a thermograph. This instrument records simultaneously barometric pressure and temperature on two charts printed on the same paper, but independent of each other. The metal drum which carries the chart is driven by clockwork and makes one revolution in a week, and the two traced lines indicate the barometric pressure and temperature for every hour and day of the week and graphically show any change, and the time when such change took place.

The mechanism is of the best quality, and the barograph is compensated so as not to be affected by temperature.

The case is either mahogany or oak with a drawer in the base to hold a supply of chart forms. The top and sides are bevelled plate glass, giving a full view of the charts. Perforations in the case admit air to the thermograph. Dimensions, base $16\frac{1}{2} \times 11\frac{1}{2}$ inches, height $11\frac{1}{2}$ inches. Complete with bottle of ink and supply of charts for a year. Fig. 28 **£17 17 0**

F 1534.—**Extra Charts** per set of 52 **7 6**

ACCESSORIES for BAROGRAPHS & THERMOGRAPHS

F 1535.—**Pen** for Barograph or Thermographeach **2 6**

F 1536.—**Ink**, violet colour per bottle **2 0**

F 1537.—**Ink**, red colour ,, **2 6**

F 1538.—**Millibar Charts**. Range of scale 950 to 1,050 millibars. Suitable for Barographs Nos. 1525, 1528, 1531. Per set of 52 charts **5 6**

EXTRA CHARTS for Barographs and Thermographs are quoted under each instrument, and are supplied to commence either on Sunday or Monday.

Barographs and Thermographs with scales other than those specified can be supplied. Price according to requirements.

THERMOGRAPHS.

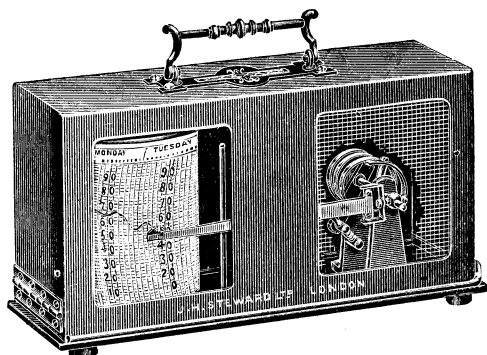


Fig. 29.

F 1539.—**The Thermograph** or Self-Recording Thermometer. This instrument traces a continuous record of the temperature on a graduated chart which is carried on a metal drum driven by clockwork and making one revolution in a week.

The motion of the pen is controlled by a bi-metallic thermometer and as the drum revolves a line is traced on the chart, indicating the temperature hour by hour for every day of the week. Every change of temperature is recorded with the time when the change took place. The instrument is enclosed in a copper case, with a glass window through which the chart is viewed, and perforations allow the air to circulate round the thermometer. The chart is graduated to read from 0° to 100° Fahrenheit, but other scales can be supplied. Dimensions, 11 × 6 × 6 inches. Complete with bottle of ink and supply of charts for a year..... Fig. 29 **£8 15 0**

F 1540.—**Extra Charts** per set of 52 **5 6**

F 1541.—**Recording Hygrometer** with wet and dry bulb thermometer. The thermometers control the motion of two pens which record the "wet" and "dry" readings on a graduated chart, a different coloured ink being used for each pen. From the data obtained from the chart in connection with Glaisher's Hygrometrical Tables the percentage of humidity in the atmosphere is determined. Every change of temperature and humidity is thus recorded. The chart is graduated from 0° to 100° Faht. and is carried on a metal drum which is revolved by clockwork once in a week. Dimensions 14 × 5 × 10 inches. Complete with bottles of violet and red ink, and charts for a year **£11 11 0**

F 1542.—**Glaisher's Hygrometrical Tables** **3 6**

F 1543.—**Extra Charts** per set of 52 **5 6**

F 1544.—**Hair Hygrograph** or Self-Recording Hygrometer gives a continuous graphic record of all changes in the humidity of the atmosphere. The percentage of moisture in the atmosphere is shown directly on a graduated paper chart, no calculation or reference to tables being necessary. Moisture in the atmosphere causes strands of hair to lengthen or shorten, according to the relative humidity, and their movement is communicated to a long arm at the extremity of which is a pen which traces the record on a chart. The chart which is graduated from 0 to 100 per cent. moisture is attached to a metal drum which is driven by clockwork and makes one revolution in a week. The instrument is contained in a japanned metal case with glass front and the hairs are protected by a wire gauze cage. Dimensions, 12 × 9 × 7 inches. Complete with bottle of ink and supply of charts for a year... **£13 13 0**

F 1545.—**Extra Charts** per set of 52 **5 6**

ANEROID BAROMETERS.

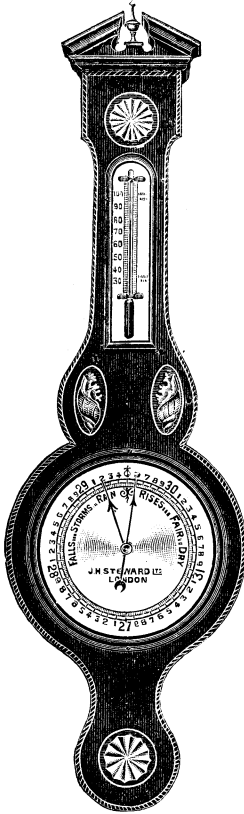


Fig. 30.

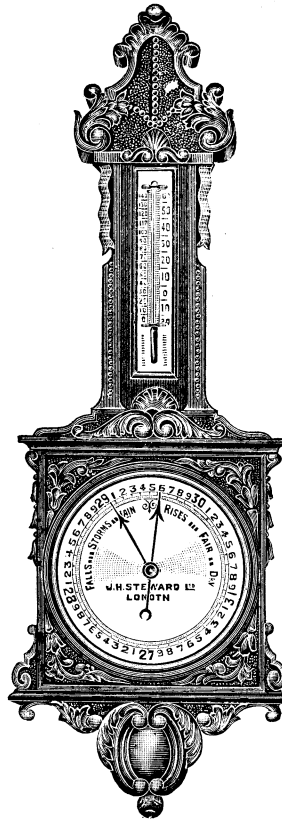


Fig. 31.

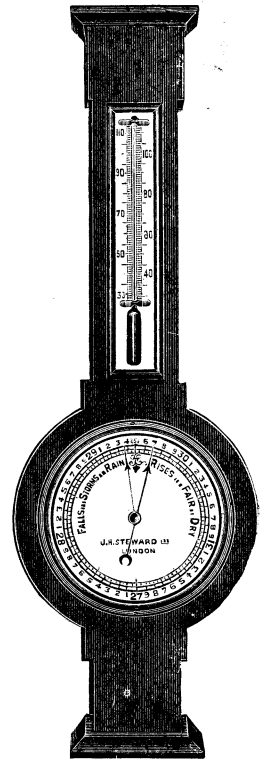


Fig. 32.

F 1546.—The "Sheraton" Aneroid Barometer. Inlaid mahogany frame. Best movement. Silvered metal dial and thermometer scale. Lacquered brass bezel to glass. Height 3 feet. Diameter of dial 8 inches Fig. 30 £8 0 0

F 1547.—.....ditto.....smaller size. Height 2 feet, 5 inches. Diameter of dial 6½ inches £7 10 0

F 1548.—The "Empire" Aneroid Barometer. Carved oak frame. Best movement. Silvered metal dial and thermometer scale. Lacquered brass bezel to glass. Height 2 feet, 5 inches. Diameter of dial 6½ inches Fig. 31 £8 10 0

F 1549.—The "Puritan" Aneroid Barometer. Fumed oak frame. Best movement. Brass dial and thermometer scale. Bronzed brass bezel to glass. Height 2 feet, 4 inches. Diameter of dial 6½ inches. Fig. 32 £6 6 0

ANEROID BAROMETERS.

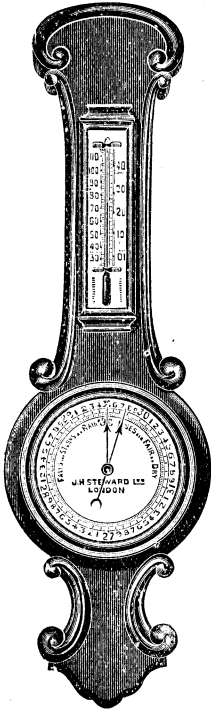


Fig. 33

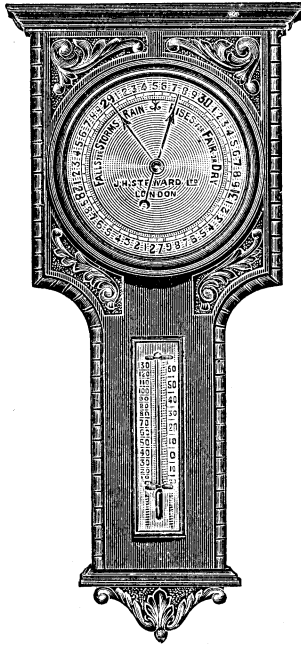


Fig. 34.

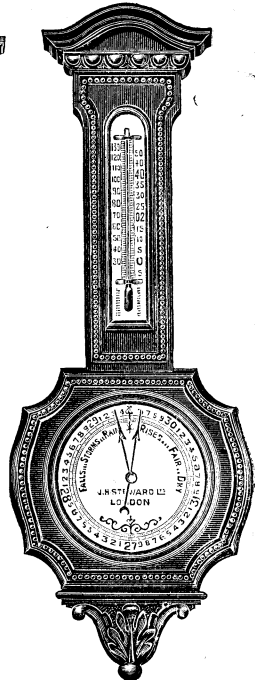


Fig. 35.

F 1550.—The “Georgian” Aneroïd Barometer. Heavy mahogany frame. Silvered metal dial and thermometer scale. Bronzed bezel ring to glass. Height 2 feet, 10 inches. Diameter of dial 8 inches.

Fig. 33 £7 7 0

F 1551.—.....ditto.....smaller size. Height 2 feet, 4 inches. Diameter of dial 6½ inches..... £6 6 0

F 1552.—The “Jacobean” Aneroïd Barometer. Fumed oak frame. Brass dial and thermometer scale. Bronzed bezel to glass. Height 2 feet. Diameter of dial 6½ inches..... Fig. 34 £6 6 0

F 1553.—The “Beaded” Aneroïd Barometer. Mahogany frame. Silvered metal dial and thermometer scale. Lacquered brass bezel to glass. Height 2 feet, 4 inches. Diameter of dial 5 inches.

Fig. 35 £5 0 0

ANEROID BAROMETERS.

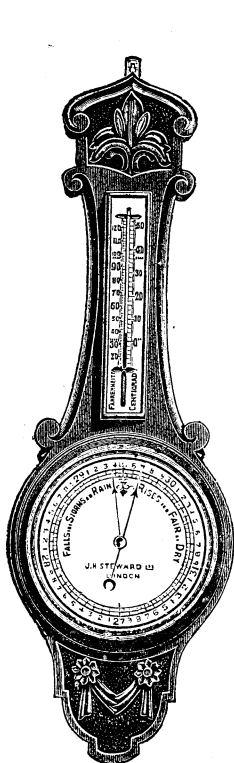


Fig. 36.

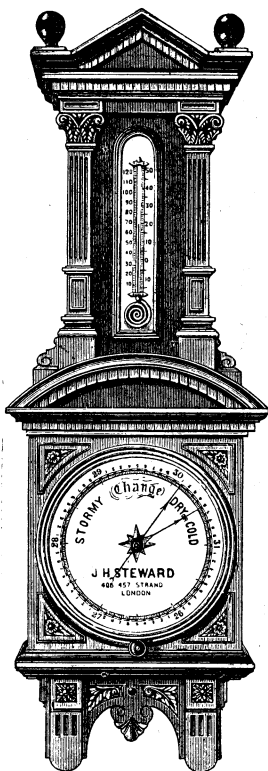


Fig. 37.

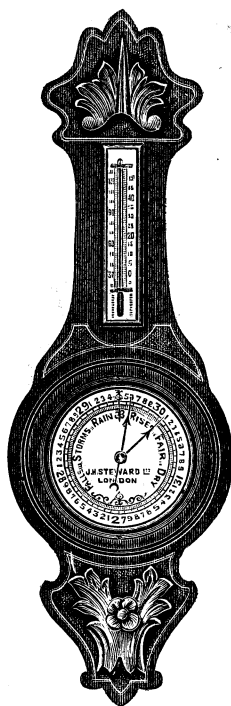


Fig. 38.

F 1554.—The “**Floral**” Aneroid Barometer. Oak frame, white porcelain dial and thermometer scale. Lacquered brass bezel to glass. Height 2 feet, 8 inches. Diameter of dial 8 inches..... Fig. 36 **£2 10 0**

F 1555.—.....ditto.....smaller size. Height 2 feet, 2 inches. Diameter of dial 5 inches Fig. 38 **£2 5 0**

F 1556.—The “**Baronial**” Aneroid Barometer. Very solid oak frame. Bold dial 10 inches diameter. Rack and pinion to setting hand. Height 3 feet, 9 inches Fig. 37 **£10 10 0**

ANEROID BAROMETERS.

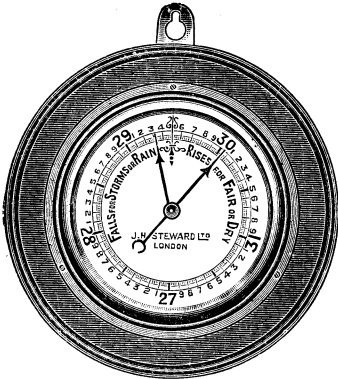


Fig. 39.

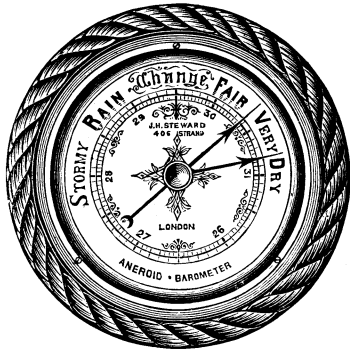


Fig. 40.

- F 1557.—**Aneroid Barometer.** Circular oak frame. Silvered metal dial. Lacquered brass bezel to glass. Diameter over all 8 inches. Diameter of dial 5 inches..... Fig. 39 **£2 10 0**
- F 1558.—.....**ditto**.....with mahogany frame and oxidised bezel to glass..... **£2 10 0**
- F 1559.—**Aneroid Barometer.** Plain circular oak frame. White porcelain dial. Lacquered brass bezel to glass. Diameter over all 8 inches. Diameter of dial 5 inches..... **£1 15 0**
- F 1560.—**Aneroid Barometer.** Carved oak rope pattern frame. White porcelain dial. Lacquered brass bezel to glass. Diameter over all 7½ inches. Diameter of dial 5 inches..... Fig. 40 **£2 5 0**
- F 1561.—.....**ditto**.....with thermometer on dial..... **2 15 0**

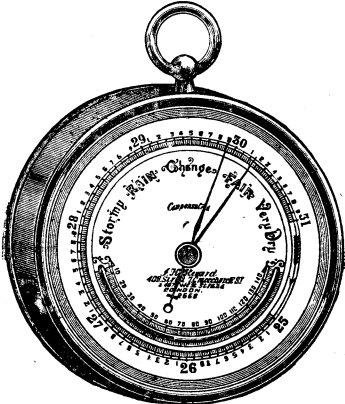


Fig. 41.

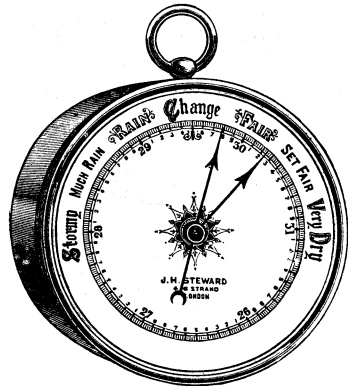


Fig. 42.

- F 1562.—**Aneroid Barometer,** mounted in brass. Best quality compensated movement. Silvered metal dial 5 inches diameter with thermometer attached. Maroon leather travelling case Fig. 41 **£5 5 0**
- F 1563.—**Aneroid Barometer,** mounted in lacquered brass, White porcelain dial 5 inches diameter. Covered cardboard box... Fig. 42 **£2 2 0**
- F 1564.—.....**ditto**.....with thermometer on dial..... **2 10 0**

YACHT BAROMETERS AND CLOCKS.

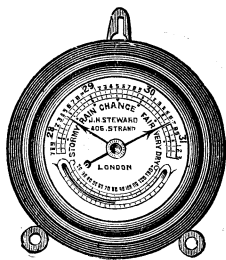


Fig. 43.

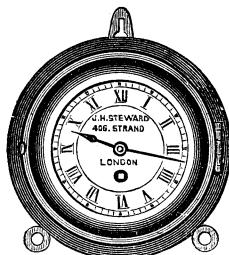


Fig. 44.

- F 1565.—**Cabin Aneroid Barometer**, best compensated movement, bronze metal case, 3½-inch silvered metal dial. Diameter over all 4½ inches **£4 5 0**
- F 1566.—.....**ditto**.....larger size, 5-inch metal dial. Diameter over all 6 inches **£4 15 0**
- F 1567.—.....**ditto**.....with the addition of a thermometer as illustrated. Fig. 43 **£5 5 0**
- F 1568.—**Cabin Clock** of best quality with 3½-inch silvered metal dial to match Aneroid No. F 1565 Fig. 44 **£5 10 0**
- F 1569.—.....**ditto**.....with 5-inch dial to match Aneroid Nos. F 1566 and F 1567 Fig. 44 **£6 6 0**

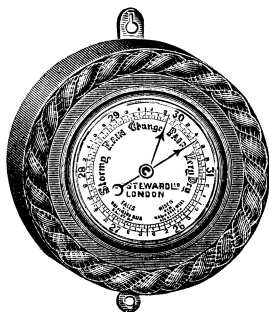


Fig. 45.



Fig. 46.

- F 1570.—**Cabin Aneroid Barometer**, teak frame, 3-inch porcelain dial. Diameter over all 6 inches Fig. 45 **£2 10 0**
- F 1571.—**Cabin Clock**, to match Aneroid No. F 1570...Fig. 46 **3 15 0**
- F 1572.—**Cabin Aneroid Barometer**, bronze metal case, 3½-inch porcelain dial. Diameter over all 4½ inches..... **£2 10 0**
- F 1573.—**Cabin Clock** to match Aneroid No. F 1572..... **4 4 0**
- F 1574.—**Cabin Aneroid**, bronze metal case, 5-inch porcelain dial. Diameter over all 6 inches **£3 3 0**
- F 1575.—**Cabin Clock** to match Aneroid No. F 1574 **4 15 0**

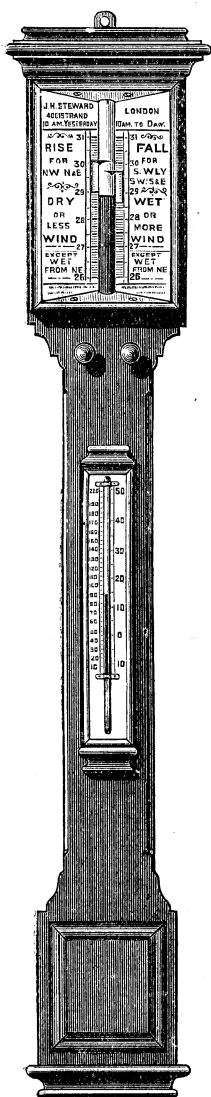


Fig. 47.

MERCURY HALL BAROMETERS.

F 1576.—**Mercury Barometer** encased in stout oak frame completely shielding the tube, which has a bore of 0.4 inch, showing a bold column of mercury. Double opal glass scales graduated so as to allow for variations in the level of the mercury in the cistern. Two verniers reading to 100ths of an inch, indicating yesterday's and to-day's reading of the barometer. The verniers are actuated by racks and pinions with detachable setting keys. Attached mercury thermometer with Fahrenheit and Centigrade scales. Plate glass front. Height 34 inches...Fig. 47 **£14 0 0**

F 1577.—**Mercury Barometer** encased in oak frame completely shielding the tube. Double ivory scale and two verniers reading to 100ths of an inch, indicating yesterday's and to-day's reading of the barometer. Rack and pinion adjustments with detachable keys to verniers. Attached mercury thermometer with Fahrenheit scale. Sheet glass front. Height 34 inches **£7 10 0**

F 1578.—.....**ditto**.....with smaller bore to tube. Single ivory scale and one vernier reading to 100ths of an inch, with rack and pinion adjustment and detachable key. Attached mercury thermometer with Fahrenheit scale. Sheet glass front. Height 34 inches..... **£5 0 0**

F 1579.—**Simplex Mercury Barometer.** Tube mounted on oak but not encased. Ivory scale with sliding vernier reading to 100ths of an inch. Attached mercury thermometer with Fahrenheit scale. Open front. Height 34 inches..... **£3 10 0**

REGISTERING THERMOMETERS.

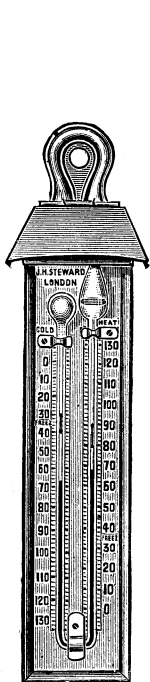


Fig. 48.

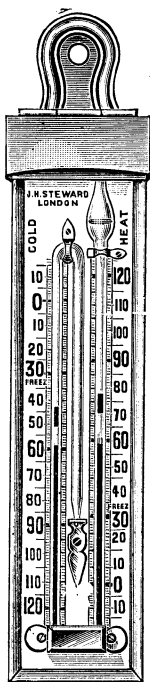


Fig. 49.

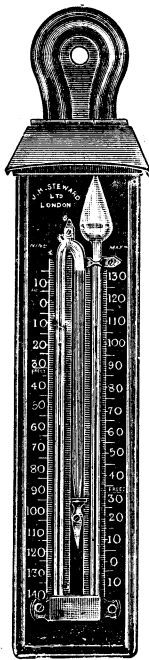


Fig. 50.

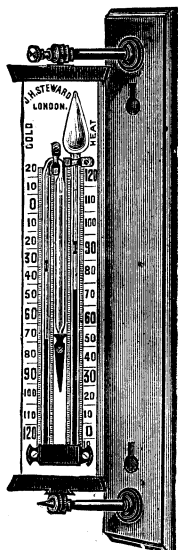


Fig. 51.

The "Six's" Thermometer automatically registers the maximum and minimum temperatures that have occurred during the twenty-four hours, and it also indicates present temperature. The bottom of the index needle on the right registers the maximum temperature, and the minimum temperature is registered by the bottom of the index needle on the left. Present temperature is indicated by the mercury column. The needles are re-set by a magnet supplied with the thermometer. The opal glass scale, Figs. 49 and 51, is the clearest to read, and easily cleaned. The metal scale, Fig. 50, is more durable than the boxwood scale, Fig. 48.

- F 1583.—8-inch Six's Thermometer, boxwood scale, divided to every 2°, japanned tin case. With magnet Fig. 48 £0 7 6
- F 1584.—8-inch...ditto...with metal scale..... 0 9 6
- F 1585.—8-inch...ditto...with metal scale and copper case..... 0 15 6
- F 1586.—8-inch...ditto...with opal glass scale and japanned tin case 0 15 6
- F 1587.—8-inch...ditto...with opal glass scale and copper case 1 1 0
- F 1588.—10-inch Six's Thermometer, metal scale divided to every degree, extra sensitive elongated bulb, japanned tin case. With magnet. Fig. 50 £0 16 6
- F 1589.—10-inch...ditto.....metal scale and copper case 1 2 6
- F 1590.—10-inch...ditto.....opal glass scale and japanned tin case..... Fig. 49 1 5 0
- F 1591.—10-inch...ditto.....opal glass scale and copper case... 1 10 0
- F 1592.—10-inch Window Six's Thermometer. Opal glass scale divided to every degree. Bronzed brass mounts and brackets with adjustment for setting the thermometer at any angle. Oak board for fixing outside a window Fig. 51 £2 10 0

GARDEN THERMOMETERS.

Minimum Thermometers. The minimum thermometers register the lowest temperature reached by means of a needle placed in the column of spirit. As the spirit contracts with lowering temperature it carries the needle with it to the lowest point reached, and the end of the needle furthest from the bulb indicates the minimum temperature. The present temperature is indicated by the end of the spirit column. To re-set the needle the thermometer is tilted with the bulb uppermost, when the needle will slide down to the end of the spirit. In use the thermometer is hung horizontally.

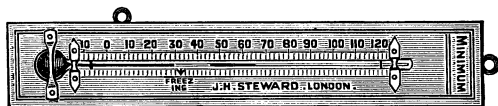


Fig. 52.

F 1593.—**8-inch Minimum Thermometer.** Boxwood scale ranging from 0° to 120° Fahrenheit and divided to every 2° Fig. 52 **3/-**

F 1594.—**8-inch Minimum Thermometer.** Metal scale ranging from 0° to 120° Fahrenheit and divided to every 2° **4/6**

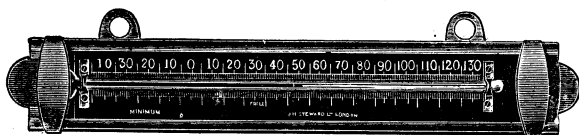


Fig. 53.

F 1595.—**10-inch Minimum Thermometer** with metal scale mounted in a copper case. Range of scale—20° to +120° Fahrenheit divided to every degree..... Fig. 53 **8/6**

F 1596.—**8-inch Dimenon Thermometer** with index needles to register the maximum and the minimum temperature. The thermometer is very similar in principle to the Six's Thermometer described on page 26, but is constructed to be hung horizontally instead of vertically. The needles are re-set by tilting the thermometer, no magnet being required. Metal scale ranging from 0° to 120° Fahrenheit, mounted in japanned tin case **12/6**

F 1597.—**12-inch Hot Bed Thermometer**, boxwood scale from 20° to 120° Fahrenheit in copper casing with pointed end to push into soil... **14/6**

HOUSE THERMOMETERS.

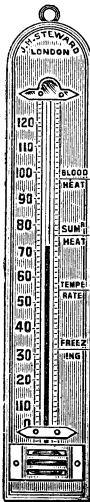


Fig. 54.



Fig. 55.

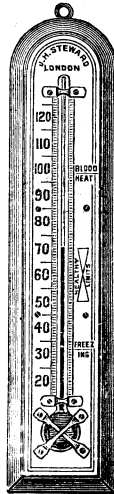


Fig. 56.

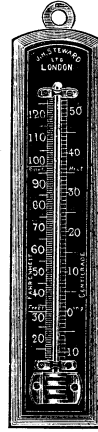


Fig. 57.

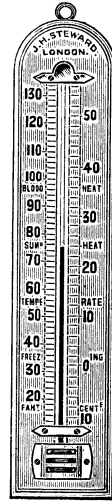


Fig. 58.

To ensure accurate indications of temperature, the scale of every thermometer is specially graduated for each individual tube, and the different points are laid off by comparison with a certified standard thermometer. The tubes are filled either with mercury or coloured spirit. Mercury is the more sensitive and responds quicker to change of temperature. Spirit being coloured is more legible, but as it is less sensitive than mercury, it does not respond so readily to change of temperature.

- F 1598.—**8-inch Thermometer**, boxwood scale divided to every 2 degrees Fahrenheit, tube filled with mercury..... Fig. 54 **3/-**
- F 1599.—**8-inch ditto**.....tube filled with coloured spirit..... **3/-**
- F 1600.—**6-inch ditto ditto ditto**..... **2/-**
- F 1601.—**8-inch Thermometer**, solid metal scale divided to every 2° Fahrenheit, tube filled with coloured spirit..... Fig. 55 **4/6**
- F 1602.—**8-inch Thermometer**, boxwood scale divided to every degree Fahrenheit and corresponding Centigrade scale, tube filled with mercury Fig. 58 **5/6**
- F 1603.—**6-inch ditto**.....divided to every 2° Fahrenheit and Centigrade scales **4/-**
- F 1604.—**8-inch Thermometer**, black metal scale mounted on boxwood, divided to every degree Fahrenheit and corresponding Centigrade scale, lens front to the tube magnifying the coloured spirit and making it very legible Fig. 57 **7/6**
- F 1605.—**8-inch Thermometer**, white xylonite scale mounted on boxwood, divided to every degree Fahrenheit, lens front to tube of coloured spirit Fig. 56 **7/6**
- F 1605a.—**6-inch Thermometer**, white xylonite scale mounted on ebonised wood, divided to every degree Fahrenheit, tube filled with mercury **8/6**

BATH THERMOMETERS.

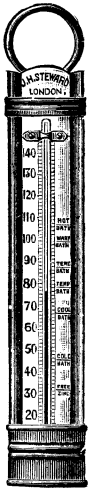


Fig. 59.

- F 1606.—**8-inch Bath Thermometer**, metal scale divided to every 2 degrees Fahrenheit, and with Dr. Forbes' specification for "warm," "tepid" and "hot bath." Tube filled with mercury. Japanned metal case with scoop. Fig. 59 **4/-**
- F 1607.—.....**ditto**.....with copper case **5/-**

MISCELLANEOUS THERMOMETERS.

- F 1608.—**8-inch High Temperature Thermometer**, metal scale divided to every 2 degrees from 50° to 222° Fahrenheit. Tube filled with mercury. Copper case with scoop similar to Fig. 59 **6/6**
- F 1609.—**10-inch.....ditto**.....divided to every 5° from 60° to 410° Fahrenheit **9/6**
- F 1610.—**8-inch Sugar Boiling Thermometer**. Solid brass scale, 60° to 400° Fahrenheit, divided to every 5°. Stout hand loop at top. Tube filled with mercury..... **10/6**
- F 1611.—**12-inch.....ditto**....., 60° to 400° Fahrenheit, divided to every 2 degrees **12/6**

Oven Thermometers, Dairy Thermometers, Thermometers for Industrial Purposes made to requirements.

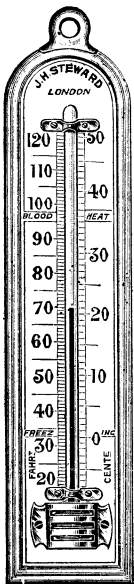


Fig. 60.

PORCELAIN THERMOMETERS.

- F 1612.—**8-inch Porcelain Thermometer**, scale divided to every degree Fahrenheit and corresponding Centigrade scale. Tube filled with mercury..... Fig. 60 **7/6**
- F 1613.—.....**ditto**....., tube filled with coloured spirit with magnifying lens front **7/6**
- F 1614.—**10-inch Porcelain Thermometer** as No. F 1612. Tube filled with mercury **9/6**
- F 1615.—.....**ditto**....., tube filled with coloured spirit with magnifying lens front..... **9/6**

F 1615A.—**10-inch Window Thermometer**. Opal glass scale divided to every degree Fahrenheit and corresponding Centigrade scale. Mercury filled tube. Bronzed brass mounts and brackets with adjustment for setting the thermometer at any angle. Oak board for fixing outside of window. Style of mounting similar to Fig. 51, page 26..... **£2 5 0**

Hydrometers, Salinometers, Saccharometers, Lactometers, Urinometers and other Specific Gravity Instruments. Quotations given.

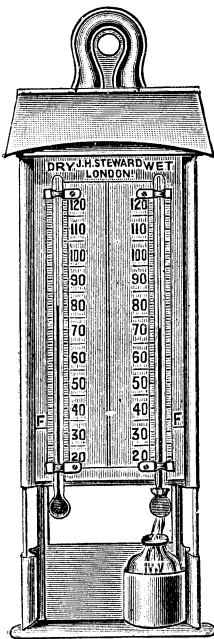


Fig. 61.

one thermometer is kept dry, and the bulb of the other thermometer is wrapped in gauze kept moist by water from a small bottle. The framework is loosely attached to a handle by means of which the thermometers are whirled vigorously through the air, causing the moisture on the wet bulb to evaporate and lower the temperature of that thermometer. The difference of the readings of the two thermometers afford the necessary data

- F 1620.—**Leather Case** with shoulder strap 5 0
- F 1621.—**Psychrometric Tables** for Whirling Hygrometer ... 1 6

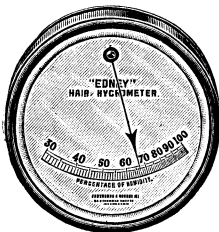


Fig. 62.

The "Mason" Hygrometer for determining the humidity of the air consists of two similar thermometers mounted side by side as illustrated, Fig. 61, one with a dry bulb which indicates the temperature of the air, and the other with its bulb wrapped in wick, kept moist by water conducted from a bottle. This thermometer with the wet bulb indicates the temperature of evaporation. The readings of the two thermometers differ according to the amount of moisture in the air, and by using the readings in conjunction with Glaisher's Tables the amount of moisture in the air can be determined and the possible occurrence of frost foretold.

- F 1616.—**"Mason" Hygrometer** with boxwood scale and japanned tin case..... £0 15 6
- F 1617.—.....**ditto**.....with opal glass scale and copper case £1 15 0
- F 1618.—**Glaisher's Hygrometric Tables.** £0 3 6

F 1619.—**The Whirling Hygrometer** is a portable hygrometer made on the same principles as the Mason Hygrometer. It is extensively used by meteorologists and surveyors in conjunction with Psychrometric Tables for determining the humidity of the air, dew point, pressure of aqueous vapour, etc. The instrument consists of two similar thermometers mounted horizontally side by side in a framework. The bulb of the other thermometer is wrapped in gauze kept moist by water from a small bottle. The framework is loosely attached to a handle by means of which the thermometers are whirled vigorously through the air, causing the moisture on the wet bulb to evaporate and lower the temperature of that thermometer. The difference of the readings of the two thermometers afford the necessary data

F 1622.—**The Hygroscope** or Hair Hygrometer indicates the percentage of moisture in the air, no calculation being required. The dial is 5 inches diameter and the mounts are metal with a fitting for suspending the instrument in any suitable position. Fig. 62

F 1623.—.....**ditto**....., with the hairs enclosed in a perforated tube 12 inches long, which can be passed through a wall or door of a room, and the percentage of moisture can be read outside without opening the door.

£2 15 0

For particulars of other hygrometers see pages 5, 19 and 31.

PORTABLE THERMOMETERS.

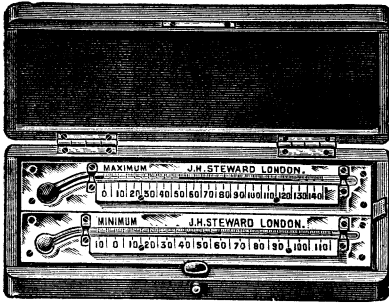


Fig. 63.

F 1625.—**Maximum and Minimum** Portable Standard Thermometers. Scales divided on the glass stems to single degrees with figures on metal with boxwood backs. In stout mahogany box, $6\frac{1}{2} \times 2\frac{1}{2} \times 1$ inch Fig. 63... **£3 15 0**

F 1626.—N.P.L. Certificate for F 1625 **£0 6 0**

F 1627.—**Maximum and Minimum** Portable Standard Thermometers as No. F 1625, but with greatly extended scales ranging from -40° to $+130^{\circ}$ Fahrenheit or -40° to $+50^{\circ}$ Centigrade, in stout mahogany box and including N.P.L. Certificate **£4 15 0**

F 1628.—**Portable Standard Hygrometer** with wet and dry bulb thermometers. Scales divided on glass stems to single degrees and mounted on metal with pedestal. In mahogany box **£3 15 0**

F 1629.—N.P.L. Certificate for F 1628 **6 0**

F 1630. — **4-inch Pocket Dimenon Thermometer** for registering both the maximum and minimum temperatures—Fahrenheit and Centigrade scales, divided on ivory. Maroon snap case, $4\frac{1}{2} \times 1\frac{1}{2} \times \frac{3}{4}$ inches. Fig. 64 **£2 2 0**

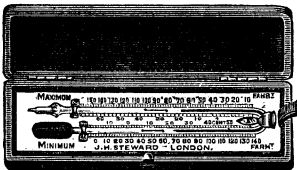


Fig. 64.

F 1631.—**5-inch.....ditto.....** in snap case, $6\frac{1}{2} \times 1\frac{3}{4} \times \frac{3}{4}$ inches. **£2 5 0**

F 1632.—**4-inch Pocket Thermometer** with tube sunk in boxwood block. Fahrenheit and Centigrade scales Fig. 65 **£0 5 6**

F 1633.—**4-inch Pocket Thermometer** with Fahrenheit and Centigrade scales on ivory, in maroon snap case, $4\frac{1}{2} \times 1\frac{1}{8} \times \frac{3}{4}$ inches **£0 12 6**

F 1634.—**Swing Thermometer** for ascertaining air temperature by whirling the thermometer round at the end of a cord. Scale etched on the glass stem, which is encased in metal. Size $4 \times \frac{1}{2}$ inches. Fahrenheit or Centigrade scale **£0 10 6**



Fig. 65.

CLINICAL THERMOMETERS.



Fig. 66.



Fig. 67.

Clinical Thermometers for taking the temperature of the human body. Every thermometer is tested and passed by the National Physical Laboratory before it is offered for sale. The scales are divided either according to Fahrenheit or Centigrade, each degree being sub-divided to 0.2° Fahrenheit or 0.1° Centigrade. "Normal" temperature is indicated by a bold mark on the scale. The thermometers are made in three degrees of sensitiveness, registering the temperature in 2 minutes, 1 minute and $\frac{1}{2}$ minute. The 1 minute and $\frac{1}{2}$ minute thermometers are designed so as to magnify the mercury column.

- | | | |
|---|---------|------------|
| F 1635.— Two-Minute Clinical Thermometer , Fahrenheit scale, in metal pocket case..... | Fig. 66 | 2/6 |
| F 1636.—..... dittoCentigrade scale | | 2/6 |
| F 1637.— One-Minute Clinical Thermometer , Fahrenheit scale, with magnifying lens front, in metal pocket case..... | Fig. 67 | 3/6 |
| F 1638.— Half-Minute dittoFahrenheit scale | | 3/6 |
| F 1639.— Half-Minute dittoCentigrade scale | | 3/6 |

CHEMICAL THERMOMETERS.

Chemical Thermometers for industrial purposes, etched and figured on the glass stem with Fahrenheit or Centigrade scale.

- | | |
|---|------------|
| F 1640.— 12-inch Chemical Thermometer , 30° to 220° Faht. ... | 4/6 |
| F 1641.—..... ditto 30° to 300° Faht. ... | 5/- |
| F 1642.—..... ditto 0° to 150° Cent. ... | 4/6 |
| F 1643.—..... ditto 0° to 200° Cent. ... | 5/- |
| F 1644.— 6-inch Chemical Thermometer , -20° to $+260^{\circ}$ Faht. ... | 5/- |
- Any other range of scale made to order. Price according to requirements.

SPECIAL THERMOMETERS.

High Temperature Thermometers up to $1,000^{\circ}$ Fahrenheit or 550° Centigrade. Low Temperature Thermometers down to -200 Centigrade. Thermometers for Viscometer, Flash Point Apparatus, Refractometers, Calorimeters, Distillation, etc. Thermometers for Butter, Lard, Bakers Dough, and other industrial purposes.

Hypsometer or Boiling Point Thermometer for ascertaining altitudes by observation of the temperature of vapour given off by boiling water.

Any of above thermometers supplied to meet requirements.

SUN DIALS.

To obtain accurate solar time a sun-dial must be constructed specially for use in the latitude of the locality where it is to be erected, and it is necessary to state the locality when ordering. Instructions for fixing the dial in position are sent out with the dial, and also a printed table of the equations of time. If desired the "equations of time" can be engraved on the dial at an extra cost of £3 10s. 0d. (see below, No. F 1649A).



Fig. 68.

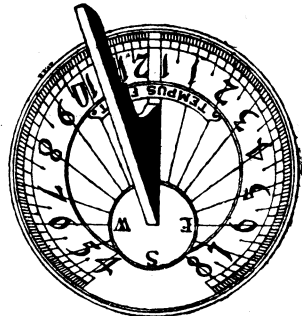


Fig. 69.

Horizontal Sun-Dial for placing on a pedestal, divided to every five minutes. Extra stout brass. dial Fig. 68.

F 1645.—10 inches diameter	£5 18 0
F 1646.—12 inches "	7 10 0

Horizontal Sun-Dial for placing on a pedestal, divided to every five minutes. Lighter construction. Fig. 69.

F 1647.—8 inches diameter	£3 10 0
F 1648.—9 inches "	4 0 0
F 1649.—10 inches "	4 10 0

F 1649A.—**Equation Table** giving the difference in minutes between "solar" time and "mean" or clock time, for every month. Engraved on either of above sun-dials..... £3 10 0

Mottoes and Inscriptions engraved on sun-dial. Price according to length of motto.

Pedestals for sun-dials. Price from £2 15s. 0d. according to material, size and style. Quotations given.

Sun-Dials designed for erection in Public Parks and Gardens or as mementoes with appropriate inscriptions. Estimates given.



Fig. 70.

Horizontal Sun-Dial for placing on a pedestal. These dials are of more simple construction and are suitable for use in England only, and where the greatest accuracy is not required. In some districts there will be a slight error of several minutes. Fig. 70.

F 1650.—6 inches diameter	£1 0 0
F 1651.—8 inches "	1 10 0
F 1652.—10 inches "	2 0 0

SOLAR CHRONOMETER.

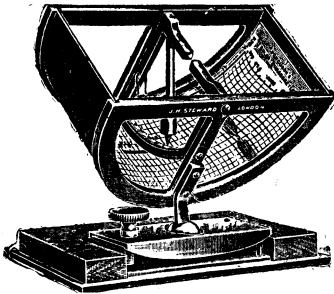


Fig. 71.

The "Ferguson" Solar Chronometer will give without calculation "Local Mean Time" or "Standard Time," and is of service for setting clocks in out of the way places. It is portable, and packs in a box for transport. In use the chronometer is placed in any place, in or out of doors, where the sun is shining. A level surface is not necessary, as the chronometer is complete in itself, and can be placed in position by its own indications, no magnetic compass or spirit level being required. An explanatory booklet accompanies each instrument.

- F 1653.—**Model A. "Ferguson" Solar Chronometer**, 4 inches diameter. Adapted for use in any country between 60° North and 60° South latitude. In case $4\frac{3}{4} \times 4 \times 3\frac{1}{2}$ inches Fig. 71 **£5 15 0**
- F 1654.—**Model B. "Ferguson" Solar Chronometer**, $6\frac{1}{4}$ inches diameter. Adapted for use in any country. In case $7 \times 5\frac{1}{2} \times 5$ inches **£6 15 0**
- F 1655.—**Solar Compass Attachment**, which is an interesting addition, for use in connection with the Chronometer for ascertaining true North **£1 10 0**

POCKET SUN-DIAL.

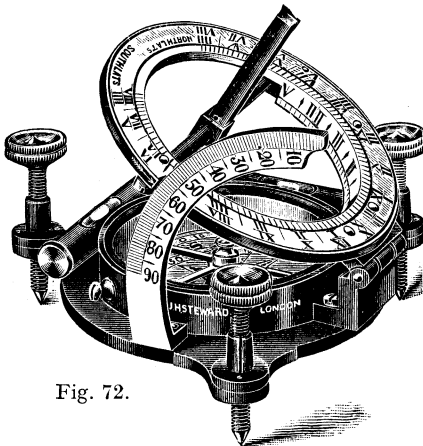


Fig. 72.

F 1656.—**Pocket Universal Sun-Dial**, for use in any latitude. Hour ring divided on face and edge for N. and S. latitudes with reversible gnomon. Folding latitude arc of degrees. Compass divided to every two degrees with double set of cardinal points for N. and S. latitudes, bar needle with sliding weight for correcting dip, and locking stop. Cross spirit levels and levelling screws. In case $4\frac{1}{4} \times 4\frac{1}{4} \times 1\frac{3}{4}$ inches, with table of equations of time and instructions.

Fig. 72 **£6 10 0**

- 1657.—**30-minute Chronograph** with stopping, starting and fly back action. Records fifths of seconds to 60 seconds and minutes to 30 minutes. Nickel-plated case. Suitable for use with Anemometers on page 10 **£2 2 0**

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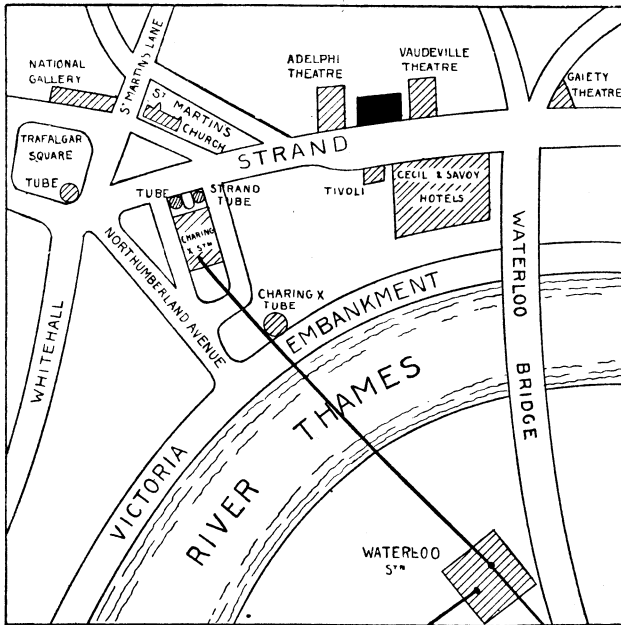
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Quote price, packed and f.o.b. London... ..	Obscure	Can deliver immediately	Occur
Quotation received, send goods	Observe	Can deliver in	Obtuse
Quotation received, send goods omitting the following ...	Obstinate	Order received	Obligate
Put in hand at once	Obstruct	Order not yet received	Officious
Remittance forwarded	Obviate	Goods were forwarded to you on	Olive
Apply for payment to	Occult	We are sending particulars by post	Onset
Ship by first steamer	Octavo	Answering your inquiry our price is	Onward
Send by parcel post	Ocular	Have received your letter or telegram and are giving the matter attention	Operate
Send by letter post	Omega		Ocean
Send by cash on delivery service	Opaque		Ode
Please supply the following ...			

When ordering it will be sufficient to quote the letter F and the number printed against the article required, adding the necessary message from the code above.

Example:—"Octavo F 1482, Occult, Jones, Queen Street, London."

Decoded, this would read:—"Send by Parcel Post a Watch Aneroid with altitude scale of 6,000 feet, apply for payment to Messrs. Jones, Queen Street, London."

Additional messages may be sent using A.B.C. Code, 5th and 6th editions.



The black patch on the map indicates the situation of the premises of:—
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CATALOGUES

Any section will be forwarded free on receipt of application.

- F 1660.—**BINOCULARS**.—"Rectiform" Prism Field Glasses. Binoculars for Military Officers and Naturalists. "Bisley" Binoculars, Race Glasses, Marine Binoculars, Night Glasses, Opera Glasses.
- F 1661.—**TELESCOPES**.—The "Lord Bury" Telescope for sportsmen, Telescopes for Naval and Military Officers, Spotting Telescopes for use on the Rifle Range, Look-Out Telescopes, Astronomical Telescopes.
- F 1662.—**BAROMETERS and THERMOMETERS** (herewith).
- F 1663.—**MICROSCOPES**.—"Rectiform" Microscopes for Students of Histology, Bacteriology and Agriculture. "Rectiform" Petrological and Metallurgical Microscopes. The "Britex" School Microscope. Dissecting Microscopes. Pocket Lenses.
- F 1664.—**MINERALOGY, CRYSTALLOGRAPHY**.—Instruments for use in Mineralogy, Crystallography, Petrology, and for the study of Precious Stones, and the detection of imitation Gem Stones.
- F 1665.—**SURVEYING and NAUTICAL INSTRUMENTS**.—"Rectiform" Theodolites, Levels, Plane Tables, Land Chains, Tapes, Prismatic Compasses, Aneroids, Clinometers. Special Instruments for Rapid Surveys. The "Pedograph," an automatic road tracer, Geological Instruments, Sextants, Boat and Binnacle Compasses, Tide Gauges, Current Meters.
- F 1666.—**MATHEMATICAL INSTRUMENTS**.—Drawing Instruments, Beam Compasses, Proportional Compasses, Dividers, Scales, Curves, Protractors, Planimeters, Slide Rules, Calculating Circles, Drafting Machines, Calipers.
- F 1667.—**MILITARY INSTRUMENTS**.—Instruments for Reconnaissance, Liquid and Luminous Compasses, Instruments for Gunnery, Range-finders, Map Scales, Map Cases, Protractors, Slide Rules, Sketching Instruments. The "ORILUX" Belt Lamp.
- F 1668.—**OPTICAL AIDS to SHOOTING**.—Spotting Telescopes, Optical Sights for Rifles, N.R.A. "Rectiform" Shooting Spectacles, "Chromos" Spectacles for increasing visibility of the aiming mark and sharply defining foresight of rifle.
- F 1669.—**SPECTACLES and EYEGLASSES**.—"Rectiform" Lenses specially adapted for Shooting, Reading, Tennis, Golf and other Sports, "Rectiform" Bi-focal Lenses serving the purpose of two separate pairs of glasses for reading and distance.

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