

— CATALOGUE —

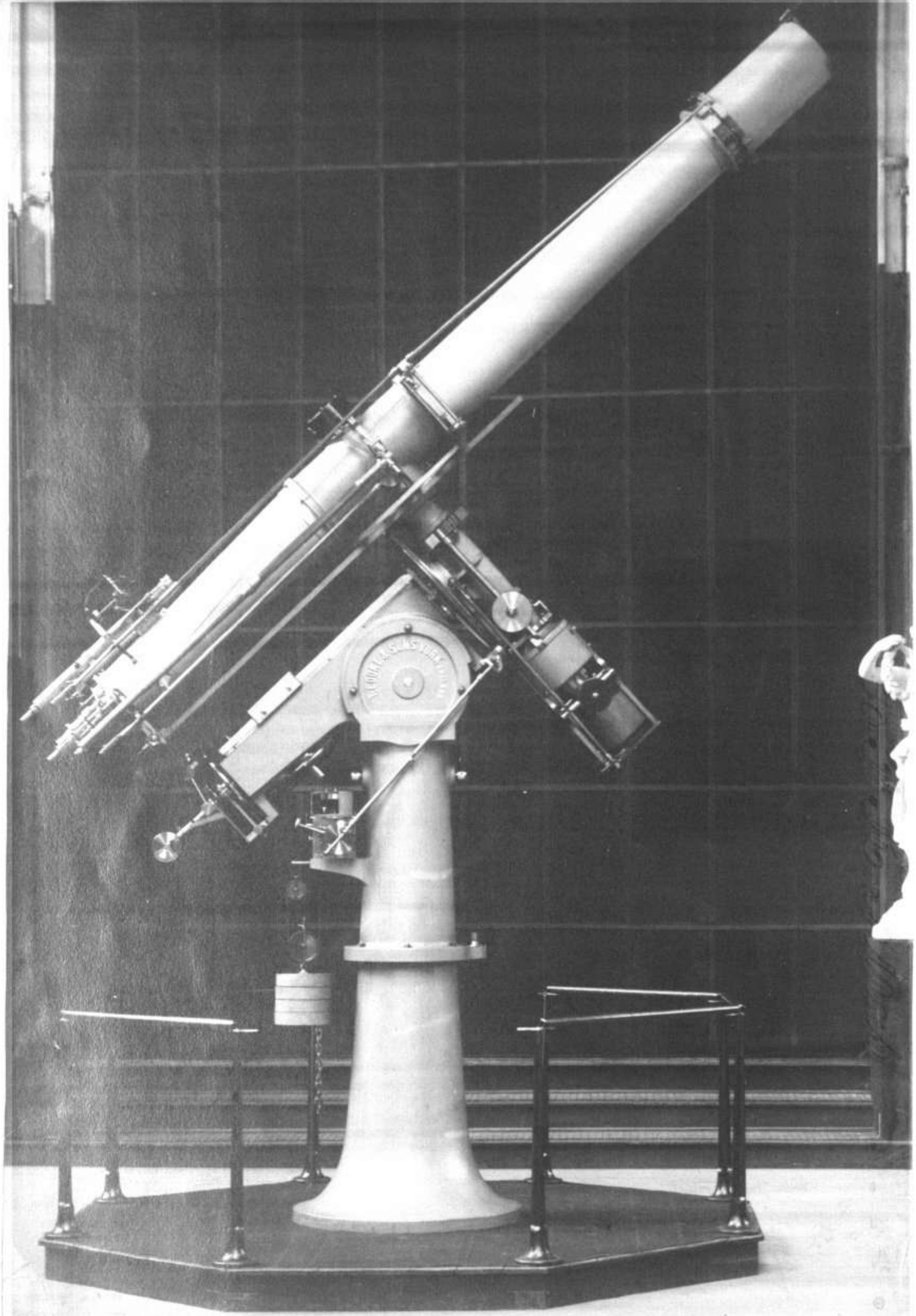
OF

— ASTRONOMICAL — INSTRUMENTS —



T. COOKE & SONS,

YORK, ENGLAND.



FIXED EQUATORIAL TELESCOPE, WITH OBJECT GLASS OF 10 INCHES APERTURE.—CLASS 1.

Fig. 1.

1886.

ALL PRICES IN OUR PREVIOUS CATALOGUES ARE HEREBY CANCELLED.



ILLUSTRATED CATALOGUE
OF
TELESCOPES,
OBSERVATORIES,
TRANSIT INSTRUMENTS, SPECTROSCOPES,
THEODOLITES,
LEVELS, LEVELLING STAVES, CLINOMETERS,
AND OTHER

Astronomical and Scientific Instruments.

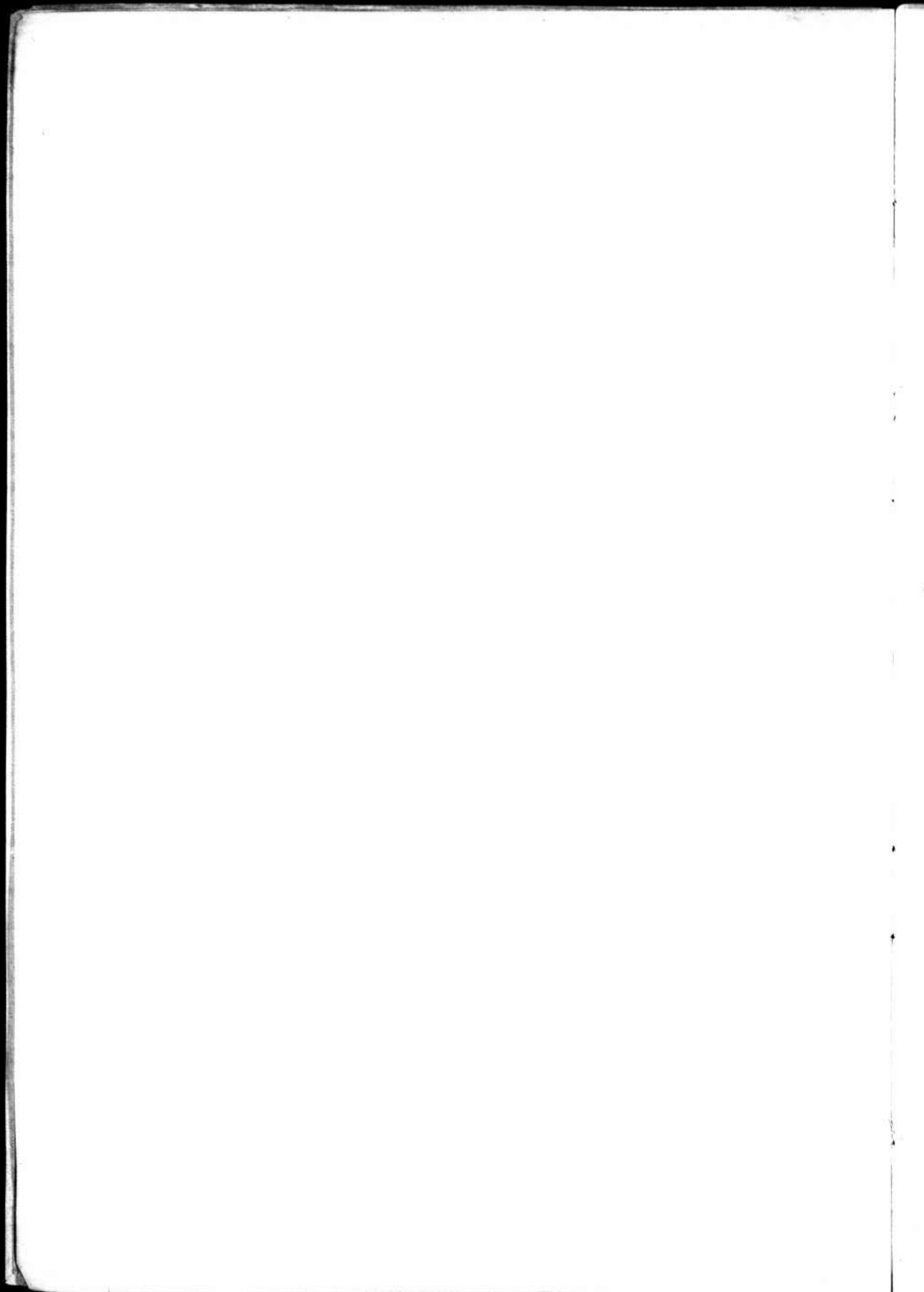
MANUFACTURED BY

T. COOKE & SONS,
BUCKINGHAM WORKS, YORK,
ENGLAND.

York:

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1886.



FIXED EQUATORIAL TELESCOPES.

EQUATORIAL TELESCOPE, CLASS I, as Frontispiece, complete with—

CAST IRON PILLAR.

STOUT BRASS TUBE, with rack and pinion to eye-end.

FINDER (rack and pinion when fixed to Equatorials over 8 inches aperture).

EYE-PIECES in polished mahogany box (as subjoined list).

FIRST SURFACE REFLECTION PRISM, for viewing the Sun.

STAR DIAGONAL OR TOTAL REFLECTION PRISM.

TRANSIT EYE-PIECE.

BARLOW LENS.

IRIS DIAPHRAGM, fixed in front of the Object-glass for contracting the aperture at will, and worked by a rod brought down to the eye-end.

DEW-SHADE with folding shutters worked by a cord from eye-end.

DOUBLE PARALLEL WIRE MICROMETER, with dark field arrangement and in polished mahogany box (see subjoined list).

PRISMATIC ILLUMINATING APPARATUS, for dark and bright fields of Micrometer, Declination and Position Circle.

SENSITIVE LEVEL, swinging on pivots attached to the Telescope tube, for determining the horizontal of the Dec. Axis and enabling transits to be taken.

LARGE POSITION CIRCLE at eye-end of the Telescope, graduated on silver, and read by vernier and microscope; with quick and slow motions and clamping arrangements.

DECLINATION CIRCLE of large size, with vernier graduated on silver, and read by microscope from eye-end. Coarse divisions are also placed on the edge of the circle for rough setting.

BUCKINGHAM WORKS, YORK.

Fixed Equatorial Telescopes.

HOUR CIRCLE, graduated on silver, with sets of divisions and verniers, reading microscope, and fixed lamp for illumination.

CLOCK for communicating equatorial motion, with means for changing sidereal to lunar rate, and additional slow motions in Right Ascension and Declination by means of rods and handles brought down to the eye-end.

CLAMPING ARRANGEMENTS worked from eye-end.

POLAR AND DECLINATION AXES OF STEEL, the pressure on their bearings being relieved by means of friction rollers and counterpoises; the pressure endwise is also relieved by friction rollers. (The anti-frictional arrangement to the Dec. Axis is not introduced in instruments under 10 inches aperture).

SLIDING COUNTERPOISE attached to the upper end of the tube and worked by a screw-rod from the eye-end, for balancing Spectroscope or other heavy appliances.

QUICK MOTION in Right Ascension for rough setting while reading Right Ascension Circle.

ADJUSTMENTS IN LATITUDE AND AZIMUTH to a considerable extent, with means for setting to great accuracy.

EQUATORIAL TELESCOPE, CLASS II., in general form as frontispiece, with—

CAST IRON PILLAR.

STOUT BRASS TUBE, with rack and pinion to eye-end.

FINDER.

EYE-PIECES AND SUNSHADES in mahogany box (see subjoined list)

FIRST SURFACE REFLECTION PRISM for viewing the Sun.

DEW-SHADE with close-fitting cover.

PRISMATIC ILLUMINATING APPARATUS, for bright field of micrometer and declination circle.

STRIDING LEVEL for declination axis.

BUCKINGHAM WORKS, YORK.

Fixed Equatorial Telescopes.

DECLINATION CIRCLE of large size, with vernier graduated on gun metal and read by a microscope from eye-end.

HOURLY CIRCLE graduated on gun metal, with two sets of divisions and verniers, and read by microscope.

CLOCK for communicating equatorial motion, with means for changing sidereal to lunar rate.

SLOW MOTIONS IN RIGHT ASCENSION AND DECLINATION by means of cords.

CLAMPING ARRANGEMENTS are also provided.

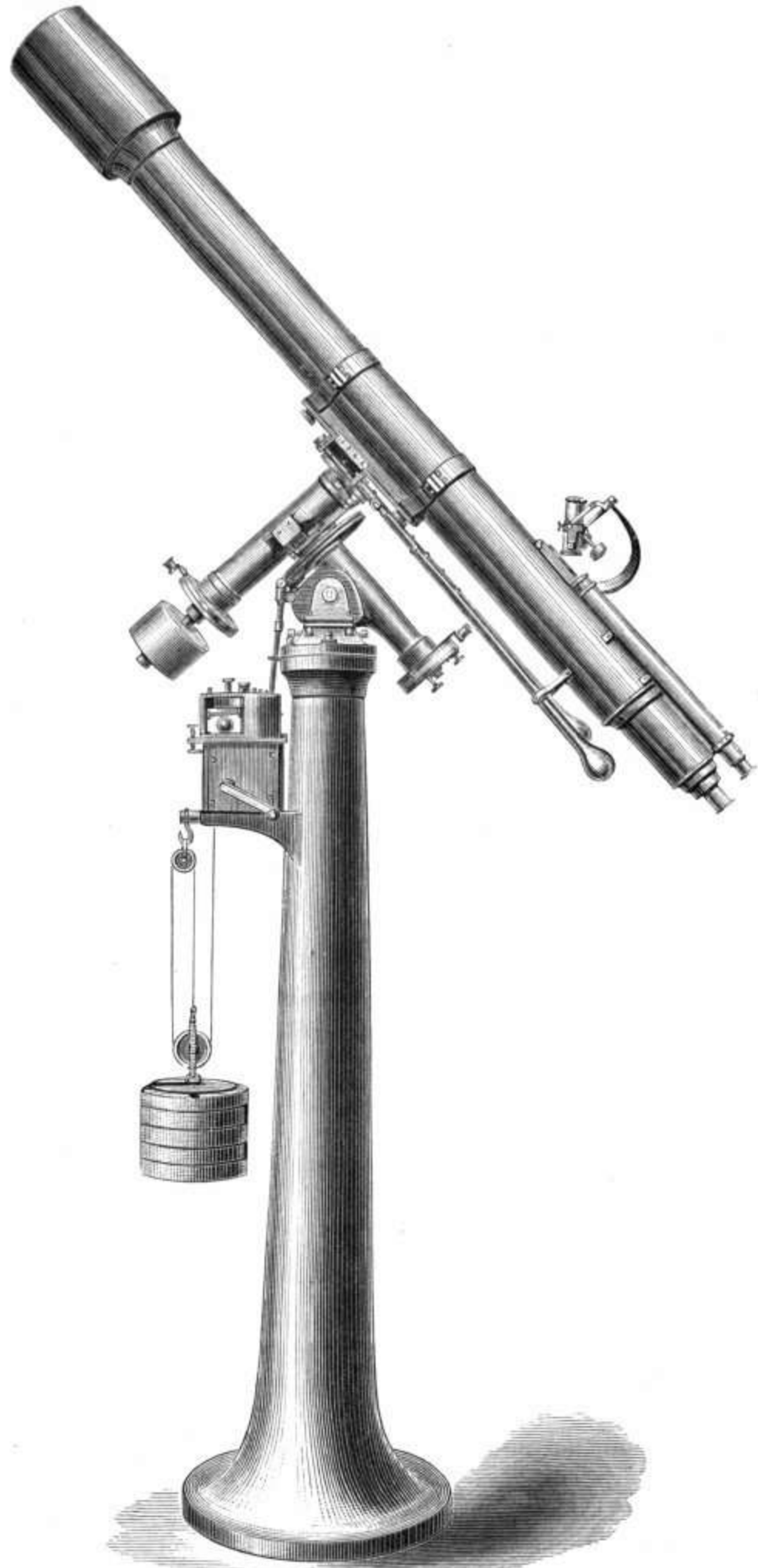
POLAR AND DECLINATION AXES OF STEEL, the former having the pressure on its upper bearing relieved by friction rollers and counterpoises.

ADJUSTMENTS IN LATITUDE AND AZIMUTH to a considerable extent.

Price List of Fixed Equatorial Refracting Telescopes.

APERTURES OF OBJECT GLASSES.		ASTRONOMICAL EYE-PIECES.			SUN-SHADES	CLASS 1.		CL. 2.
Tele-scope.	Finder.	No.	Powers.	No.		No. Micro Eye.	Price.	Price.
10 in.	3½ in.	9	55, 80, 120, 200, 300, 400, 500, 600, 800	6	6	£ 1200	£ 795	
9 in.	3 in.	8	55, 120, 210, 320, 470, 630, 700, 800	6	6	1050	665	
8 in.	2¾ in.	7	50, 110, 190, 290, 430, 580, 700	6	6	790	490	
7 in.	2½ in.	6	40, 95, 170, 260, 390, 530	5	5	585	355	
6½ in.	2¼ in.	6	40, 95, 170, 260, 390, 530	5	5	475	305	
6 in.	2 in.	6	35, 85, 155, 240, 360, 490	5	5	405	260	
5½ in.	1¾ in.	5	60, 120, 200, 300, 400	4	4	330	227	
5 in.	1⅝ in.	5	60, 120, 200, 300, 400	4	4	275	195	

BUCKINGHAM WORKS, YORK.



Portable Astronomical Telescope, mounted Equatorially, with Cast Iron Pillar, Clock, Prismatic Illuminating Apparatus, Tangent Screw Motions, brought down to eye-end.

Fig. 2.

PORTABLE ASTRONOMICAL TELESCOPES.

2½ per cent. allowed off the prices of these Telescopes, if "bright black" be substituted for "polished" brass tubes, &c.

Object Glass 5 in. Aperture.

<i>No.</i>		<i>£</i>	<i>s.</i>	<i>d.</i>
1	TELESCOPE, with polished brass tube, and rack adjustment to focus; finder; dew-cap; five astronomical eye pieces, powers 60, 120, 200, 300, and 400; one solar eye-piece; one terrestrial pancratic eye-piece; and three dark heads; packed in a varnished deal case - - -	75	0	0
2	Do. mounted on a tall tripod stand, with horizontal and vertical motions - - -	92	0	0
3	Do. do. with horizontal and vertical tangent-screw motions, as Fig. 3 - - -	102	0	0
4	Do. do. do. as Fig. 4 - - - <i>extra</i>	10	0	0
5	Do. do. mounted Equatorially (as per descriptions on pages 23 to 25) - - - <i>extra</i>			
	ILLUMINATING APPARATUS for Micrometer, with means for regulating intensity of the light, <i>extra</i>	5	10	0
	NEW PRISMATIC DITTO - - -	8	10	0

4½ in. Aperture.

6	TELESCOPE, with polished brass tube, and rack adjustment to focus; finder; dew-cap; four astronomical eye-pieces, powers 60, 120, 200, and 350; one solar eye-piece; one terrestrial pancratic eye-piece; and three dark heads; packed in a varnished pine case - - -	60	0	0
7	Do. mounted on a tall tripod stand, with horizontal and vertical motions - - -	75	0	0
8	Do. do. with horizontal and vertical tangent-screw motions (as Fig. 3) - - -	82	10	0
9	Do. do. (as Fig. 4) - - - <i>extra</i>	9	0	0
10	Do. do. mounted Equatorially (as per descriptions on pages 23 to 25) - - - <i>extra</i>			
	ILLUMINATING APPARATUS for Micrometer, with means for regulating intensity of the light, <i>extra</i>	5	10	0
	NEW PRISMATIC DITTO - - -	8	10	0

BUCKINGHAM WORKS, YORK.

Portable Astronomical Telescopes.



Portable Astronomical Telescope, with Alt-Azimuth Mounting.

Fig. 3.

BUCKINGHAM WORKS, YORK.

Portable Astronomical Telescopes.



Portable Astronomical Telescope, with Alt.-Azimuth Mounting
(Form suitable for Telescopes of apertures above 4 inches if
used in exposed situations).

Fig. 4.

BUCKINGHAM WORKS, YORK.

Portable Astronomical Telescopes.

4½ in. Aperture.

<i>No.</i>		<i>£</i>	<i>s.</i>	<i>d.</i>
11	TELESCOPE , with polished brass tube, and rack adjustment to focus; finder; dew-cap; four astronomical eye-pieces, powers 60, 120, 200, and 350; one solar eye-piece; one terrestrial pancratic eye-piece; and three dark heads; packed in a varnished pine case - - -	50	0	0
12	Do. mounted on a tall tripod stand, with horizontal and vertical motions - - -	65	0	0
13	Do. do. with horizontal and vertical tangent-screw motions (as Fig. 3) - - -	70	0	0
14	Do. do. do. (as Fig. 4) - - <i>extra</i>	8	0	0
15	Do. do. mounted Equatorially (as per descriptions on pages 23 to 25)- - - <i>extra</i>			
	ILLUMINATING APPARATUS for Micrometer, with means for regulating intensity of the light, <i>extra</i>	4	15	0
	NEW PRISMATIC DITTO - - - -	7	10	0

4 in. Aperture.

16	TELESCOPE , with polished brass tube, and rack adjustment to focus; finder; dew-cap; four astronomical eye-pieces, powers 60, 120, 200, and 300; one solar eye-piece; one terrestrial pancratic eye-piece; and three dark heads; packed in a varnished pine case - - -	42	10	0
17	Do. mounted on a tall tripod stand, with horizontal and vertical motions - - -	57	10	0
18	Do. do. with horizontal and vertical tangent-screw motions - - - -	62	10	0
19	Do. do. mounted Equatorially (as per descriptions on pages 23 to 25) - - - <i>extra</i>			
	ILLUMINATING APPARATUS for Micrometer with means for regulating intensity of the light, <i>extra</i>	4	15	0
	NEW PRISMATIC DITTO - - - -	7	10	0

BUCKINGHAM WORKS, YORK.

Portable Astronomical Telescopes.

 $3\frac{3}{4}$ in. Aperture.

<i>No.</i>		<i>£</i>	<i>s.</i>	<i>d.</i>
20	TELESCOPE , with polished brass tube, and rack adjustment to focus; finder; dew-cap; four astronomical eye-pieces, powers 60, 100, 160, and 250; one solar eye-piece; one terrestrial pancreatic eye-piece; and three dark heads; packed in a varnished pine case - -	35	10	0
21	Do. mounted on a tall tripod stand, with horizontal and vertical motions - - -	50	10	0
22	Do. do. with horizontal and vertical tangent-screw motions - - - - -	55	10	0
23	Do. do. mounted Equatorially (as per descriptions on pages 23 to 25) - - - <i>extra</i> ILLUMINATING APPARATUS for Micrometer with means for regulating intensity of the light, <i>extra</i>	4	5	0

 $3\frac{1}{2}$ in. Aperture.

24	TELESCOPE , with polished brass tube, and rack adjustment to focus; finder; dew-cap; four astronomical eye-pieces, powers 50, 100, 160, and 240; one solar eye-piece; one terrestrial pancreatic eye-piece; and three dark heads; packed in a varnished pine case - -	30	0	0
25	Do. mounted on a tall tripod stand, with horizontal and vertical motions - - -	42	10	0
26	Do. do. with horizontal and vertical tangent-screw motions - - - - -	47	0	0
27	Do. do. mounted Equatorially (as per descriptions on pages 23 to 25) - - - <i>extra</i> ILLUMINATING APPARATUS for Micrometer, with means for regulating intensity of the light, <i>extra</i>	4	5	0

 Portable Astronomical Telescopes.

3¼ in. Aperture.

<i>No.</i>		<i>£</i>	<i>s.</i>	<i>d.</i>
28	TELESCOPE , with polished brass tube, and rack adjustment to focus; finder; dew-cap; three astronomical eye-pieces, powers 50, 120, and 220; one solar eye-piece; one terrestrial panoramic eye-piece; and two dark heads; packed in a varnished pine case - - -	27	0	0
29	Do. mounted on a tall tripod stand, with horizontal and vertical motions - - -	39	0	0
30	Do. do. with horizontal and vertical tangent-screw motions - - - - -	43	10	0

3 in. Aperture.

31	TELESCOPE , with polished brass tube, and rack adjustment to focus; finder; dew-cap; three astronomical eye-pieces, powers 50, 100, and 180; one solar eye-piece; one terrestrial panoramic eye-piece; and two dark heads; packed in a varnished pine case - - -	23	0	0
32	Do. mounted on a tall tripod stand, with horizontal and vertical motions - - -	32	0	0
33	Do. do. with horizontal and vertical tangent-screw motions - - - - -	36	10	0

BUCKINGHAM WORKS, YORK.

Portable Astronomical Telescopes.

 $2\frac{3}{4}$ in. Aperture.

<i>No.</i>		<i>£</i>	<i>s.</i>	<i>d.</i>
34	TELESCOPE , with polished brass tube, and rack adjustment to focus; finder; dew-cap; two astronomical eye-pieces, powers 80 and 150; one solar eye-piece; two dark heads; one terrestrial pancratic eye-piece; packed in varnished pine case - - - -	18	10	0
35	Do. mounted on a tall tripod stand, with horizontal and vertical motions - - - -	28	0	0
36	Do. do. with horizontal and vertical tangent-screw motions - - - -	32	0	0

 $2\frac{1}{2}$ in. Aperture.

37	TELESCOPE , with polished brass tube, and rack adjustment to focus; two astronomical eye-pieces, powers 60 and 120; one terrestrial pancratic eye-piece; and one dark head for viewing the Sun; packed in a varnished pine case - - - -	14	0	0
38	Do. mounted on a polished brass tripod table-stand - - - -	20	0	0

 $2\frac{1}{4}$ in. Aperture.

39	TELESCOPE , with polished brass tube, and rack adjustment to focus; one astronomical eye-piece, power 75; one terrestrial pancratic eye-piece; and one dark head for viewing the Sun; packed in a varnished pine case - -	10	15	0
40	Do. mounted on a polished brass tripod table-stand - - - -	16	10	0

Educational Telescopes.



Educational Telescope.

Fig. 5.

BUCKINGHAM WORKS, YORK.

EDUCATIONAL TELESCOPES.

The optical part of these instruments is equal in every respect to that of the more costly Telescopes. The reduction is effected in the mounting only, and in which all superfluous finish is dispensed with. The tube is of brass ("bright black"), mounted on a tall tripod stand, with horizontal and vertical motions, and steadying rods to ensure firmness. The adjustment to focus is effected by means of a draw-tube and rack and pinion motion. Two astronomical eye-pieces, two sun-caps, and dew-cap are supplied with each instrument, and the tube and eye-pieces are fitted into a varnished pine case (see Fig. 5).

					<i>£</i>	<i>s.</i>	<i>d.</i>
41	TELESCOPE, complete :	OBJECT GLASS	4 in. aperture		41	10	0
	FINDER	-	-	- extra	2	15	0
42	Do.	do.	3 $\frac{3}{4}$ in. aperture		34	5	0
	FINDER	-	-	- extra	2	10	0
43	Do.	do.	3 $\frac{1}{2}$ in. aperture		27	10	0
	FINDER	-	-	- extra	2	7	6
44	Do.	do.	3 $\frac{1}{4}$ in. aperture		23	10	0
	FINDER	-	-	- extra	2	5	0
45	Do.	do.	3 in. aperture		20	15	0
	FINDER	-	-	- extra	1	12	6
46	Do.	do.	2 $\frac{3}{4}$ in. aperture		17	10	0
	FINDER	-	-	- extra	1	2	6
47	Do.	do.	2 $\frac{1}{2}$ in. aperture		14	10	0

TERRESTRIAL AND NAVAL TELESCOPES.



Terrestrial Telescope, on Brass Table-Stand.

*Fig. 6.**German Silver. Brass, Bronzed.**No.*

£ s. d. £ s. d.

Object Glass, 3 in. Aperture.

48	TELESCOPE, with one draw and rack adjustment to focus; pancratic eye- piece and dew-shade	-	-	-	18	5	0
49	Do. do. without rack adjustment	-	-	-	16	0	0
	MAHOGANY CASE	-	-	-	1	10	6

BUCKINGHAM WORKS, YORK.

Terrestrial and Naval Telescopes.

2 $\frac{3}{4}$ in. Aperture.

No.		<i>German Silver. Brass, Bronzed.</i>					
		£ s. d.			£ s. d.		
50	TELESCOPE, with one draw and rack adjustment to focus; pancratic eye-piece and dew-shade - -				14	15	3
51	Do. without rack adjustment -				12	15	0
	MAHOGANY CASE - - -				1	10	0

2 $\frac{1}{2}$ in. Aperture.

52	DRAW TELESCOPE, with leather covered body, pancratic eye-piece, and dew-shade; on brass tripod table-stand; packed in polished mahogany case - - -	17	5	0	16	5	0
53	Do. do. without stand and mahogany case - - -	11	11	0	10	10	0
	LEATHER SLING CASE - - -	0	17	6	0	17	6
54	Do. do. with leather sling and caps	11	11	0	10	10	0
55	NAVAL TELESCOPE, with one draw; pancratic eye-piece and dew-shade -	10	10	0	10	0	0
56	Do. do. with leather sling and caps	10	10	0	10	0	0

2 $\frac{1}{4}$ in. Aperture.

57	DRAW TELESCOPE, with leather covered body, pancratic eye-piece, and dew-shade; on brass tripod table-stand; packed in polished mahogany case - - -	14	5	0	13	5	0
58	Do. do. without stand and mahogany case - - -	9	0	0	8	0	0
	LEATHER SLING CASE - - -	0	13	6	0	13	6
59	Do. do. with leather sling and caps	9	0	0	8	0	0

BUCKINGHAM WORKS, YORK.

Terrestrial and Naval Telescopes.

No.		<i>German Silver. Brass, Bronzed.</i>					
		£ s. d.			£ s. d.		
60	NAVAL TELESCOPE , with one draw ; pancratic eye-piece and dew-shade -	8	7	6	7	17	6
61	Do. do. with leather sling and caps	8	7	6	7	17	6

2 in. Aperture.

62	DRAW TELESCOPE , with leather covered body, pancratic eye-piece, and dew-shade ; on brass tripod table-stand ; packed in polished mahogany case - - -	12	2	6	11	5	0
63	Do. do. without stand and mahogany case - - -	7	7	6	6	12	6
	LEATHER SLING CASE - - -	0	12	0	0	12	0
64	Do. do. with leather sling and caps	7	7	6	6	12	6
65	NAVAL TELESCOPE , with one draw ; pancratic eye-piece and dew-shade -	6	17	6	6	10	0
66	Do. do. with leather sling and caps	6	17	6	6	10	0

1 $\frac{3}{4}$ in. Aperture.

67	DRAW TELESCOPE , with leather covered body, pancratic eye-piece, and dew-shade ; on brass tripod table-stand ; in polished mahogany case - - -	10	10	0	9	15	0
68	Do. do. without stand and mahogany case - - -	6	0	0	5	7	9
	LEATHER SLING CASE - - -	0	12	0	0	12	0
69	Do. do. with leather sling and caps	6	0	0	5	7	6
70	NAVAL TELESCOPE , with one draw ; pancratic eye-piece and dew-shade -	5	10	0	5	5	0
71	Do. do. with leather sling and caps	5	10	0	5	5	0

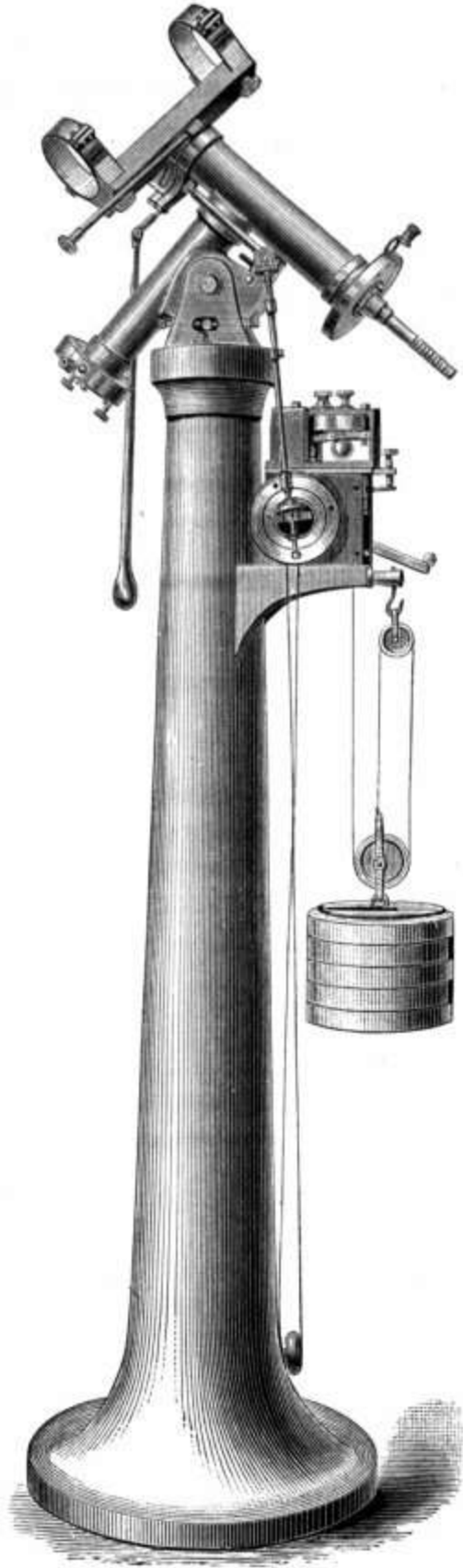
BUCKINGHAM WORKS, YORK.

Terrestrial and Naval Telescopes.

 $1\frac{1}{2}$ in. Aperture.*German Silver. Brass, Bronzed.*

<i>No.</i>		<i>£</i>	<i>s.</i>	<i>d.</i>	<i>£</i>	<i>s.</i>	<i>d.</i>
72	DRAW TELESCOPE , with leather covered body, panoramic eye-piece, and dew-shade; on brass tripod table-stand; in polished mahogany case - - - - -	9	5	0	8	12	6
73	Do. do. without stand and mahogany case - - - - -	5	0	0	4	7	6
	LEATHER SLING CASE - - - - -	0	9	0	0	9	0
74	Do. do. with leather sling and caps	5	0	0	4	7	6
75	NAVAL TELESCOPE , with one draw; panoramic eye-piece and dew-shade -	4	10	0	4	5	0
76	Do. do. with leather sling and caps	4	10	0	4	5	0

PORTABLE EQUATORIAL MOUNTINGS.

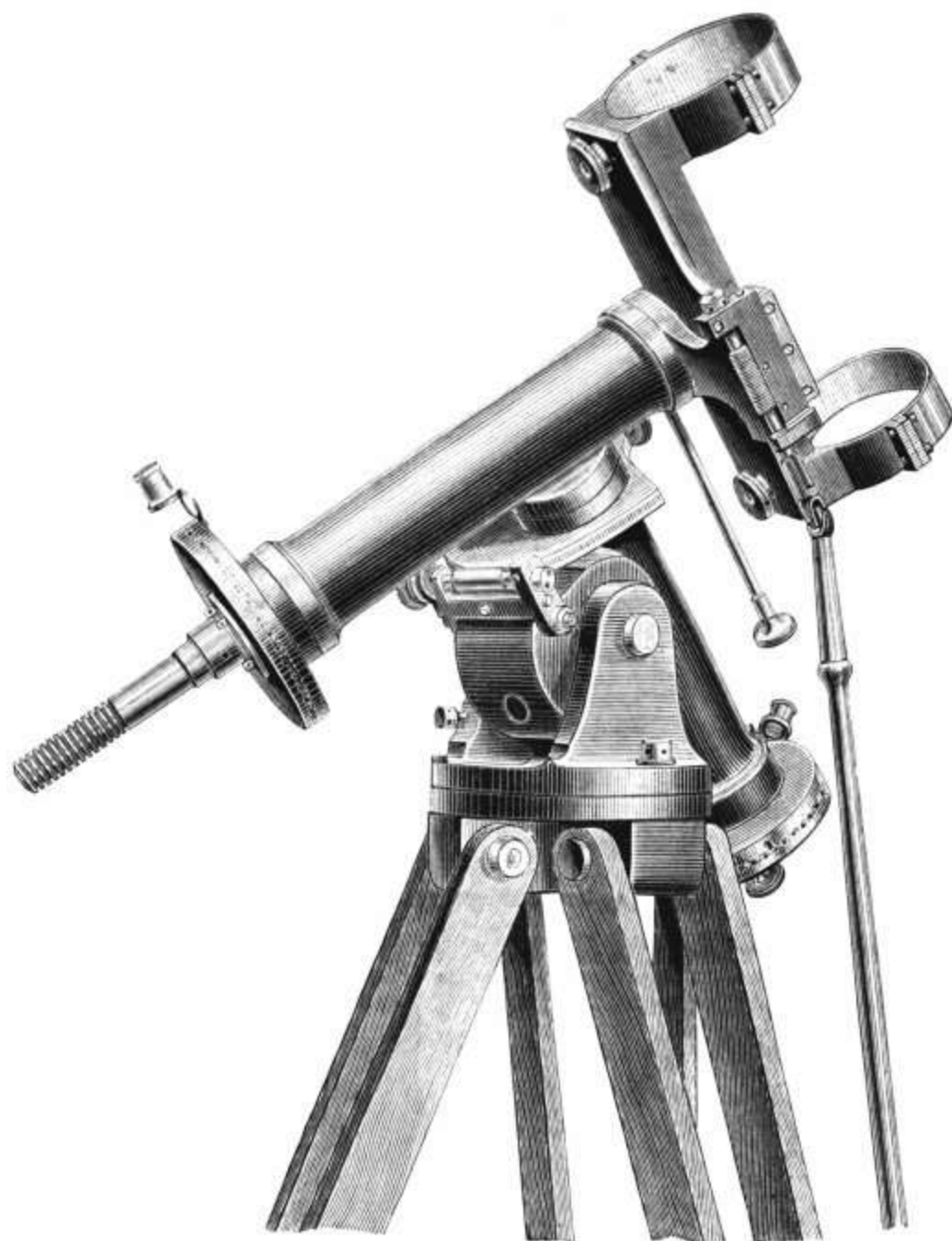


Portable Equatorial Mounting, with Cast Iron Pillar, Clock, Tangent-Screw Motion in Right Ascension not brought down to eye-end.

Fig. 7.

BUCKINGHAM WORKS, YORK.

Portable Equatorial Mountings.



Portable Equatorial Mounting on Tripod. Tangent-Screw Motion in Right Ascension not brought down to eye-end.

Fig. 8.

<i>No.</i>		<i>£</i>	<i>s.</i>	<i>d.</i>
	EQUATORIAL MOUNTING , with universal adjustment for different latitudes.			
	DECLINATION CIRCLE graduated on silver, two verniers, and reading microscope.			
	HOUR CIRCLE graduated on silver, two sets of divisions and verniers, and reading microscope.			

BUCKINGHAM WORKS, YORK.

Portable Equatorial Mountings.

<i>No.</i>		<i>£</i>	<i>s.</i>	<i>d.</i>
	TANGENT-SCREW MOTIONS in Right Ascension and declination, brought down to eye-end.			
	CRADLE PIECE and BRASS CLASPS for holding the Telescope, and all necessary means of adjustment.			
	CROSS LEVELS.			
	STOUT TRIPOD STAND. Packed in two cases.			
77	EQUATORIAL MOUNTING , complete as above, for Telescopes of 5 to 5½ inches aperture -	66	0	0
78	Do. do. 4 to 4½ do. -	50	0	0
79	Do. do. 3 to 3¾ do. -	41	0	0
	CAST IRON PILLAR (with Clock Bracket) for the above, by which the Telescope is converted into a more permanent instrument, for use in a garden, observatory or other position, saving time and trouble in fixing and adjusting, £7 5s., £6, £5, each respectively. An allowance is made for the wooden tripod stands of £5, £4, £3 10s.			
	GOVERNOR DRIVING CLOCK and connections, for communicating the Equatorial Motion to the Telescope, with an arrangement for additional motion by hand, for Telescopes with object glasses up to 5 inches diameter -	17	10	0
	Do. do. 6½ do. -	22	10	0
	Do. do. do. do. -	27	10	0
	Should silver circles not be required, gun-metal ones would be supplied, and an allowance of £3 10s., £3, and £2 10s. be made. A deduction of £8, £7, and £6 10s. is made should the tangent motion in Right Ascension not be required to be brought down to the eye-end. See Figs. 2 and 7.			

Portable Equatorial Mountings.

<i>No.</i>		<i>£</i>	<i>s.</i>	<i>d.</i>
	EQUATORIAL MOUNTING, made to latitude required.			
	TANGENT-SCREW MOTION, in right ascension and declination.			
	CRADLE PIECE and LEATHER STRAPS for holding the Telescope.			
	TALL TRIPOD STAND.			
80	EQUATORIAL MOUNTING, complete as above, for Telescopes of 5 to 5½ inches aperture -	15	10	0
81	Do. do. for Telescopes of 4 to 4½ inches aperture	14	10	0
82	Do. do. for Telescopes of 3 to 3¾ inches aperture	13	0	0
	Without TANGENT-SCREW MOTIONS - <i>less</i>	4	0	0
	BRASS CLASPS, <i>extra</i> £1 15s., £1 12s. 6d., and £1 10s.			
	VARNISHED DEAL CASE, £2, £1 15s., and £1 10s.			
	CAST IRON PILLAR, £7 5s., £6, and £5.			

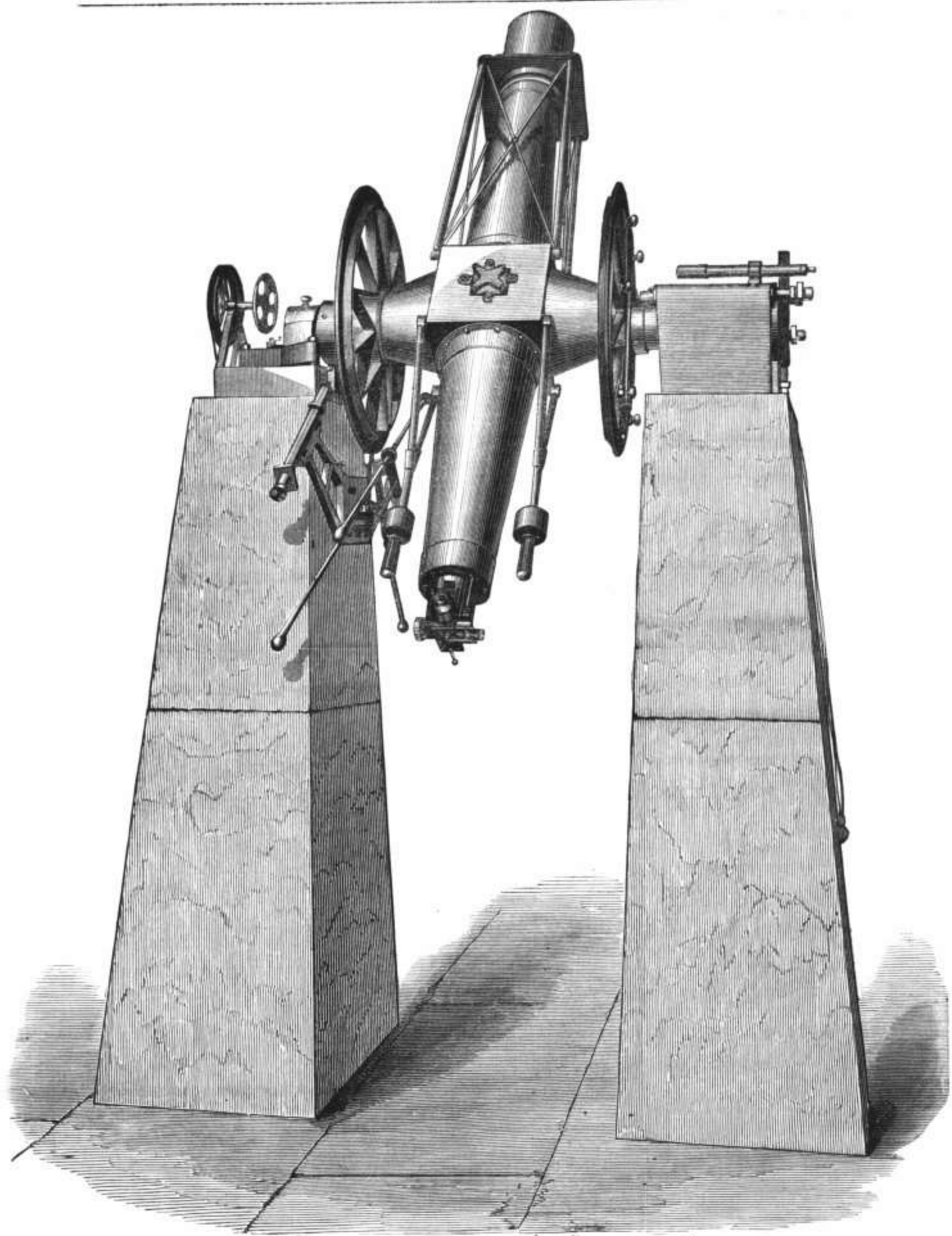
TRIPOD STANDS, &c.

<i>No.</i>		<i>£</i>	<i>s.</i>	<i>d.</i>
83	BRASS TRIPOD TABLE-STAND ; vertical and horizontal motions, and brass clasp; for Telescopes of 2 and $2\frac{1}{4}$ inches aperture - -	4	10	0
84	Do. do. for Telescopes of $1\frac{1}{2}$ and $1\frac{3}{4}$ inches aperture - - - -	3	5	0
85	LIGHT MAHOGANY TRIPOD TABLE-STAND ; vertical and horizontal motions, and brass clasp; for Telescopes of 2 and $2\frac{1}{4}$ inches aperture -	3	3	0
86	Do. do. for Telescopes of $1\frac{1}{2}$ and $1\frac{3}{4}$ inches aperture - - - -	2	15	0
87	Do. TALL TRIPOD STAND ; vertical and horizontal motions, and brass clasp; for Telescopes of 2 and $2\frac{1}{4}$ inches aperture - - -	3	10	6
88	Do. do. for Telescopes with $1\frac{1}{2}$ and $1\frac{3}{4}$ inches aperture - - - -	3	3	0
	Do. do. round pattern, with two brass rings to bind the legs while being carried; brass screw and cap, £2 7s. 6d. and £2 12s. 6d.			

STRONG TALL TRIPOD STAND, for Telescopes with $2\frac{1}{2}$ to 5 inches aperture, £3 to £5.

STEADYING RODS AND BRASS CLASP, £2 10s. to £4.

TELESCOPE HOLDERS, for fixing to window frame, £1 15s. to £3 17s. 6d.

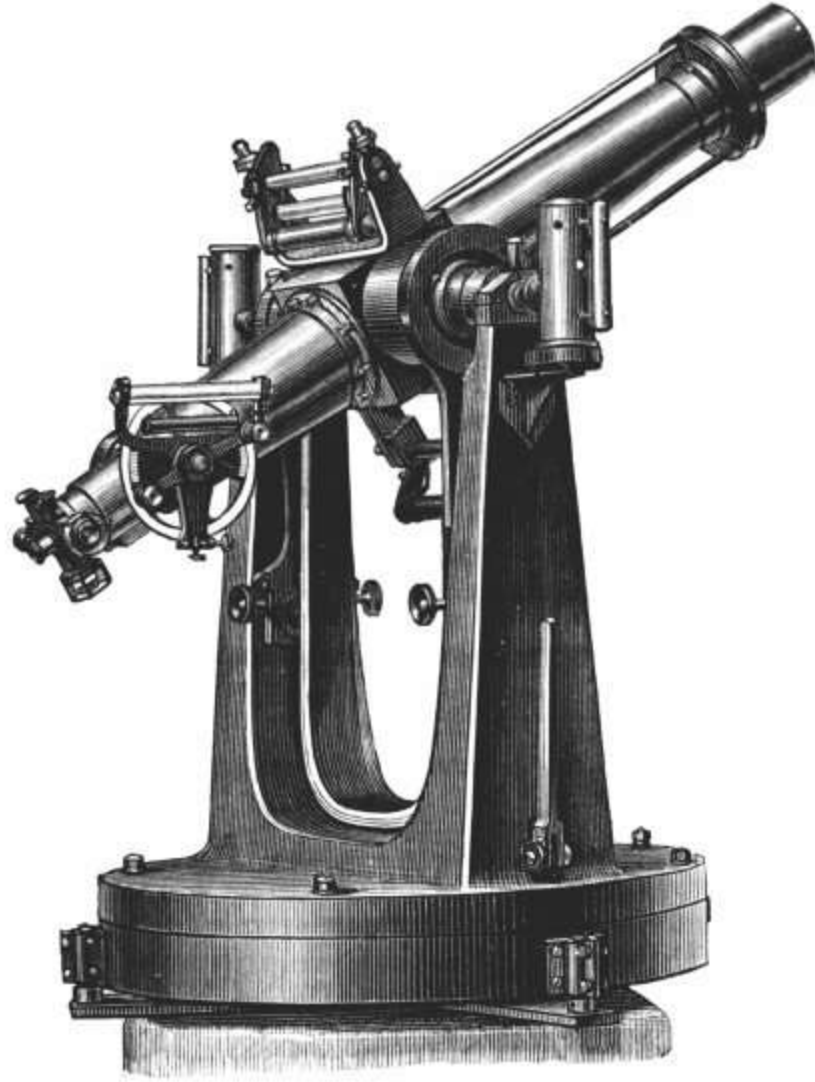


Transit Instrument suitable for a Large Observatory.

(Specifications and estimates on application.)

Fig. 9.

BUCKINGHAM WORKS, YORK.

TRANSIT INSTRUMENTS.


Transit Instrument, with Reversing Arrangement and Two Setting Circles.

Fig. 10.

TRANSIT INSTRUMENT, complete, with—

SETTING CIRCLE, graduated on silver; with delicate level, two verniers, and reading microscopes.

CLAMP AND SLOW-MOTION SCREWS.

CROSS SLIDE to eye-end for movement of the eye-pieces; with quick traversing screw and milled heads.

STRIDING LEVEL, with the necessary screw adjustments, and an outer glass protection for the bubble.

BUCKINGHAM WORKS, YORK.

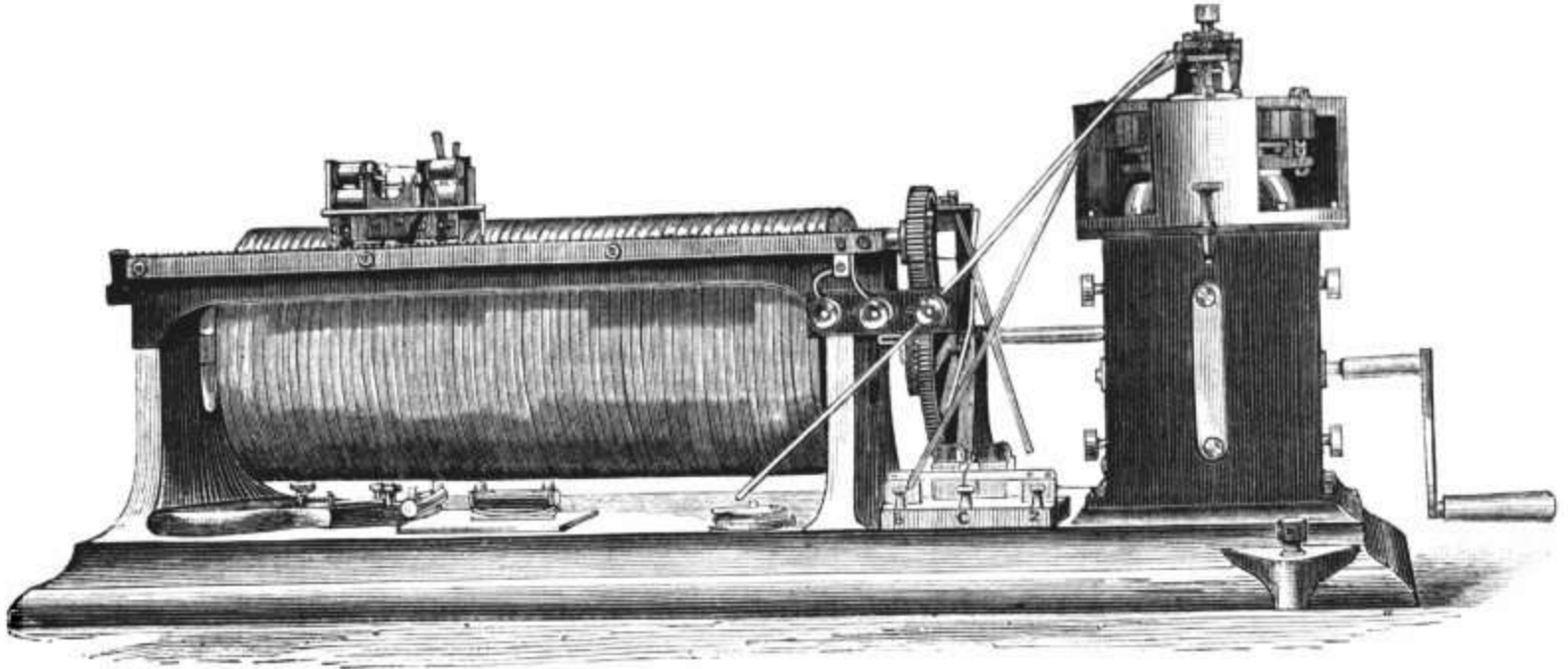
Transit Instruments.		£	s.	d.
No.	THREE MICROMETER EYE-PIECES; ONE RECT- ANGULAR EYE-PIECE; TWO SUNSHADES; in mahogany case.			
	DEW-SHADE.			
	ILLUMINATING LAMP.			
	ON CAST IRON STAND, with the necessary meri- dianal adjustments			
89	TRANSIT INSTRUMENT , complete, as above;			
	OBJECT GLASS 3 inches aperture - - -	86	0	0
	APPARATUS FOR LIFTING AND REVERSING THE AXIS - - - - - <i>extra</i>	18	0	0
	BÖHNENBERGER, or COLLIMATING EYE-PIECE, for determining the collimation error of the wires by reflection from a surface of mercury - <i>extra</i>	2	10	0
	MERCURY TROUGH for do. - - - - <i>extra</i>	0	15	0
	ARRANGEMENT for changing the dark lines in a bright field to bright lines in a dark field, <i>extra</i>	10	0	0
	HANGING LEVEL, attached to the centre cube of axis. This adaption renders unnecessary the striding level, for which an allowance of £6 will be made - - - - - <i>extra</i>	10	0	0
	VARNISHED PINE CASE - - - - <i>extra</i>	2	10	0
	TWO SETTING CIRCLES - - - - <i>extra</i>	8	5	0
90	TRANSIT INSTRUMENT , complete; OBJECT GLASS $2\frac{3}{4}$ inches aperture - - - -	68	10	0
	TWO SETTING CIRCLES - - - - <i>extra</i>	7	15	0
91	Do. complete; OBJECT GLASS $2\frac{1}{2}$ inches aperture	58	10	0
92	Do. do. do. $2\frac{1}{4}$ „ „	51	10	0
93	Do. do. do. 2 „ „	46	10	0

CHRONOGRAPHS.

From this Illustration (Fig. 11) will be seen the principle upon which this instrument is constructed. The two electro magnets for working the pens are mounted on a roller carriage

BUCKINGHAM WORKS, YORK.

Chronographs.



Cylindrical Form of Electrically Controlled Chronograph.

Fig. 11.

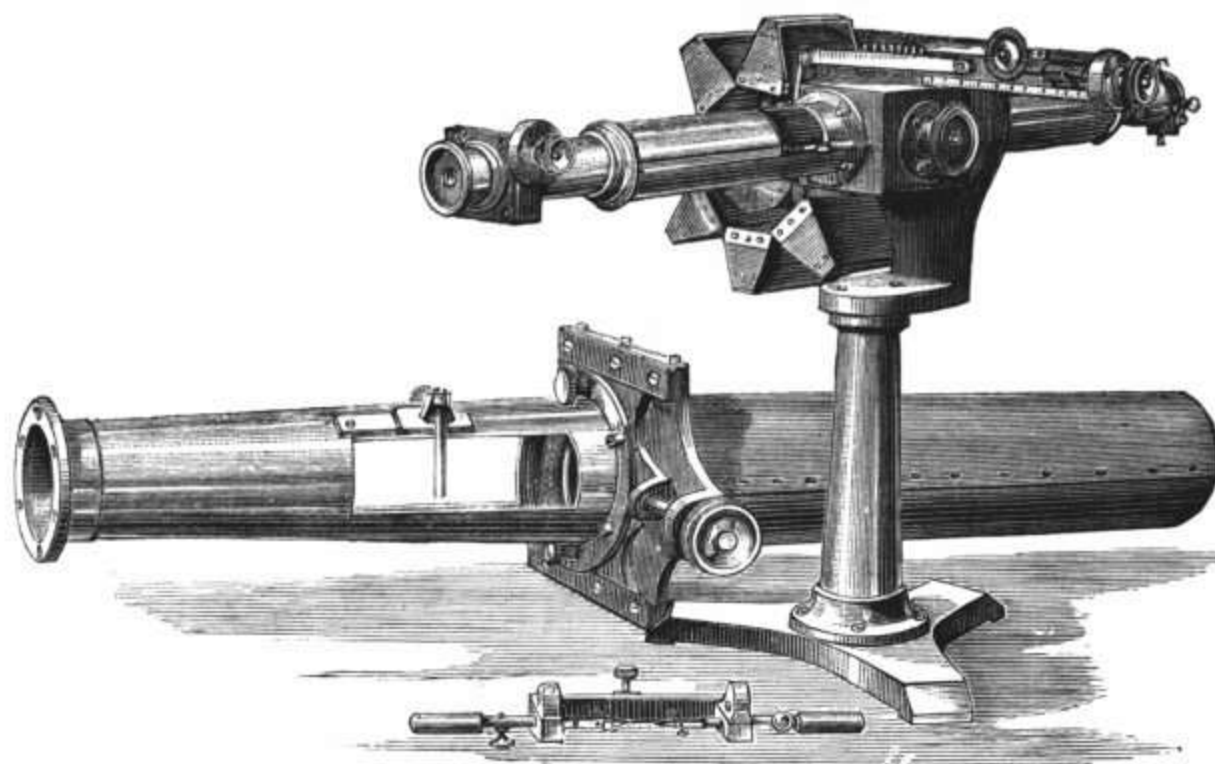
travelling on a light slide fixed in front of the cylinder; this carriage is moved along by means of a screw working with the cylinder, which revolves by means of clockwork. As the cylinder rotates lines are traced on the paper covering it by the pens moving along with the carriage; one of the pens is in connection with an astronomical clock, and marks on the paper seconds of time; the other is under the control of the observer, who sends a current at the instant desired by means of contact key.

By this means a correct registration of time is kept, and may be read off to a great degree of accuracy by comparison of the two sets of tracings. The advantage of such a controlling system is obvious from the facility with which the observations are afterwards read off; for one revolution of the cylinder being completed in exactly one minute, a straight line drawn across the cylinder will mark each succeeding minute. The price of this Instrument complete, with one cylinder, £60; extra cylinders (each), £5.

Specifications and Estimates for any other form of Chronograph will be furnished on application.

BUCKINGHAM WORKS, YORK.

SPECTROSCOPES.



Direct Vision Automatic Solar Spectroscope.

*Fig. 12.**No.*94 DIRECT VISION SOLAR SPECTROSCOPE,
(Fig. 12,) with—

SIX PRISMS.

DISPERSIVE POWER, equivalent to 2, 4, 6, 8, 10,
or 12 prisms; changeable from one power to
another.AUTOMATIC MOVEMENT of the prisms, for the
minimum angle of deviation for the part of the
spectrum under examination.MEASURING APPARATUS, for the position of the
lines, by a micrometer screw and divided head,
connected with the chain of prisms.

£ s. d.

BUCKINGHAM WORKS, YORK.

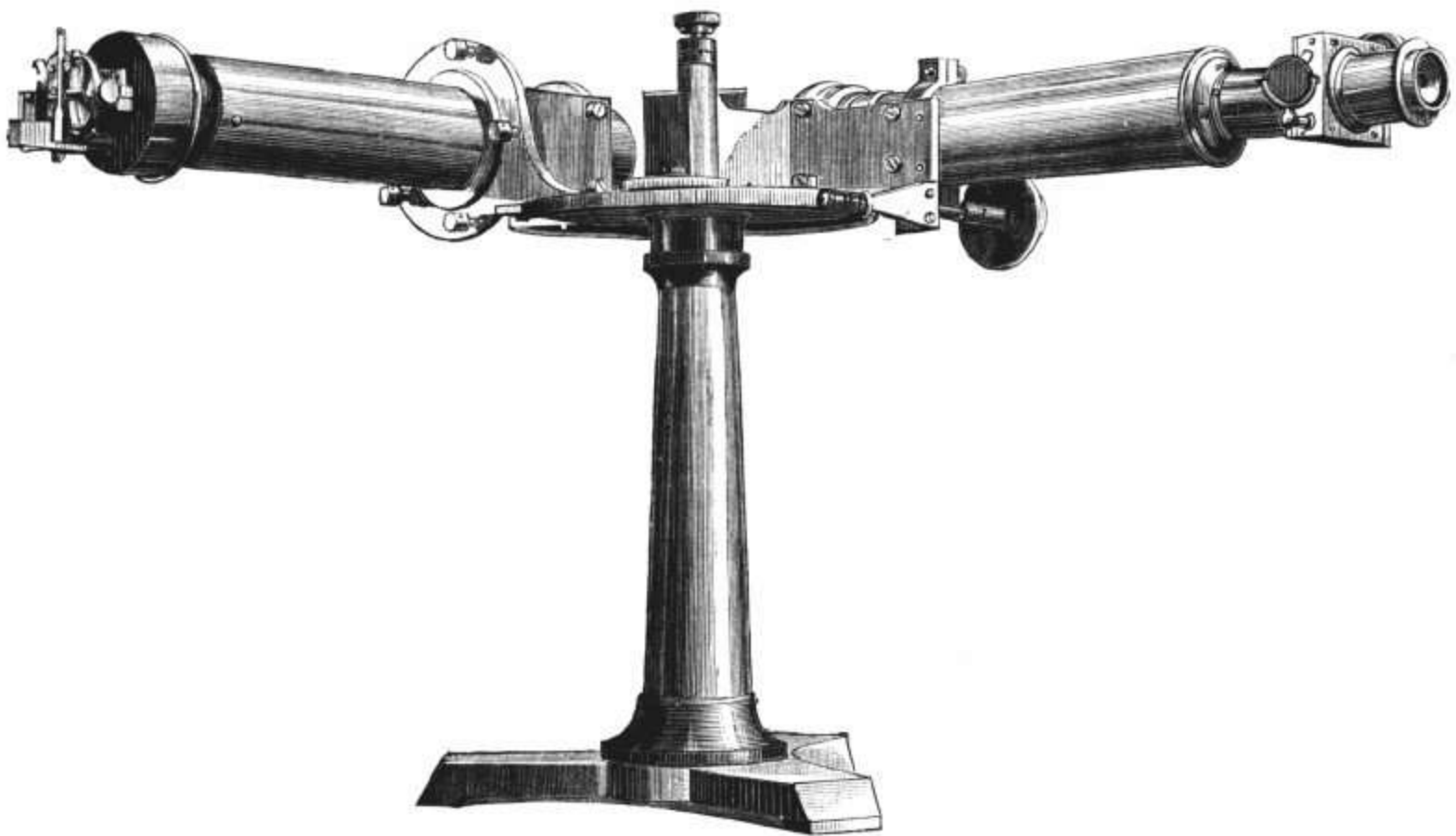
Spectroscopes.

<i>No.</i>		<i>£</i>	<i>s.</i>	<i>d.</i>
	FILAR MICROMETER, for delicate differential measurements, with revolution counter and small mirror on universal joint for directing the light on to the webs.			
	FOUR ACHROMATIC MICROMETER EYE-PIECES.			
	TELESCOPE AND COLLIMATOR OBJECTIVES, 1 inch clear aperture. Their adjustment to focus on the different parts of the spectrum is effected simultaneously by rack and pinion.			
	SLIT, with two movable jaws and edged with platinum.			
	COMPARISON SPECTRUM PRISM in front of slit.			
	ADAPTER OF SOLAR SWEEPING APPARATUS, with eccentric orbital and rotatory motions.			
	INSULATED SPARK APPARATUS and TUBE-HOLDER.			
	BRASS TRIPOD and PILLAR STAND, for supporting the instrument when used on a table.			
	Packed in mahogany case, complete	87	0	0
95	DIRECT VISION SPECTROSCOPE , with ONE COMPOUND PRISM (consisting of five).			
	TELESCOPE and COLLIMATOR, objectives $\frac{3}{4}$ inch clear aperture.			
	RACK and PINION, focussing adjustment to Telescope.			
	TWO ACHROMATIC EYE-PIECES.			
	SLIT, with platinum edges.			
	COMPARISON SPECTRUM PRISM attached to slit.			
	DIVIDED GUN-METAL ARC.			

BUCKINGHAM WORKS, YORK.

Spectroscopes.

<i>No.</i>		<i>£ s. d.</i>
	TANGENT-SCREW MOTION.	
	DRAW-TUBE ADAPTER, for attaching the instrument to a Telescope.	
	BRASS TRIPOD PILLAR STAND, with hinged clasp, for supporting the Spectroscope when used on a table.	
	Packed in mahogany case, complete	- - 27 0 0



Star Spectroscope.

Fig. 13.

- 96 **STAR SPECTROSCOPE**, (Fig. 13) with—
THREE PRISMS, the dispersive power being only equal to two prisms of equal angles; those nearest the Telescope and Collimator are half-angle prisms.
 Half the dispersive power can be used at pleasure by the removal of the centre prism.

BUCKINGHAM WORKS, YORK.

		Spectroscopes.	<i>£ s. d.</i>		
<i>No.</i>					
	AUTOMATIC ACTION OF THE THREE PRISMS, for minimum deviation.				
	TELESCOPE AND COLLIMATOR, objectives $1\frac{1}{2}$ inch clear aperture.				
	RACK and PINION, focusing adjustment to Telescope.				
	SLIT.				
	COMPARISON SPECTRUM PRISM attached to slit.				
	MEASURING ARRANGEMENT, by tangent-screw and divided head.				
	FILAR-MICROMETER, for more accurate and close measuring.				
	CYLINDRICAL LENS.				
	DRAW-TUBE ADAPTER, for attaching the Spectroscope to a Telescope.				
	BRASS TRIPOD PILLAR STAND, for supporting the Spectroscope for use on a table.				
	Packed in mahogany case, complete	-	-	35	0 0
97	STUDENTS' SPECTROSCOPE, with ONE PRISM.				
	TELESCOPE and COLLIMATOR, with objectives $1\frac{1}{8}$ inch clear aperture.				
	RACK AND PINION, focusing adjustment to Telescope.				
	GUN-METAL DIVIDED CIRCLE and VERNIER, reading to $30''$.				
	SLIT.				
	COMPARISON SPECTRUM PRISM attached to slit.				
	TWO ACHROMATIC EYE-PIECES.				
	STAGE, on which the prism is supported, having a rotating and sliding motion for facilitating the adjustment of the prism.				
	Packed in varnished pine case, complete	-	-	15	0 0
98	Do. with two prisms	-	-	-	17 0 0

BUCKINGHAM WORKS, YORK.

Spectroscopes.

<i>No.</i>		<i>£</i>	<i>s.</i>	<i>d.</i>
99	POCKET SPECTROSCOPE, with adjustable slit and achromatic lenses, in morocco case	-	2	6 0
100	Do. with adjustable slit and non-achromatic lenses, in morocco case	-	1	15 0
101	Do. with plain slit and non-achromatic lenses, in morocco case	-	1	4 0

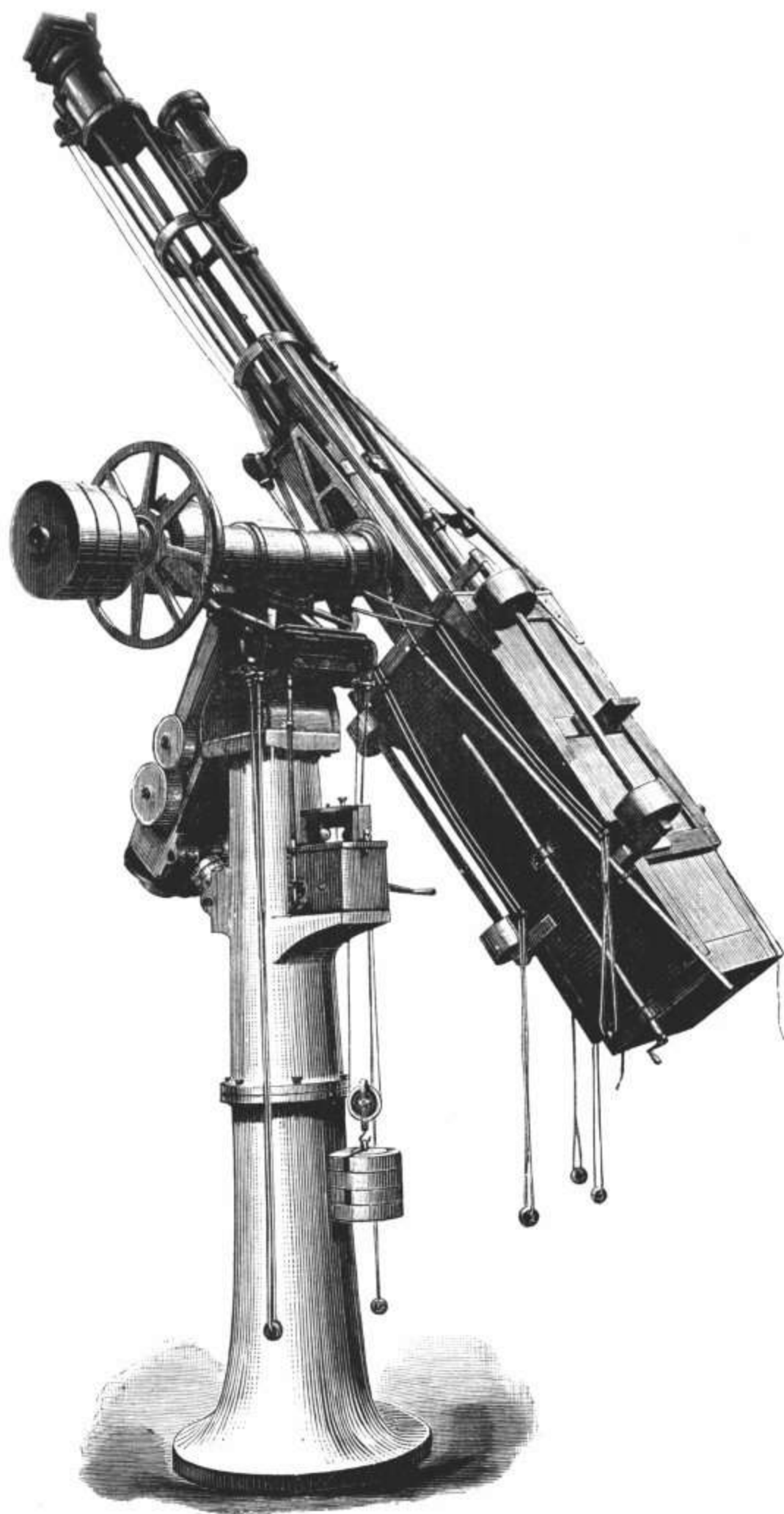
Estimates will be given for other kinds of Spectroscopes and Spectroscopic Apparatus.

ACHROMATIC OBJECT-GLASSES IN BRASS CELL.

<i>No.</i>	CLEAR APERTURE.	<i>£</i>	<i>s.</i>	<i>d.</i>	<i>No.</i>	CLEAR APERTURE.	<i>£</i>	<i>s.</i>	<i>d.</i>
102	10 INCHES -	390	0	0	112	4½ INCHES -	27	0	0
103	9 " -	280	0	0	113	4 " -	22	0	0
104	8 " -	190	0	0	114	3¾ " -	18	0	0
105	7 " -	125	0	0	115	3½ " -	14	10	0
106	6½ " -	100	0	0	116	3¼ " -	12	0	0
107	6 " -	75	0	0	117	3 " -	9	10	0
108	5½ " -	55	0	0	118	2¾ " -	7	0	0
109	5 " -	42	0	0	119	2½ " -	4	15	0
110	4¾ " -	37	0	0	120	2¼ " -	3	5	0
111	4½ " -	32	0	0	121	2 " -	2	2	0

The prices of larger sizes may be had on application.

BUCKINGHAM WORKS, YORK.



Photoheliograph.

(Specifications and estimates supplied on being furnished with particulars).

Fig. 14.

OBSERVING SEATS.

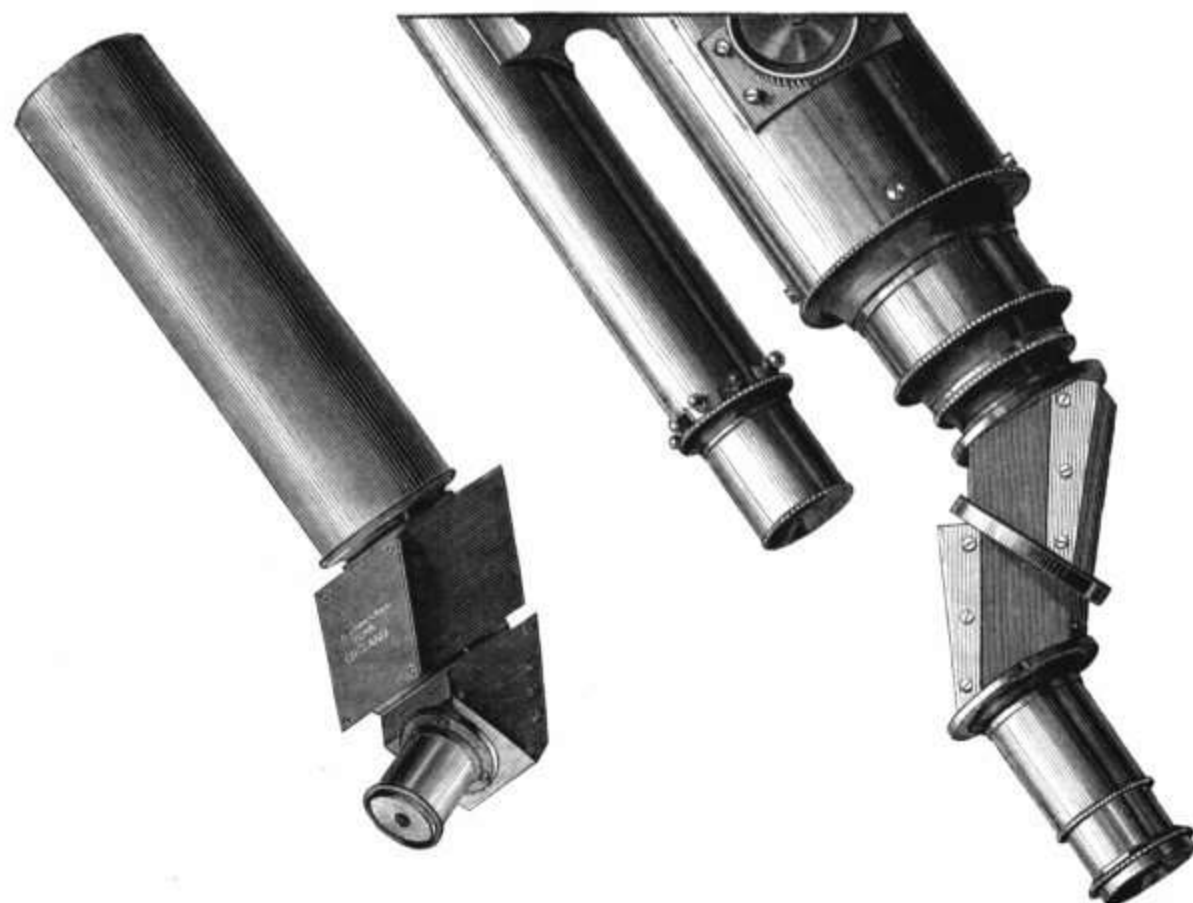


Simple Observing Chair, with Movable Steps.

Fig. 15.

OBSERVING SEATS, (as Fig. 15) in varnished pine or mahogany, from £4 10s.

EYE-PIECES, MICROMETERS, &c.



Polarizing Solar Eye-pieces.

Fig. 16.

No.
122**POLARIZING SOLAR EYE-PIECE** (see Fig. 16)

£	s.	d.
6	0	0

The principle of this eye-piece depends upon a curious property of light discovered by M. Malus in 1808, viz., the polarization of light at plane surfaces of transparent bodies.

The eye-piece consists of two reflecting surfaces receiving the solar rays successively; the surface nearer the eye has a rotatory motion, but always keeps the same reflecting angle with the other surface. By turning the former surface quarter-way round, it appears to almost entirely lose its power of reflection, the rays of light being said to be "polarized by reflection;" the sun's light can thus be diminished without any distortion of the object, and without disturbing the natural tints by coloured glasses.

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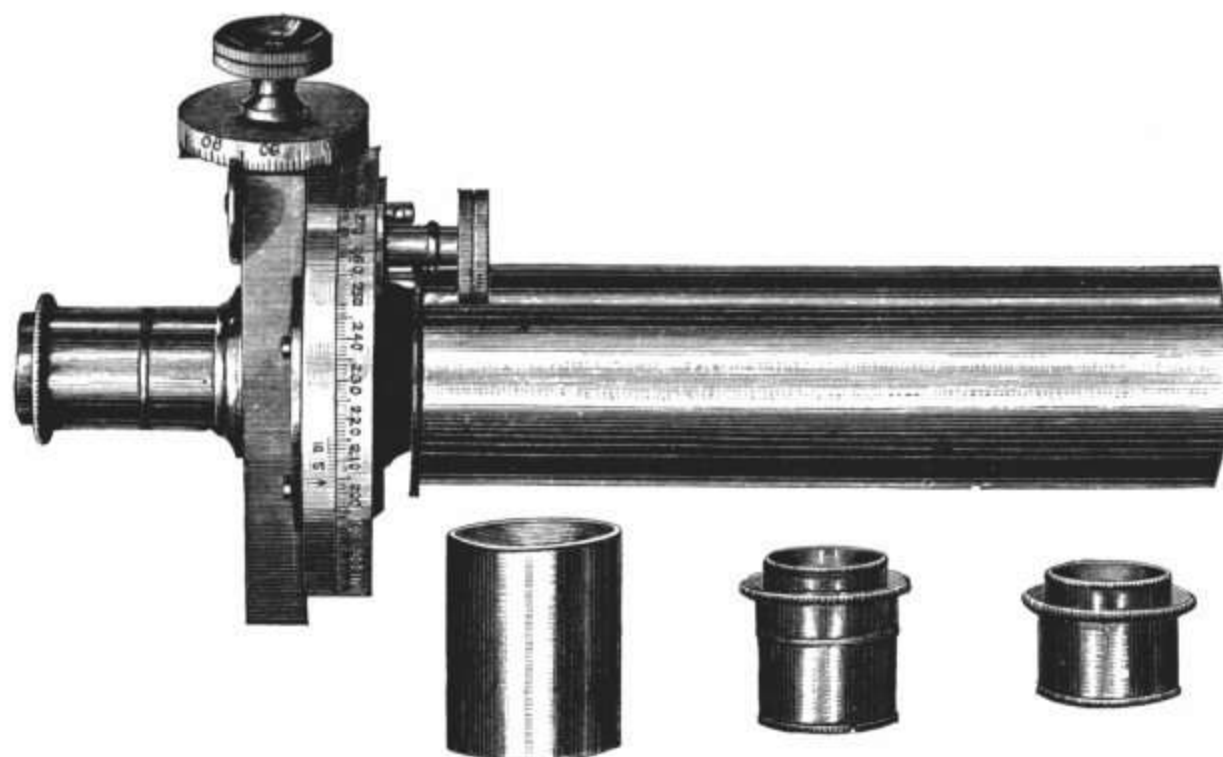
Eye-pieces, Micrometers, &c.

<i>No.</i>		<i>£</i>	<i>s.</i>	<i>d.</i>
	Often a third or fourth reflector is introduced, and by a single rotation of the one nearest the eye the light is diminished at will; thus the sun may be viewed for hours together without the slightest pain to the eyes.			
123	Do. do. with three reflecting surfaces -	8	0	0
124	Do. do. with four reflecting surfaces -	10	0	0
125	DAWES'S SOLAR EYE-PIECE -	8	0	0
	A special eye-piece for the sun, devised by the late Mr. Dawes, consisting of a revolving circular metallic plate, faced on the inner side with ivory, containing a series of apertures of various sizes, from $\frac{1}{130}$ to $\frac{1}{2}$ an inch; these serve to limit the field <i>ad libitum</i> , and the field so curtailed is examined by single lenses mounted on another plate revolving concentrically with the former one. Superposed upon the wheel of single lenses is another wheel, containing a series of dark glasses of various shades, to suit the eye and magnifying power used. The single lenses are focused on the apertures in the diaphragm by a rack and pinion movement. It is admirably adapted for solar observation, and for general celestial purposes, such as the examination of a faint sidereal object, without the presence of a more luminous neighbour.			
126	BÖHNENBERGER OR COLLIMATING EYE-PIECE , for use with Transit Instruments -	2	10	0
127	Do. with mercury trough -	3	5	0

Eye-pieces, Micrometers, &c.

<i>No.</i>		<i>£</i>	<i>s.</i>	<i>d.</i>
128	ACHROMATIC POSITIVE EYE - PIECE, for Micrometers, &c. - - - -	2	0	0
129	TRANSIT EYE-PIECE, in mahogany box -	3	0	0
130	TERRESTRIAL EYE-PIECE (Pancratic) -	1	15	0
131	COMET " - - - -	1	10	0
132	RECTANGULAR " for Transit Instruments	2	10	0
133	ASTRONOMICAL " (Huyghenian) -	0	19	0
134	SUN-SHADE for " - - - -	0	4	0
135	FIRST SURFACE REFLECTION SOLAR PRISM	1	5	0
<p>This is a diagonal eye-piece, and consists of a tube (sliding into the Telescope tube at the eye-end) with another tube let into it at right angles. In the main tube, at an angle of 45° to the axis and opposite to the secondary tube, is a prism, and the image of the sun diverted by reflection from the first surface of this prism is viewed through an ordinary eye-piece placed in the secondary tube. The loss of light by reflection is no disadvantage, but the reduction of light and heat by this arrangement is not sufficient to obviate the use of a sun-shade of coloured glass.</p>				
136	TOTAL REFLECTION PRISM - - - -	2	10	0
137	COMBINED TOTAL REFLECTION AND SOLAR PRISM - - - -	2	15	0

Eye-pieces, Micrometers, &c.

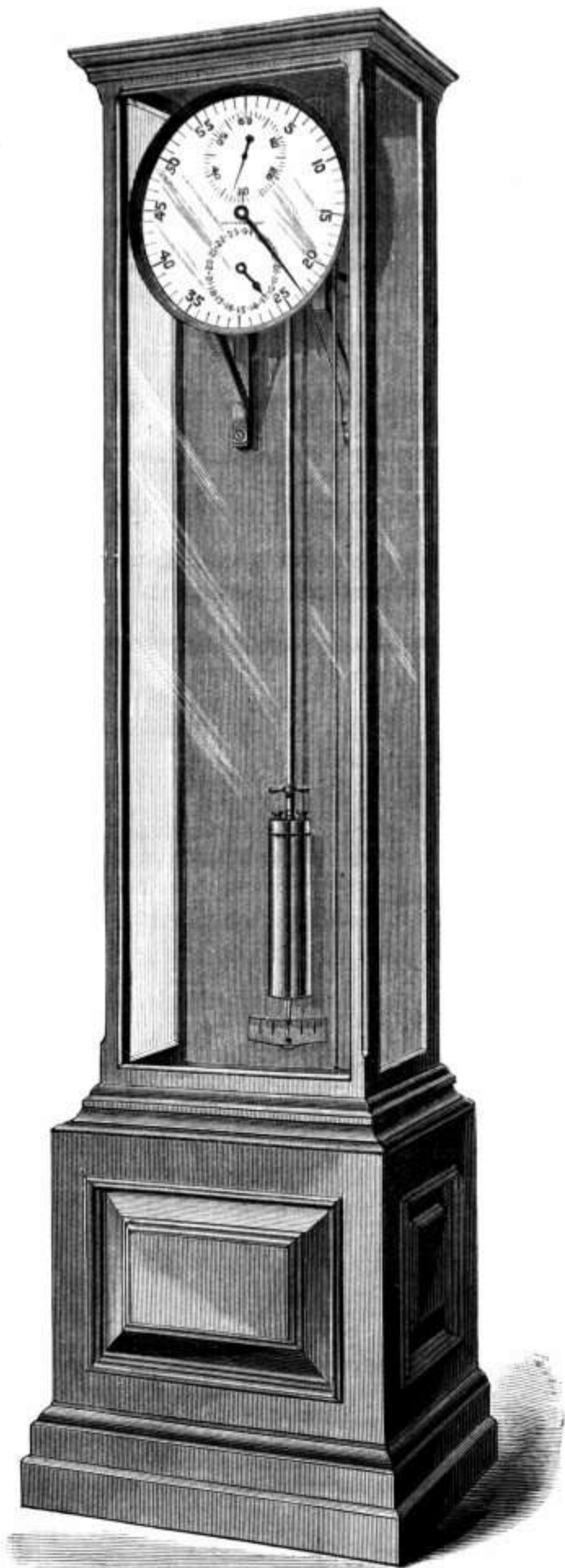
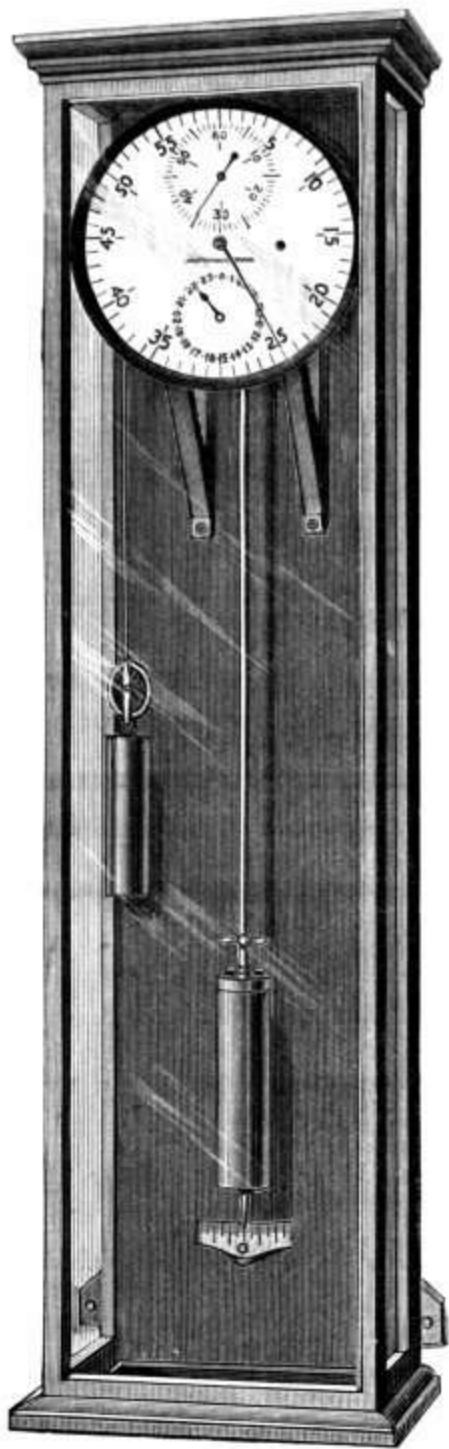


Filar Micrometer, with Position Circle.

Fig. 17.

No.						£	s.	d.
	FILAR MICROMETER,	with eye-pieces and						
		mahogany case, from	£8	to	£16.			
	Do. do.	with position circles	do.	from	£15	to	£22.	(Fig. 17.)
138	BAR	do.	-	-	-	2	15	0
139	RING	do.	-	-	-	1	10	0
140	DOUBLE RING	do.	-	-	-	2	15	0
141	DYNAMOMETER	(Cavallo's)	-	-	-	1	7	6
142	Do.	with compound microscope	-	-	-	2	15	0
143	BARLOW LENS	-	-	£1	12s. 6d.	2	5	0
144	SLIDING WEDGE OF DARK GLASS AND CAP					1	12	6

BUCKINGHAM WORKS, YORK.



Astronomical Clocks.

Figs. 18 & 19.

ASTRONOMICAL AND ELECTRIC CLOCKS.

<i>No.</i>		<i>£</i>	<i>s.</i>	<i>d.</i>
145	ASTRONOMICAL CLOCK , dead-beat escapement, jewelled pallets, and compensated pendulum, with steel rod and mercurial jar, and divided arc at bottom of pendulum. In plate-glass case, with strong polished mahogany back for hanging on a wall. (Fig. 18) - -	40	0	0
146	Do. do. with mahogany case to stand on floor (Fig. 19) - - - - -	43	0	0
147	Do. do. in polished mahogany case to stand on floor, with plate-glass door - - -	35	10	0
148	Do. do. in oak case, with do. - - -	33	10	0
149	Do. do. in oak case, pallets not jewelled, and pendulum compensated with zinc and iron rods	25	10	0
150	Do. do. in varnished pine case - - -	22	10	0

AN ELECTRIC CURRENT may be sent, if desired, by the above or other standard clocks, through any number of electro-magnetic or sympathetic clocks fixed in various parts of a building or of a town, which may thereby be driven and kept to exact corresponding time. The same result may be attained by means of a controlled pendulum adapted to existing clocks.

ILLUMINATING APPARATUS.



Prismatic Illuminating Apparatus.

Fig. 20.

L—Is the Lamp. P—A Prism to reflect the light into the tube. D—A Disc with Diaphragms to regulate the quantity of light. B—A Disc with glasses to regulate the colour of the light. S—Spring catches to clamp the Discs. C—Counterpoise of Lamp. G—Gravity Poise.

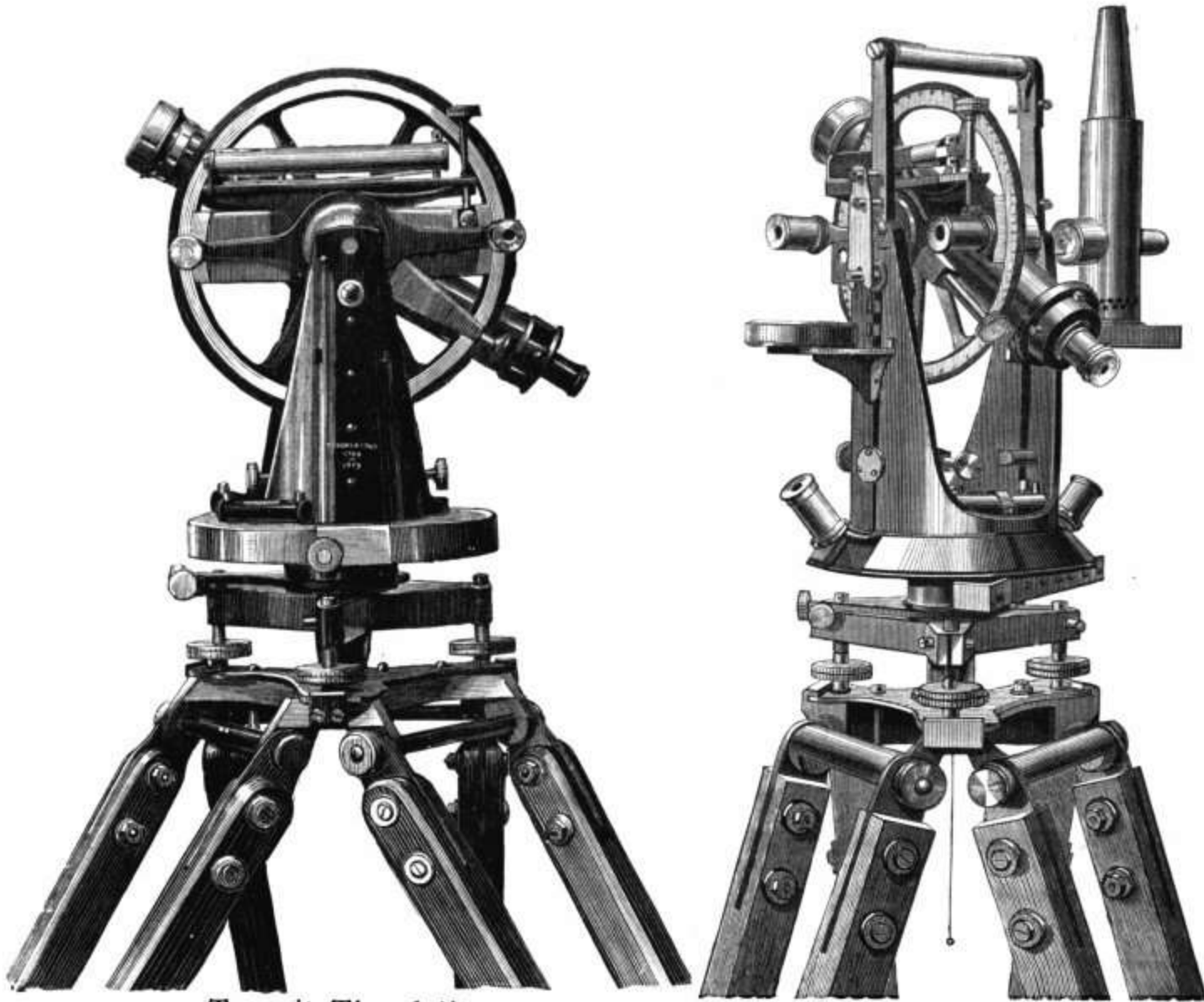
£ s. d.

This arrangement (Fig. 20) is for illuminating the tube of the Telescope for Micrometer and other work. It is constructed so as to maintain its perpendicular in any position of the Telescope, and the field can be changed into different tints at will. Price

from 7 10 0

 BUCKINGHAM WORKS, YORK.

THEODOLITES.



Transit Theodolite.

Fig. 21.

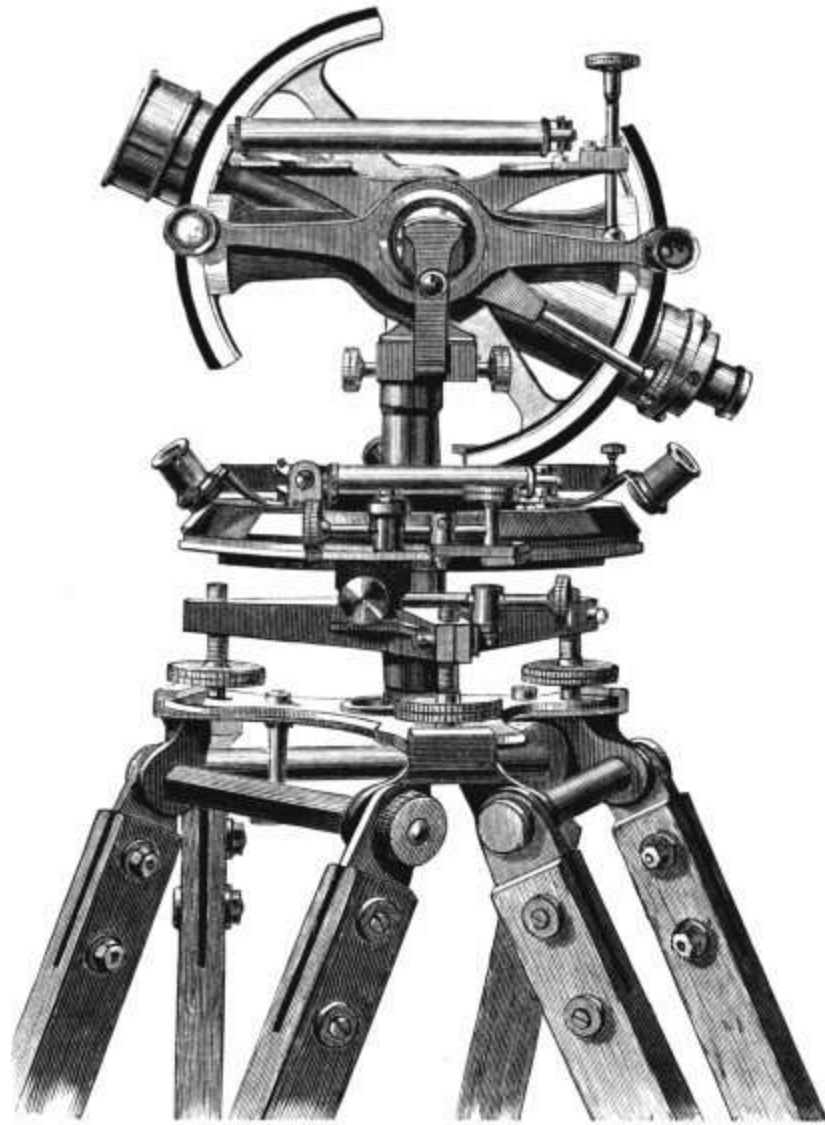
Transit Theodolite,
with Illuminated Axis, &c.

Fig. 22.

<i>No.</i>							<i>£</i>	<i>s.</i>	<i>d.</i>		
151	12 INCH	TRANSIT	THEODOLITE;	tangent							
				screw							
				motions;							
				circles							
				graduated							
				on silver;							
				reading							
				with verniers							
				and microscopes							
				to 10							
				seconds;							
				mahogany							
				case and							
				tripod stand							
				-		105	0	0			
152	10 INCH	Do.	do.	-	-	-	-	82	10	0	
153	8	"	Do.	do.	-	-	-	60	10	0	
154	7	"	Do.	do.	-	-	-	46	5	0	
			ILLUMINATED	AXIS	-	-	-	<i>extra</i>	2	10	0

BUCKINGHAM WORKS, YORK.

Theodolites.						£	s.	d.
No.								
155	6 INCH	Do.	do.	reading to 20 seconds	-	39	0	0
		ILLUMINATED	AXIS	-	-	-	extra	2 10 0
156	5 INCH	Do.	do.	reading to 30 seconds	-	32	0	0
		ILLUMINATED	AXIS	-	-	-	extra	2 10 0
157	4 INCH	Do.	do.	-	-	-	-	29 0 0



Everest Theodolite.

Fig. 23.

158	12 INCH	EVEREST	THEODOLITE	; tangent-screw motions ; circles graduated on silver ; reading with verniers and microscopes to 10 seconds ; mahogany case and tripod stand	-	78	0	0
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BUCKINGHAM WORKS, YORK.

		Theodolites.					<i>£ s. d.</i>			
<i>No.</i>										
159	10 INCH EVEREST THEODOLITE ;	tangent-								
		screw motions ;								
		circles graduated on silver ;								
		reading with verniers and microscopes to 10								
		seconds ; mahogany case and tripod stand -				78	0	0		
160	8	„	Do.	do.	-	-	-	50	10	0
161	7	„	Do.	do.	-	-	-	40	0	0
162	6	„	Do.	do.	reading to 20 seconds	-		32	0	0
163	5½	„	Do.	do.	-	-	-	28	0	0
164	5	„	Do.	do.	reading to 30 seconds	-		26	0	0
165	4½	„	Do.	do.	-	-	-	24	0	0
166	4	„	Do.	do.	-	-	-	23	0	0

Theodolites.



Everest Theodolite, with centring arrangement and wrought iron stand, extra.

Fig. 24.

BUCKINGHAM WORKS, YORK.

LEVELS.

No.						£	s.	d.
167	20	INCH Y LEVEL;	graduated compass-ring;					
			two eye-pieces; screw-drivers and levers;					
			mahogany case and tripod stand	-	-	20	10	0
168	14	INCH	Do. do.	-	-	18	10	0
169	12	"	Do. do.	-	-	16	0	0
170	10	"	Do. do.	-	-	13	15	0

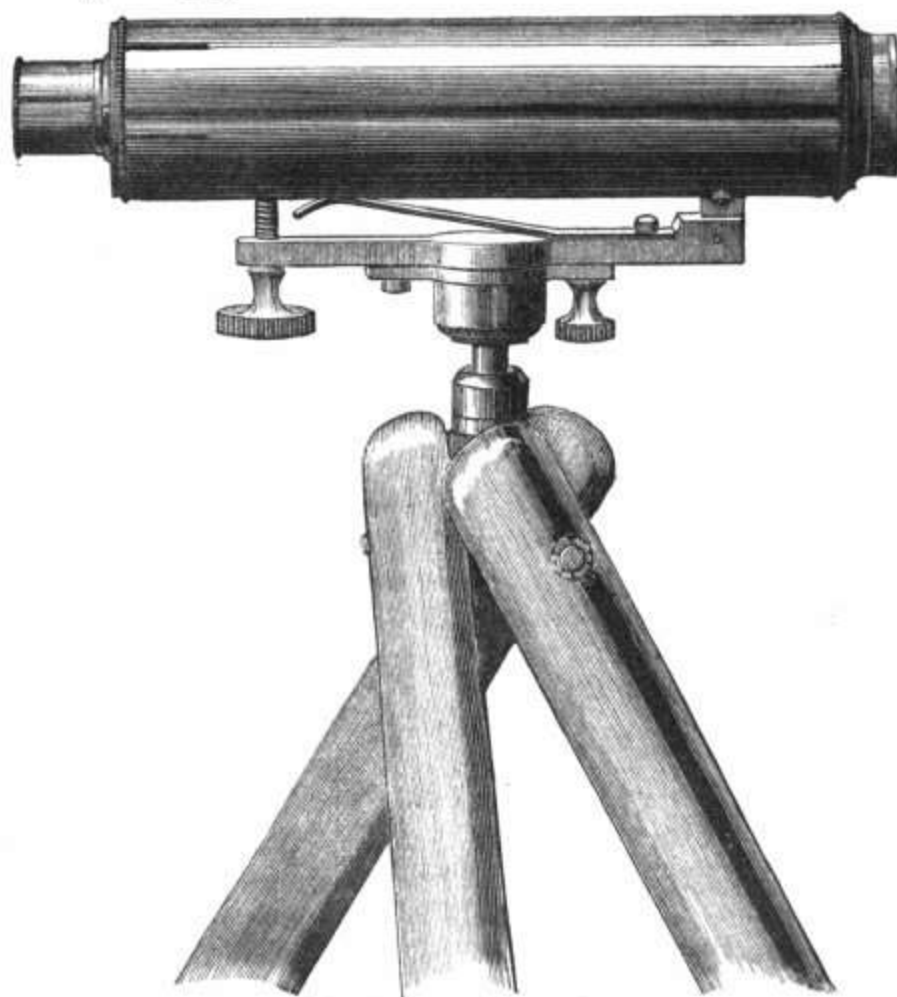


Fig 25.

No.						£	s.	d.	
171	20	INCH COOKE'S REVERSIBLE LEVEL,	(Patent 12,175); graduated compass-ring;						
			two eye-pieces; screw-drivers and levers;						
			mahogany case and tripod stand	-	-	19	10	0	
172	14	INCH	Do. do.	-	-	17	0	0	
173	12	"	Do. do.	-	-	14	15	0	
174	10	"	Do. do.	-	-	12	10	0	
			Without COMPASS-RING	-	-	less	1	12	6

BUCKINGHAM WORKS, YORK.

		Levels.				£. s. d.		
No.								
175	SIMPLE ENGINEER'S LEVEL;	parallel plates						
		and one eye-piece;						
		mahogany case and tripod						
		stand	-	-	-	-	8	5 0
176	ABNEY'S LEVEL,	in morocco case	-	-	-	-	1	17 6
177	12 INCH BRASS POCKET LEVEL,	in case	-	-	-	-	1	7 6
178	10	„ Do. do.	-	-	-	-	1	0 0
179	8	„ Do. do.	-	-	-	-	0	16 0
180	6	„ Do. do.	-	-	-	-	0	12 6
181	4	„ Do. do.	-	-	-	-	0	9 0
182	12 INCH SPIRIT LEVEL	in mahogany block,						
		with brass plate	-	-	-	-	0	9 6
183	10 INCH	Do. do.	-	-	-	-	0	7 0
184	8	„ Do. do.	-	-	-	-	0	5 6
185	6	„ Do. do.	-	-	-	-	0	4 0



Drainage Level.

Fig 26.

186	AGRICULTURAL DRAINAGE LEVEL (as Fig. 26)	with Telescope, tripod stand, and station staff						
		complete, with instructions for use	-	-	-	-	5	10 0

BUCKINGHAM WORKS, YORK.

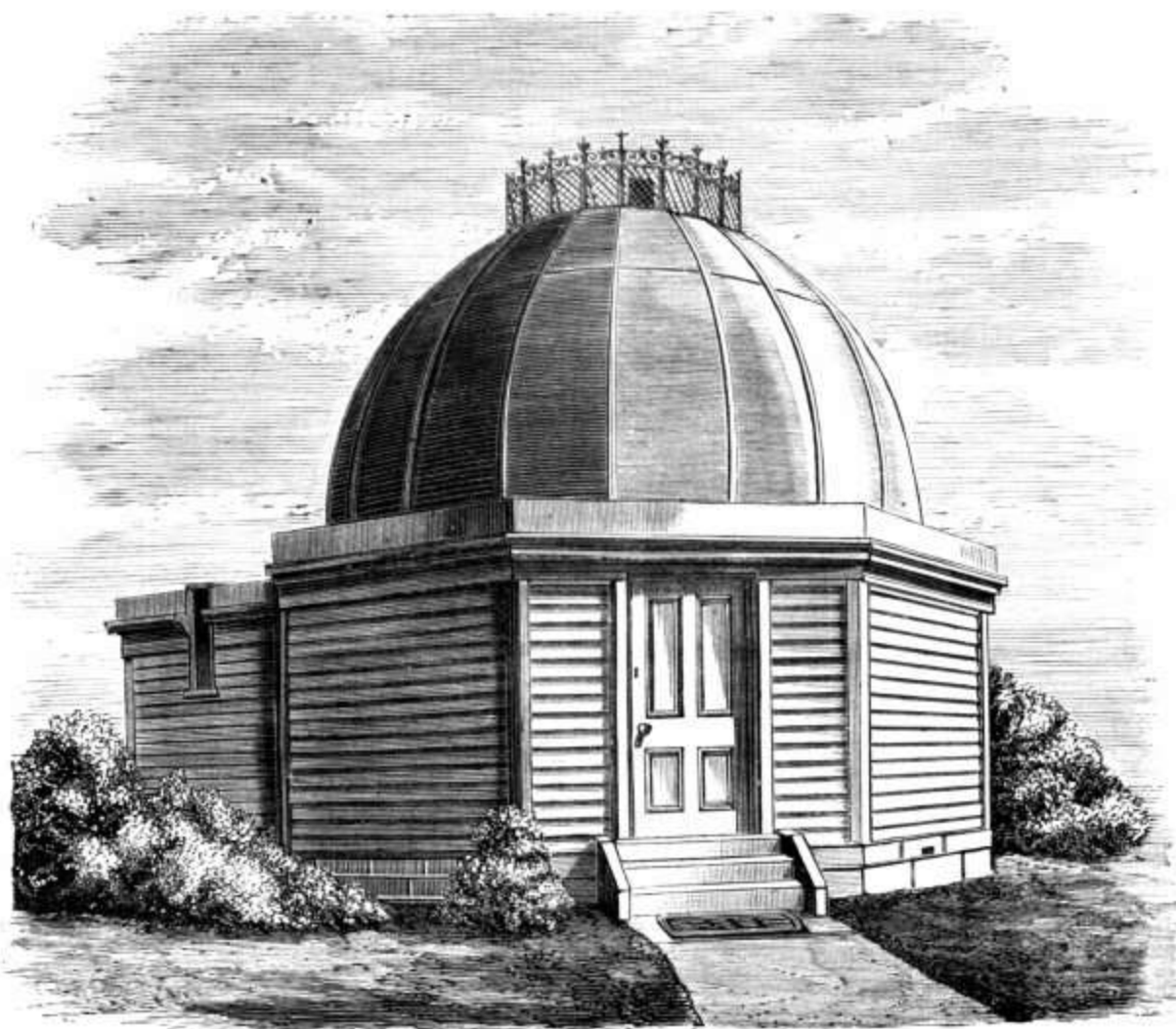
STAVES, SURVEYING CHAINS, &c.

No.				£	s.	d.
187	SOPWITH'S LEVELLING STAFF,	17 feet,	painted	3	10	0
188	Do.	do.	14 feet do.	3	0	0
189	Do.	do.	14 feet	-	2	10
190	TRIANGULAR	do.	24 feet	-	3	5
191	COMMON	do.	12 feet	-	1	17
192	Do.	do.	9 feet	-	1	12
193	LAND CHAIN,	100 feet,	and set of Arrows	-	1	2
194	Do.	66 feet,	do.	-	0	17
195	Do.	50 feet,	do.	-	0	13
196	TAPE MEASURE,	100 feet,	links or decimals	-	0	17
197	Do.	66 feet,	do.	-	0	11
198	Do.	50 feet,	do.	-	0	9
199	Do.	33 feet,	do.	-	0	7

SEXTANTS, &c.

200	8 INCH METAL SEXTANT,	arcs divided on				
		silver to 10 seconds	-	-	-	15 10 0
201	6 INCH Do.	arc divided on silver to 15				
		seconds	-	-	-	12 0 0
		GOLD AND PLATINUM ARCS	-	-	<i>extra</i>	2 5 0
202	3½ INCH POCKET SEXTANT,	with Telescope				5 10 0
203	3 INCH Do.	do.				5 0 0
204	PRISMATIC COMPASS,	with ring 4 inches				
		diameter	-	-	-	6 0 0
205	Do.	do.	with ring 3½ inches			
		diameter	-	-	-	5 0 0
		STANDS FOR DITTO WITH BALL AND SOCKET				
		JOINT	-	-	-	<i>extra</i> 1 12 6
206	ARTIFICIAL HORIZONS,	from £3 5s. to £5.				
207	OPTICAL SQUARE,	in case	-	-	-	1 2 0
208	Do.	do. do., German pattern	-	-	-	1 10 0
209	DE LISLE'S CLINOMETER,	for the tracing of				
		roads	-	-	-	3 3 0

 ASTRONOMICAL OBSERVATORIES.



Astronomical Observatory with Transit Room attached.

Fig. 27.

In constructing an Observatory it is essential that a suitable form be selected, in order that perfect freedom of motion for the Instruments may be secured without unnecessary waste of space or material.

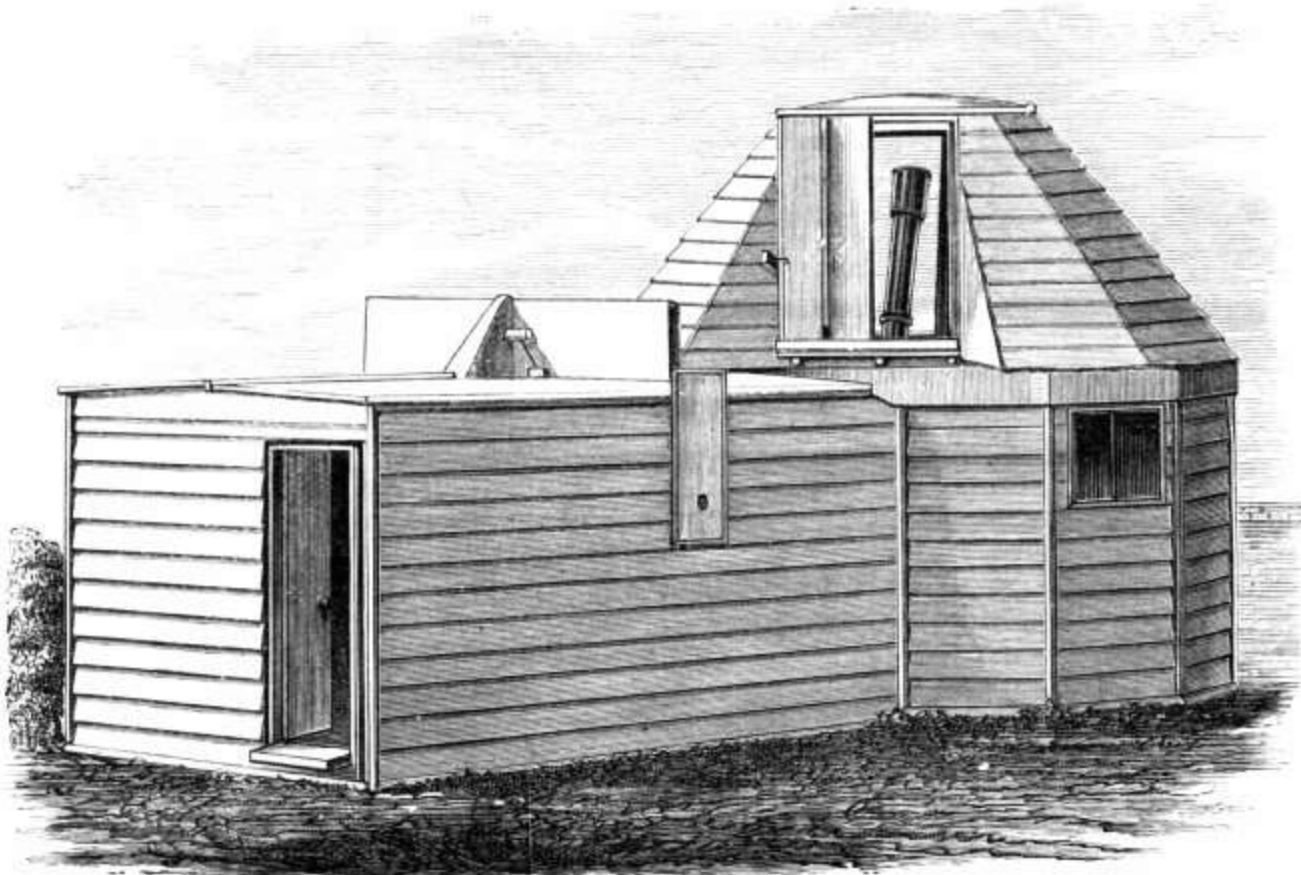
In order to aid those who are contemplating the erection of such a building, we beg to call attention to two forms of Observatories made by us, the one suitable for Telescopes of apertures exceeding 6 inches ; the other a simpler form for less expensive instruments.

Fig. 27 is an Observatory with Transit room attached. The form is octagonal, the overhanging eaves and iron rail upon which the dome revolves being supported in the interior at each angle

BUCKINGHAM WORKS, YORK.

Astronomical Observatories.

by cast iron pillars which are let into the stone work surrounding the basement of the building, the foundation of which is of brick. The sides are constructed of redwood boards; the framework of the dome is also of redwood, which is covered with canvas thoroughly painted to withstand the weather; this covering has the advantage of being light, and thus renders the dome, which rests upon seven cast iron wheels working on a circular rail, capable of being turned round with comparative ease. The shutter of the dome is divided longitudinally through the centre, and the two halves move on rails equably from the centre by means of a pinion and double rack.



Astronomical Observatory, with Transit Room attached.

Fig. 28.

Fig. 28. A less expensive form of Observatory; has also a Transit room attached (this should always be done if possible, as by a comparatively small extra outlay at first much expense is saved should the Transit room be afterwards required). The

Astronomical Observatories.

whole of the building is of redwood, lightly but well put together, and is all that can be desired for equatorials of under six inches aperture. Care should be taken, however, that the pillar of the Telescope rests upon a sufficiently firm foundation.

It being almost impossible to give estimates for Observatories without previously knowing the apertures of the Telescopes for which they are required, we have refrained from publishing a series of estimates, feeling that however large we might make the series it would at best be unsatisfactory. We shall be glad, however, to send specifications and estimates to anyone upon being furnished with the necessary particulars.



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