Astronomical
Instruments
Optical Equipment
Observatory Domes
Observation Ladders
Rising Floors

Identification Numbers

The various items listed and described in this catalogue bear numbers for their identification as to design and equipment which are part of the system of our workshop and despatch departments. These identification numbers should be quoted on all orders, in addition to the respective codewords, as this will materially assist in their prompt and correct execution.

Identification No.	Page	Description
14 70 50 — 14 71 53	96	Magnifying lenses
51 10 01 — 51 10 02	57	60-mm. (2⅜ in.) tube mountings
51 10 21 — 51 10 23	10	60 „ (2⅜ in.) telescope on table stand
51 10 61 — 51 10 62	57	60 „ (2⅜ in.) tube mountings
51 10 41 — 51 10 73	12	60 „ (2⅜ in.) travelling telescopes
51 13 01 — 51 13 02	57	80 „ (3⅛ in.) tube mountings
51 13 21 — 51 13 23	10	80 „ (3⅛ in.) telescope on table stand
51 13 41 — 51 13 63	14	80 „ (3⅛ in.) altazimuth telescopes
51 13 44 — 51 13 64	20	80 „ (3⅛ in.) comet finders
51 14 24 — 51 14 79	22	80 „ (3⅛ in.) look-out telescopes
51 16 01 — 51 16 02	57	110 „ (4⅜ in.) tube mountings
51 16 21 — 51 16 43	16	110 „ (4⅜ in.) altazimuth telescopes
51 17 31 — 51 17 61	22	110 „ (4⅜ in.) look-out telescopes
51 18 31	22	110 „ (4⅜ in.) bin. look-out telescope
51 20 01 — 51 20 02	57	130 „ (5⅛ in.) tube mountings
51 20 21 — 51 20 43	18	130 „ (5⅛ in.) altazimuth telescopes
51 21 31 — 51 21 51	22	130 „ (5⅛ in.) look-out telescopes
51 22 31	22	130 „ (5⅛ in.) bin. look-out telescope
51 23 61	22	240 „ (9½ in.) look-out telescope
51 28 31 — 51 28 83	24—26	80 „ (3⅛ in.) equatorial telescopes
51 30 31 — 51 30 63	26—28	110 „ (4⅜ in.) equatorial telescopes
51 31 31 — 51 31 33	28	130 „ (5⅛ in.) equatorial telescopes
51 32 31 — 51 32 33	30	150 „ (5⅞ in.) refractors
51 33 31 — 51 33 33	30	200 „ (7⅞ in.) refractors
51 35 65	6, 42, 124	650 „ (25⅝ in.) refractor
51 36 16	36	160-mm. (6¼ in.) astrograph
51 36 34	37	340 „ (13⅜ in.) Lippert astrograph
51 37 20	21	200 „ (7⅞ in.) comet finder
51 37 21	40	Photographic double refractor
51 37 30	39	300-mm. (11⅞ in.) refractor
51 37 36	41	Triple photographic refractor
51 38 26	44	260-mm. (10¼ in.) reflecting telescope
51 38 30	43	300 „ (11⅞ in.) reflecting telescope
51 39 10	47	1000 „ (39⅜ in.) reflecting telescope
51 39 12	49	1220 „ (48⅛ in.) reflecting telescope
51 39 40	45	400 „ (15¾ in.) reflecting telescope
51 39 72	48	720 „ (28⅜ in.) reflecting telescope
51 40 01 — 51 41 14	57	Stands for altazimuth telescopes
51 42 11 — 51 42 32	52	Changing appliances
51 43 11 — 51 43 21	52	Slow motions
51 43 31 — 51 43 61	52	R. A. and declination circles
51 43 71 — 51 43 91	54	Clocks
51 44 11 — 51 44 16	54	Electric seconds control
51 44 18 — 51 44 19	54, 58	Incandescent lamp, accumulator
51 44 31	56	Driving gear
51 47 11 — 51 47 21	58	Lighting arrangement
51 47 22 — 51 47 33	60	Revolvers
51 47 41 — 51 47 47	61, 111	Erecting prisms
51 47 61 — 51 47 71	62	Finders
51 48 11 — 51 48 25	62	Eyepiece and zenith prisms
51 48 41	66	Binocular eyepiece
51 48 61 — 51 48 91	66	Dark glasses and absorbing wedges
51 49 11 — 51 49 71	68	Sun prisms
51 49 90 — 51 49 95	68	Sun projection screens
51 50 10 — 51 50 81	70—75	Micrometers
51 52 11 — 51 52 41	78—81	Spectroscopes
51 53 11 — 51 53 61	82—83	Sun and moon cameras
51 54 11 — 51 54 63	84	Astro camera
51 54 71 — 51 54 81	86—87	Star guiding eyepiece head
51 54 91	89	Planet camera
51 55 11 — 51 55 21	93	Cœlostat
51 55 31	105	Centring telescope
51 56 11 — 51 56 61	90—92	Astro-spectrographs
51 57 16	94	Comparison star scale
51 58 10 — 51 58 35	98—101	Radiometrical Apparatus, Thermocouples
51 60 06 — 51 60 50	106	E-objectives
51 61 06 — 51 61 20	106	A-objectives
51 61 56 — 51 61 70	107	B-objectives
51 62 11 — 51 62 25	107	C-objectives
51 62 20	107	D-objectives
51 64 07 — 51 64 80	109	Huygens eyepieces
51 64 91	108	Eyepiece sliding sleeve
51 64 95	108	Dynameter
51 66 05 — 51 67 40	109	Orthoscopic eyepieces
51 69 09 — 51 70 60	110	Kellner eyepieces
51 72 06 — 51 73 25	110	Monocentric eyepieces
51 73 51	111	Eyepiece microscope
51 73 61 — 51 73 64	111	Terrestrial eyepieces
51 75 46 — 51 76 36	112	Astro-photographic objectives
51 80 11 — 51 84 50	114	Silvered glass reflectors
51 86 16 — 51 92 90	115	Prisms
51 94 01 — 51 94 20	116	Plane-parallel glasses
51 96 10 — 51 96 70	120—122	Domes
51 98 10 — 51 98 50	126	Observation ladders
51 98 51	21	Observation chair

Contents

Description	Page
Identification numbers	2
Business Terms	4
Preface	5
Astronomical telescopes	7—50
Choice of objectives and telescopes to suit the nature of the proposed investigation	118
Altazimuth telescopes	9—22
of 60—80 mm. (2⅜—3¼ in.) aperture, on table (claw) stand	10
of 60—130 mm. (2⅜—5⅛ in.) aperture, on floor stand	12—19
Comet finders	20—21
80 mm. (3⅛ in.) — altazimuth	20
200 mm. (7⅞ in.) — equatorial	21
Look-out telescopes	22
Equatorial telescopes	23—39
of 80 mm. (3⅛ in.) aperture, portable	24
of 80—110 mm. (3⅛—4⅜ in.) aperture, portable	26
of 110—130 mm. (4⅜—5⅛ in.) aperture, refractors	28
of 150—200 mm. (6—7⅞ in.) aperture, refractors	31—35
of 300 mm. (12 in.) aperture, refractors	38—39
Astro-photographic refractors	36-37,40,41,102
Reflecting telescopes	43—50
Accessories	51—102
Mechanical accessories and separate parts of telescopes	51—60
Changing devices	52
Slow motion devices	52
Reading circles	52
Clocks	54—56
Stands	57
Tube mountings	57
Illuminating arrangements	58
Revolvers for eyepieces	60
Accessories for visual observations	61—69
Prism erecting systems	61
Finders	62
Zenith prisms	62
Zeiss field glasses	64—65
Binocular eyepieces	66
Dark glasses	66
Sun glasses	66
Coloured glasses	66
Absorbing wedges	66
Sun prisms and projection screens	68—69
Micrometers	70—75
Eyepiece micrometers	70
Filar position micrometers	70—75
Double image micrometer	74
Surveying instruments	76—77
Astro-spectroscopes	78—81
Eyepiece spectroscopes	78—79
Prominence spectroscopes	80—81
Accessories for astro-photography	82—97
Moon camera	82
Sun camera	83
Astro cameras	84—85
Star guiding eyepiece head	86—87
Planet camera	89
Astro spectrographs	90—91
U. V. sun spectrograph	92
Cœlostat	93
Measuring apparatus for astro-photography	94—95
Abbe Comparator	95
Hartmann Spectro-comparator	95
Stereo comparator	94
Comparison star scale	94
Magnifiers and focussing microscopes	96—97
Radiometrical apparatus, thermocouples	98—101
Astronomical parts	103—118
Centring telescope	105
Telescope objectives	104—107
E two-lens, ordinary	106
A two-lens, apochromatic	106
B three-lens, apochromatic	107
C two-lens, with large relative aperture	107
D three-lens, with large relative aperture	107
Eyepieces	108—111
Huygens	109
Orthoscopic	109
Kellner	110
Monocentric	110
Terrestrial	111
Erecting prisms	61, 111
Objectives for astro-photography	112—113
Astro-Tessar	112
Astro-Petzval	112
Astro-U. V. objectives	112
Spectrograph objectives	112
Silvered glass reflectors	114
Parabolic reflectors	114
Spherical reflectors	114
Plane reflectors	114
Prisms	115
Objective prisms	115
Reflecting prisms	115
Prisms for spectrographs	115
Plane-parallel glasses	116
Tables of magnifications, fields of view and exit pupils	117
Selection of objectives etc.	118
Observatory domes	119—123
Domes of 3—6 m. (10—20 ft.) dia.	120
Domes of 6—10 m. (20—32 ft.) dia.	122
Rising floors	124—125
Observation ladders	126—127
Dimensions and weights	128—137
Altazimuth telescopes	128
Equatorial telescopes	130
Accessories	132
Astro-optical equipment	134
Domes and observation ladders	136
Index	144—148

Business Terms

The prices of the instruments specified in this catalogue are strictly net for prompt cash and do not include the cost of packing and carriage from the works. Respecting payment we beg to refer to the enclosed price list. The cost of packing amounts to about 5% of the list price of an instrument. Dates of delivery are approximate only and should not be regarded as binding upon us.

When placing an order, the reference title of this catalogue **"Astro 30"**, the **codeword** and the identification **number of the** required item should be quoted.

All orders (excepting those of our regular business friends) should be accompanied by a remittance.

Goods are forwarded at the cost and risk of the consignee and are insured under our open policy, the cost of insurance being charged to the consignee. In the absence of special instructions, goods ordered from abroad are despatched by the most advantageous route, every precaution being taken to ensure safe transit and prompt delivery.

Small instruments are packed and forwarded ready for use, whilst large telescopes are dismounted before packing. We are prepared to provide fitters for the erection of the latter, subject to arrangement.

The prices of the telelescopes include the apparatus and accessories given at the head of each page. **The illustrations do not necessarily represent the equipment of the instrument as specified in the catalogue.** In most cases the instruments are shown equipped with additional accessories which are not included in the stated price and which require to be ordered separately.

Parts of instruments to be sent to us for repair, exchange etc. should be provided with a label (tied or stuck on) bearing the following particulars:

Astro 30. Name and Address of sender: .....

Date of covering letter: .....

Carl Zeiss · Jena

Telegraphic Address: Zeisswerkastro Jena

Branches:

BERLIN W.9, Potsdamer Straße 139 HAMBURG, Rathausmarkt 8
WIEN, IX/3, Ferstelgasse 1 BUENOS AIRES, Casilla de Correo 846
TOKYO, Tsukiji 33a

Sole Agents:

LONDON W.C.2, 8, Southampton Row PARIS V^e, 26, rue Vauquelin
NEW YORK, 110 East 23rd Street MILAN

Preface

This catalogue supersedes our former

Catalogue "Astro 8" of Astronomical Telescopes and Accessories, 3rd Edition, as well as the **Price Lists "Astro 20, 23, 25".**

The present catalogue comprises astronomical telescopes with their accessories and optical equipment including objectives up to 200 mm (8 in.) in diameter. Reference will also be made to instruments of larger dimensions or of special design; and some large instruments installed by the firm are shown in illustrations. Special quotations or tenders for these instruments and their erection will be furnished on application.

In the specifications of telescopes, due prominence has been given to apochromatic objectives, since the owners of even comparatively small telescopes have not failed to appreciate their advantages. To meet rising requirements the equipment of the telescopes has been appropriately extended or modified.

In the section dealing with accessory apparatus special attention has been paid to astro-photographic devices, whilst the astro-optical equipment has been made to include units designed for larger telescopes.

The section devoted to observatory domes furnishes more detailed information, and a variety of designs adapted to satisfy a wide range of requirements is shown by a number of illustrations.

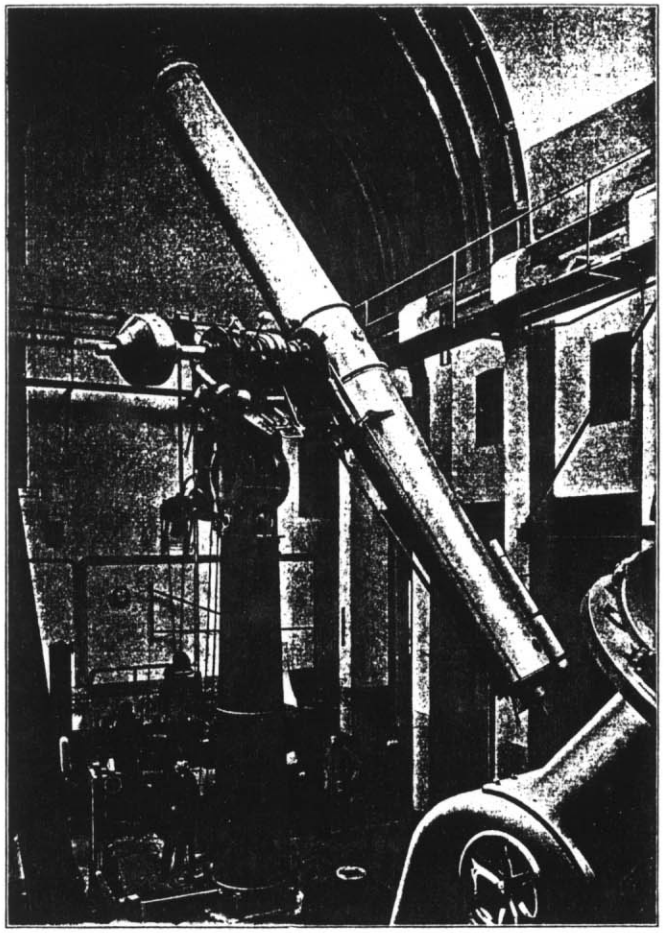
The prices of all items described in the catalogue are given in a separate list appended to the catalogue.

Tables of dimensions and weights of the instruments will be found on pages 128 to 137.

The catalogue also contains particulars respecting magnifiers, focussing microscopes, measuring instruments for astrophotographic work, and surveying instruments.

Attention may be called to the following additions:

Description	Page	No.
Slow motions for altazimuth telescopes, Fig. 10	17, 52	68—70
200 mm (7⅞ in.) comet finder, equatorial, Fig. 13, 14	21	33
Reflecting telescopes	43—50	—
Hour angle disc	52	72
Hour circle for direct setting by stellar time	52	73—75
Spring motor	54	76
Electric seconds control	54	80, 81
Driving gear for the motion in R. A. of large refractors	56	83
Electric slow motion in R. A.	54	79
Monocular field-glass type of finder	62	121
Revolving colour disc	66	135
Binocular eyepiece	66	125
Colzi polarizing solar prism	68	138, 139
Filar position micrometer	70—75	154, 155
Wellmann double-image micrometer	74	156
U. V. Astro-spectrographs	90, 91	188, 189
Planet camera	89	187
U. V. sun spectrograph	92	190
Cœlostat	93	191, 192
Radiometrical apparatus, thermocouples	98—101	215 a—s
Two-and three-lens camera objectives for spectrographs	112	330—335
Eyepiece microscope with variable magnification	111	310
Rising floors	124	—
Observation ladders	126	434—439
Surveying instruments	76, 77	—



2275

Fig. 1

Erecting Shop for Astronomical Instruments

Zeiss Works at Jena

Erecting the Great Refractor for the Observatory at Berlin-Babelsberg
Diameter of objective 650 mm. (25⅝ in.), focal length 10.5 m. (34½ ft.)

Price: On application. Code word: *Asechome.* Identification Number: 51 35 65

Astronomical Telescopes

The **prices of the telescopes** include their complete mechanical and optical equipment together with the accessories required for the intended purpose, including a case and suitable appendages for protection against atmospheric influences. Details of design and accessories shown in the illustrations, but not expressly named in the synopses of parts included in the price, are supplied to order only and priced separately.

In the **mechanical construction** of the telescopes special care has been taken to select material best adapted to meet the stresses and working conditions affecting these parts. Any desired departure from the standard design of our telescopes and the substitution of other than the usual materials are subject to special quotations.

In the **optical equipment** the type of the objective with which the various telescopes may be provided is indicated by one of the three letters E, A, B, which symbolise the three types as follows:

The **E-objectives are two-lens telescope combinations** made of silicate glasses and calculated on the Fraunhofer formula. Their relative aperture is 1:15.

The **A-objectives are two-lens apochromatic telescope combinations** made from glasses without secondary spectrum. Their relative aperture is 1:17.5.

The **B-objectives are three-lens apochromatic telescope combinations** made from glasses without secondary spectrum. Their relative aperture is 1:15.

Further particulars respecting the correction of the three types of objectives will be found on pages 104—107. Some hints on the choice of objectives and telescopes according to the visibility of astronomical objects are given in the tables on page 118.

The eyepieces supplied with the telescopes are:

Huygens or **Kellner Eyepieces** having focal lengths from 60 mm. (2⅜ in.) to 12.5 mm. (½ in.) inclusive for the lower magnifications,

Orthoscopic Eyepices of 9 to 5 mm. (⅜ to ³⁄₁₆ in.) focal lengths for the higher magnifications.

If required, the telescope can be provided with eyepieces of other focal lengths or of a different type than those stated.

In the case of each telescope the magnification, the field of view in angular measure, and the diameter of the exit pupil are given for each of the eyepieces included in the specification.

These numbers determine the resolving power, the field of view, and the light transmitting power which each eyepiece gives in conjunction with the telescope. Detailed information on the calculation and significance of these numbers will be found on page 108.

For eyepieces differing in focal length or type from those supplied with a telescope the figures may be taken from the tables of magnification, field of view and exit pupil on page 117.

The figures given in the catalogue relating to eyepiece magnifications should be regarded as approximate only, as the focal length of the objective, which partly determines these figures, varies within narrow limits according to the constants of the glass which happens to be available at any time for the production of an object glass. The actual magnifications obtaining in each individual telescope are engraved on the eyepiece caps. These figures deviate in general only by a few units from the corresponding figures in the catalogue.

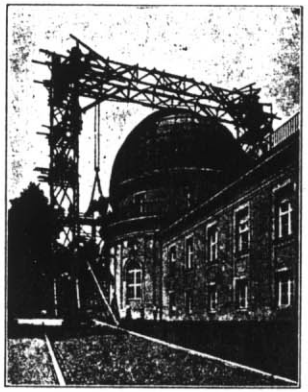
Respecting the choice of a telescope according to the nature of the proposed investigation see page 118

With each type of telescope a few accessories, expressly specified in each case, are included in the price of the telescope. That of a telescope without one or the other of these accessories can be ascertained by deducting the prices of the latter. At the end of the specification for the various types will be found a list of other accessories which can be used with the respective instruments and readily adapted to such as have been supplied on a previous occasion. When ordering accessories in the latter case it is sufficient to quote the factory number (i. e. the number on the drawtube) of the telescope.

For storing the telescopes a suitably fitted wooden box is supplied with the instrument in every case where this is stated. The eyepieces and accessories are accommodated in a separate polished wooden box or leather case, unless it is deemed more convenient in the use of the instruments (as in the case of small telescopes) to keep these parts in the telescope case. The stands of the smallest telescope models are included in the telescope box, whilst the other portable instruments are provided with a canvas case for the tripod head.

As far as it is necessary, the instruments are tested and adjusted by actual observations of celestial objects, both during construction and after completion, in spaces specially fitted for this purpose (Erecting Shop, pp. 6 and 23, Carl Zeiss Observatory, pp. 102 and 120). For the installation and manipulation of telescopes which have been supplied special instructions can be furnished on application.

Instruments of small size are delivered ready for use. The larger telescopes, which are necessarily forwarded in parts, may, if required, be erected by one of our fitters at the cost of the purchaser.

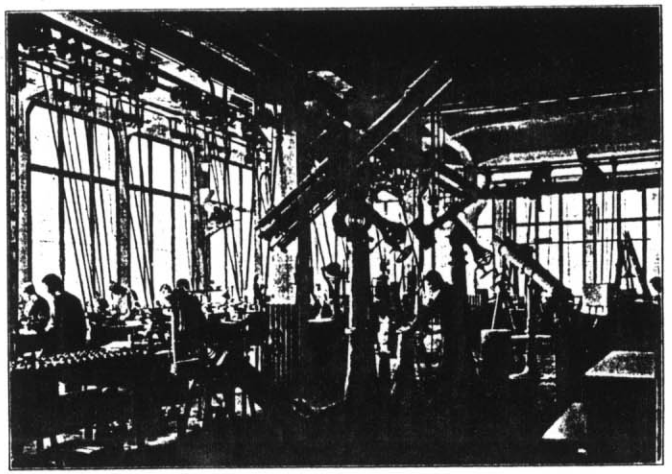


2324

Fig. 2

Observatory at Berlin-Babelsberg

Scaffolding for housing the 650-mm. (25½-in.) Refractor (pp. 6 and 124)



A 91

Fig. 3

Astronomical Instrument Shop

Telescopes in Altazimuth Mounts

with Objectives of 60 to 130 mm. (2⅜ to 5⅛ in.) aperture.

These instruments are primarily equipped for astronomical observations. The position of their motion axes renders them readily adaptable for terrestrial use, in which case the astronomical eyepieces are employed in conjunction with erecting prisms (Nos. 113—116), or, if preferred, the terrestrial eyepieces (Nos. 315—318). The Look-out Telescopes on Stands (page 22) are primarily designed for terrestrial observations.

The telescopes are all mounted on trunnions in fork bearings and are well balanced for motion in altitude. Small disturbances of the balance due to a change in the eyepiece fittings may be overcome by slightly clamping the bearings in the fork. Greater disturbances of the balance are corrected by a displacement of the running weight.

Respecting the choice of a telescope to suit the nature of the astronomical object see page 118

60 and 80-mm. (2⅜ and 3⅛-inch) Altazimuth Telescopes on Table Stands. Figs. 4 and 5

The prices of Nos. 1 to 6 include:

No.	
	1 Telescope objective of 60 or 80 mm. (2⅜ or 3⅛ in.) aperture respectively
281	1 Kellner eyepiece, f=40 mm. (1⅝ in.)
253	1 Huygens eyepiece, f = 18 mm. (¾ in.)
265	1 Orthoscopic eyepiece, f = 9 mm. (⅜ in.)
126	1 Sun glass
95, 96	1 Tube mounting with 1 Eyepiece draw-tube
247	1 Eyepiece sliding sleeve
	1 Counterpoise 19, Fig. 4
	1 Objective sun shade
	1 Case for all telescope parts
84, 85	1 Table stand, disjointing

Astro 30 No.	Description	To be quoted when ordering: Codeword	Identification No.
	60-mm. (2⅜-in.) Telescope with erecting prisms No. 113		
1	with E-objective No. 217, focal length 85 cm. (33½ in.) Magnification astro. and terr: × 21, × 47, × 94 Field of view: 2° 1′ 1° 1′ 28′ Exit pupil: 3.0 1.3 0.6 mm.	*Asalveado*	51 10 21
2	with A-objective No. 227, focal length 105 cm. (41⅜ in.) Magnification astro. and terr: × 26, × 58, × 117 Field of view: 1° 40′ 51′ 22′ Exit pupil: 2.4 1.1 0.5 mm.	*Asalveamos*	51 10 22
3	with B-objective No. 233, focal length 85 cm. (33½ in.) Magnification astro. and terr: × 21, × 47, × 94 Field of view: 2° 1′ 1° 1′ 28′ Exit pupil: 3.0 1.3 0.6 mm.	*Asalvear*	51 10 23
	80-mm. (3⅛-in.) Telescope with erecting prisms No. 114		
4	with E-objective No. 218, focal length 120 cm. (47¼ in.) Magnification astro. and terr: × 30, × 67, × 134 Field of view: 1° 23′ 46′ 20′ Exit pupil: 2.7 1.2 0.6 mm.	*Asalvearia*	51 13 21
5	with A-objective No. 228, focal length 141 cm. (55½ in.) Magnification astro. and terr: × 35, × 78, × 157 Field of view: 1° 13′ 37′ 16′ Exit pupil: 2.4 1.1 0.5 mm.	*Asalvearon*	51 13 22
6	with B-objective No. 234, focal length 120 cm. (47¼ in.) Magnification astro. and terr: × 30, × 67, × 134 Field of view: 1° 23′ 46′ 20′ Exit pupil: 2.7 1.2 0.6 mm.	*Asalveles*	51 13 23

Additional Accessories recommended for Nos. 1—6:

No.	
252	Huygens eyepiece f = 25 mm. (1 in.)
266	Orthoscopic eyepiece f=7 mm. (⅜ in.)
110	Double revolver for Nos. 1—6 or
111	Triple revolver for Nos. 4—6
122	Eyepiece prism
124	Zenith prism
135	Revolving colour disc
141	Herschel sun prism, or
138	Colzi polarizing solar prism
152	Ring micrometer
166	Eyepiece spectroscope
144	Solar projection screen
117	×8 Finder
121	Finder, monocular field-glass type
62, 63	Changing device

For particulars of dimensions and weights see page 128 — **Price List at end of catalogue**

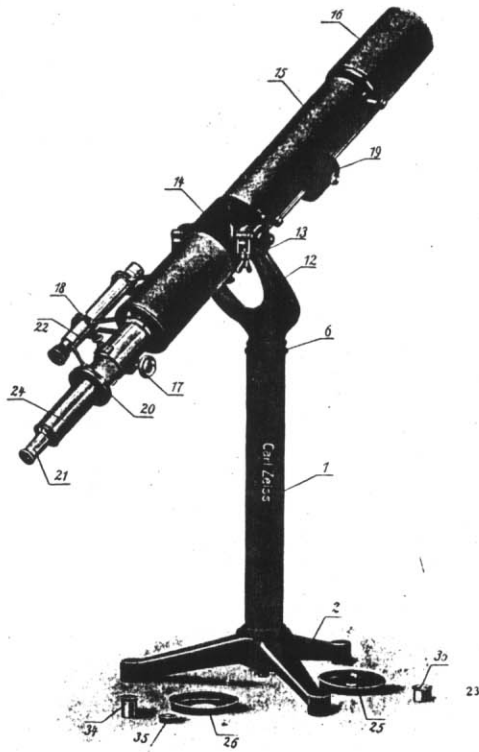


Fig. 4

Figs. 4 and 5

1 Pillar
2 Tripod, Claw
6 Azimuth motion
12 Telescope fork
13 Trunnion cap
14 Telescope trunnion sleeve
15 Telescope
16 Dew cap
17 Eyepiece draw-tube with rack and pinion
18 Clamp for eyepiece draw-tube
19 Counterpoise
20 Changing device
21 Eyepiece sliding sleeve
22 Finder with brackets
23 Triple revolver
24 Balancing and extension tube
25 Lens cap
26 Objective sun shade
27 Fitted case
34 Astro-eyepieces
35 Sun glasses
36 Lens cap for finder

Fig. 4
60 and 80-mm. (2⅜ and 3⅛-in.)
Altazimuth Telescopes
on table stands
Nos. 1—6

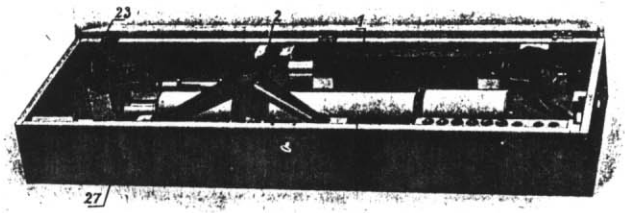


Fig. 5

60 and 80-mm. (2⅜ and 3⅛-inch) **Altazimuth Telescopes** on table claw stands
Nos. 1—6

All parts of the telescope and stand are accommodated in one case

60-mm. (2 3/8-inch) Travelling Telescopes

Figs. 6—8

In the prices of Nos. 7—12 are included:

No.	
	1 Telescope objective of 60 mm. (2 3/8 in.) aperture
281	1 Kellner eyepiece f = 40 mm. (1 7/8 in.)
253	1 Huygens eyepiece f = 18 mm. (1 1/8 in.)
265	1 Orthoscopic eyepiece f = 9 mm. (1/2 in.)
126	1 Sun glass
113	1 Set of erecting prisms

No.	
95, 96, 103, 104	1 Tube mounting with 1 Eyepiece draw-tube
247	1 Eyepiece sliding sleeve 1 Objective sun shade 1 Case accommodating all parts of telescope and tripod
86, 87,	1 Two-fold sliding wooden tripod 1 Extension rod for the tripod

Astro 30 No.	Description	To be quoted when ordering: Codeword	Identification No.
	60-mm. (2 3/8-in.) Travelling Telescope *with* slow motions in azimuth and altitude. Figs. 6 and 7		
7	with E-objective No. 217, focal length 85 cm. (33 1/2 in.) Magnification astro. and terr: × 21, × 47, × 94 Field of view: 2° 1′ 1° 1′ 28′ Exit pupil: 3.0 1.3 0.6 mm.	*Asedabais*	51 10 71
8	with A-objective No. 227, focal length 105 cm. (41 3/8 in.) Magnification astro. and terr: × 26, × 58, × 117 Field of view: 1° 40′ 51′ 22′ Exit pupil: 2.4 1.1 0.5 mm.	*Asalven*	51 10 72
9	with B-objective No. 233, focal length 85 cm. (33 1/2 in.) Magnification astro. and terr: × 21, × 47, × 94 Field of view: 2° 1′ 1° 1′ 28′ Exit pupil: 3.0 1.3 0.6 mm.	*Asalvenlo*	51 10 73
	60-mm. (2 3/8-in.) Travelling Telescope *without* slow motions in azimuth and altitude. Fig. 8		
10	with E-objective No. 217, focal length 85 cm. (33 1/2 in.) Magnification astro. and terr: × 21, × 47, × 94 Field of view: 2° 1′ 1° 1′ 28′ Exit pupil: 3.0 1.3 0.6 mm.	*Asedadme*	51 10 41
11	with A-objective No. 227, focal length 105 cm. (41 3/8 in.) Magnification astro. and terr: × 26, × 58, × 117 Field of view: 1° 40′ 51′ 22′ Exit pupil: 2.4 1.1 0.5 mm.	*Asalvenme*	51 10 42
12	with B-objective No. 233, focal length 85 cm. (33 1/2 in.) Magnification astro. and terr: × 21, × 47, × 94 Field of view: 2° 1′ 1° 1′ 28′ Exit pupil: 3.0 1.3 0.6 mm.	*Asalveo*	51 10 43

Additional Accessories recommended for Nos. 7—12:

No.	
252	Huygens eyepiece, f = 25 mm. (1 in.)
266	Orthoscopic eyepiece, f = 7 mm. (3/8 in.)
110	Double revolver
122	Eyepiece prism
124	Zenith prism
135	Revolving colour disc
141	Herschel sun prism, or
138	Colzi polarizing solar prism
152	Ring micrometer
166	Eyepiece spectroscope
144	Solar projection screen
125	Binocular eyepiece
121	Finder, monocular field-glass type
61, 63	Changing device

Catalogue of Travelling Telescopes, "Astro 28", on application

For particulars of dimensions and weights see page 128 — **Price List at end of catalogue**

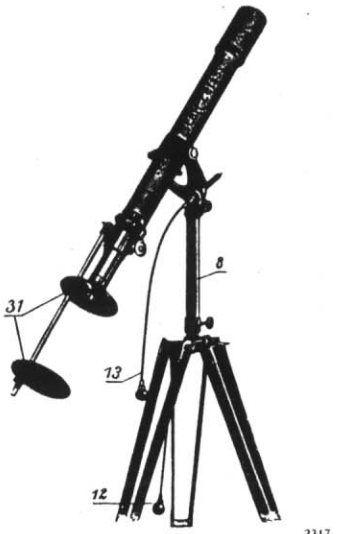


Fig. 6
60-mm. (2 3/8-in.) Travelling Telescope
Nos. 7—9



Fig. 8
60-mm. (2 3/8-in.) Travelling Telescope
Nos. 10—12

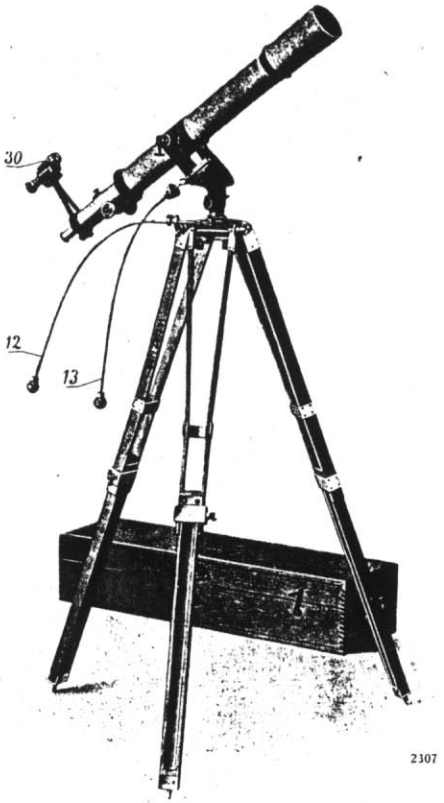


Fig. 7
60-mm. (2 3/8-in.) Travelling Telescope
Nos. 7—9

Figs. 6—8

8 Extension rod for the tripod
12 Slow motion in azimuth
13 Slow motion in altitude
30 Finder, monocular field-glass type, No. 121
31 Solar projection screen, No. 144

80-mm. (3⅛-inch) Altazimuth Telescopes on Floor Stands

Fig. 9

The prices of Nos. 13—18 include:

No.	
	1 Telescope objective of 80 mm. (3⅛ in.) aperture
281	1 Kellner eyepiece, f = 40 mm. (1 9/16 in.)
253, 254	2 Huygens eyepieces, f = 18, 12.5 mm. (¾, ½ in.)
266	1 Orthoscopic eyepiece, f = 7 mm. (9/32 in.)
126	1 Sun glass
127	1 Moon glass
-114	1 Set of erecting prisms
97, 98	1 Tube mounting with 1 Eyepiece draw-tube
247	1 Eyepiece sliding sleeve
	1 Sun shade
	1 Counterpoise
	1 Case for the telescope parts
88, 91	1 Elevating device for the tripod
	1 Protecting cover for tripod head

Astro 30 No.	Description	To be quoted when ordering: Codeword	Identification No.
	80-mm. (3⅛-in.) Altazimuth Telescope with *rigid* pyramid stand No. 88, Fig. 10, with foot screws and casters		
13	with E-objective No. 218, focal length 120 cm. (47¼ in.) Magnification astro. and terr: × 30, × 67, × 96, × 171 Field of view: 1° 23′ 46′ 31′ 15′ Exit pupil: 2.7 1.2 0.8 0.5 mm.	*Asalvera*	51 13 61
14	with A-objective No. 228, focal length 141 cm. (55⅝ in.) Magnification astro. and terr: × 35, × 78, × 113, × 201 Field of view: 1° 13′ 37′ 27′ 12′ Exit pupil: 2.4 1.1 0.7 0.4 mm.	*Asamara*	51 13 62
15	with B-objective No. 234, focal length 120 cm. (47¼ in.) Magnification astro. and terr: × 30, × 67, × 96, × 171 Field of view: 1° 23′ 46′ 31′ 15′ Exit pupil: 2.7 1.2 0.8 0.5 mm.	*Asamiento*	51 13 63
	80-mm. (3⅛-in.) Altazimuth Telescope with *folding* field tripod No. 91, Fig. 9, of steel tubes with fixing stays		
16	with E-objective No. 218, focal length 120 cm. (47¼ in.) Magnification astro. and terr: × 30, × 67, × 96, × 171 Field of view: 1° 23′ 46′ 31′ 15′ Exit pupil: 2.7 1.2 0.8 0.5 mm.	*Asana*	51 13 41
17	with A-objective No. 228, focal length 141 cm. (55⅝ in.) Magnification astro. and terr: × 35, × 78, × 113, × 201 Field of view: 1° 13′ 37′ 27′ 12′ Exit pupil: 2.4 1.1 0.7 0.4 mm.	*Asanara*	51 13 42
18	with B-objective No. 234, focal length 120 cm. (47¼ in.) Magnification astro. and terr: × 30, × 67, × 96, × 171 Field of view: 1° 23′ 46′ 31′ 15′ Exit pupil: 2.7 1.2 0.8 0.5 mm.	*Asanarse*	51 13 43

Additional Accessories recommended for Nos. 13—18:

No.	
252	Huygens eyepiece, f = 25 mm. (1 in.)
265	Orthoscopic eyepiece, f = 9 mm. (⅜ in.)
125	Binocular eyepiece
110	Double revolver, or
111	Triple revolver
122	Eyepiece prism
124	Zenith prism
130—133	Coloured glasses, or
135	Revolving colour disc
141	Herschel solar prism, or
138	Colzi polarizing solar prism
144	Solar projection screen
117	× 8 Finder, or
121	Finder, monocular field-glass type
62, 63	Changing device
166	Eyepiece spectroscope
152	Ring micrometer
68	Slow motions in azimuth and altitude
434	Observation ladder

For particulars of dimensions and weights see page 128 — **Price List at end of catalogue**

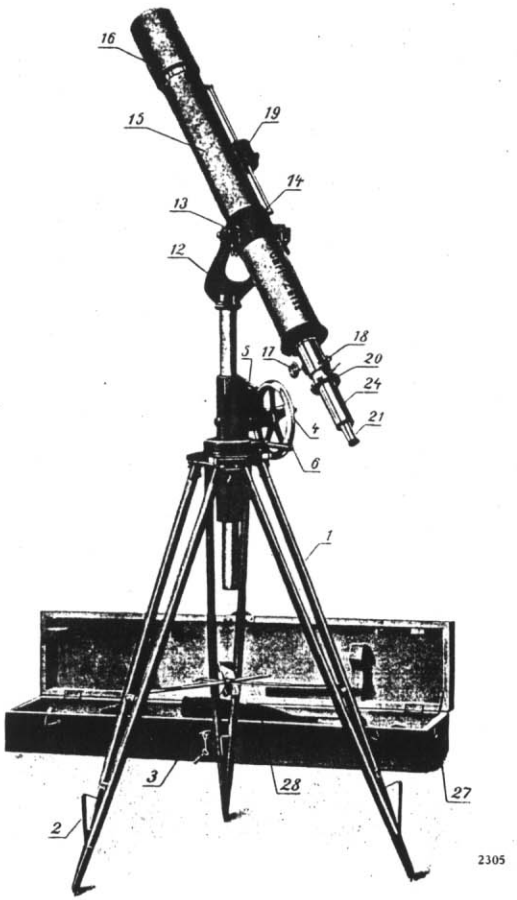


Fig. 9

80-mm. (3⅛-inch) Altazimuth Telescopes

Nos. 13—18

1 Field tripod
2 Tread
3 Stays with clamping screw
4 Elevating gear with rack and pinion
5 Clamp for elevating gear
6 Clamp for azimuth motion
12 Telescope fork
13 Trunnion cap
14 Trunnion sleeve
15 Telescope
16 Dew cap
17 Eyepiece draw-tube with rack and pinion
18 Clamp for eyepiece draw-tube
19 Counterpoise
20 Changing device
21 Eyepiece sliding sleeve
24 Balancing and extension tube
27 Case for all telescope parts
28 Cover for elevating gear and telescope fork

110-mm. (4¼-inch) Altazimuth Telescopes on Floor Stands

Figs. 9 and 10

The prices of Nos. 19—24 include:

No.	
	1 Telescope objective of 110 mm. (4¼ in.) aperture
280	1 Kellner eyepiece, f=50 mm. (2 in.)
252, 254	2 Huygens eyepieces, f=25, 12.5 mm. (1, ½ in.)
265, 267	2 Orthoscopic eyepieces, f=9.6 mm. (⅜ in.)
126	1 Sun glass
127	1 Moon glass
114	1 Set of erecting prisms
99, 100	1 Tube mounting with 1 Eyepiece draw-tube
62, 63	1 Changing device
247	1 Eyepiece sliding sleeve
111	1 Triple revolver
118	1 × 10 Finder
	1 Sun schade
	1 Counterpoise
	1 Fitted case for telescope
	1 Small polished wooden box for above eyepieces and accessories
89, 92	1 Elevating gear for stand
	1 Cover for stand head

Astro 30 No.	Description	To be quoted when ordering: Codeword	Identification No.
	110-mm. (4¼-inch **Altazimuth Telescope** with *rigid* pyramid stand No. 89, Fig. 10, with casters and levelling screws		
19	with E-objective No. 219, focal length 165 cm. (65 in.) Magnification astro. and terr: ×33, ×66, ×132, ×184, ×275 Field of view: 1° 20′ 45′ 23′ 14′ 10′ Exit pupil: 3.4 1.7 0.9 0.6 0.4 mm.	*Asand*	51 16 41
20	with A-objective No. 229, focal length 204 cm. (80½ in.) Magnification astro. and terr: ×41, ×82, ×164, ×226, ×340 Field of view: 1° 2′ 35′ 17′ 11′ 7′,9 Exit pupil: 2.8 1.4 0.6 0.5 0.4 mm.	*Asander*	51 16 42
21	with B-objective No. 235, focal length 165 cm. (65 in.) Magnification astro. and terr: ×33, ×66, ×132, ×184, ×275 Field of view: 1° 20′ 45′ 23′ 14′ 10′ Exit pupil: 3.4 1.7 0.9 0.6 0.4 mm.	*Asaneis*	51 16 43
	110-mm. (4¼-inch) **Altazimuth Telescope** with *folding* field tripod No. 92, Fig. 9, made of steel tubing with adjustable stays		
22	with E-objective No. 219, focal length 165 cm. (65 in.) Magnification astro. and terr: ×33, ×66, ×132, ×184, ×275 Field of view: 1° 20′ 45′ 23′ 14′ 10′ Exit pupil: 3.4 1.7 0.9 0.6 0.4 mm.	*Asanemos*	51 16 21
23	with A-objective No. 229, focal length 204 cm. (80½ in.) Magnification astro. and terr: ×41, ×82, ×164, ×226, ×340 Field of view: 1° 2′ 35′ 17′ 11′ 7′,9 Exit pupil: 2.8 1.4 0.6 0.5 0.4 mm.	*Asangue*	51 16 22
24	with B-objective No. 235, focal length 165 cm. (65 in.) Magnification astro. and terr: ×33, ×66, ×132, ×184, ×275 Field of view: 1° 20′ 45′ 23′ 14′ 10′ Exit pupil: 3.4 1.7 0.9 0.6 0.4 mm.	*Asantam*	51 16 23

Additional Accessories recommended for Nos. 19—24:

No.	
281	Kellner eyepiece, f=40 mm. (1 9/16 in.)
253	Huygens eyepiece, f=18 mm. (¾ in.)
266	Orthoscopic eyepiece, f=7 mm. (3/9 in.)
125	Binocular eyepiece
122	Eyepiece prism
124	Zenith prism
141	Herschel sun prism, or
138, 139	Colzi polarizing solar prism
130—133	Set of Coloured glasses
135	Revolving colour disc
145	Solar projection screen
166	Eyepiece spectroscope
152	Ring micrometer
69	Slow motions in azimuth and altitude
434	Observation ladder

For particulars of dimensions and weights see page 128 — **Price List at end of catalogue**

Fig. 10

1 Pyramid stand
2 Footscrew with lock nut
3 Caster
4 Elevating gear with rack and pinion motion
5 Clamp for elevating gear
7 Horizontal slow motion by wormwheel with disengaging worm for coarse motion in azimuth
8 Altitude slow motion by wormwheel with disengaging worm for coarse motion in altitude
9 Clamping screw for slow motion in altitude
10 Flexible shaft for actuating slow motion in azimuth
11 Flexible shaft for actuating slow motion in altitude
12 Telescope fork
13 Trunnion clip
14 Telescope sleeve
15 Telescope
16 Dew cap
17 Eyepiece draw-tube with rack and pinion motion
18 Clamp for eyepiece draw-tube
19 Counterpoise
20 Changing device
22 Finder
23 Triple revolver
25 Lens cap
26 Sun shade for objective
27 Fitted case for all telescope parts
28 Cover case for elevating gear and telescope fork
29 Directions for keeping telescope in good order
32 Zenith prism
33 Herschel sun prism
34 Astro-eyepieces
35 Sun and moon glasses
36 Lens cap for finder

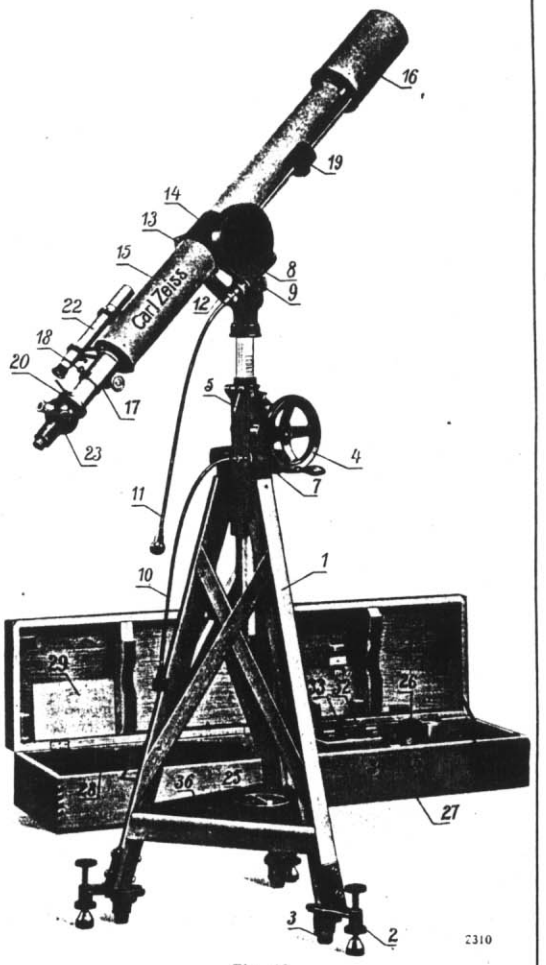


Fig. 10

110-mm. (4¼-inch) Altazimuth Telescope
Nos. 19—24

130-mm. (5⅛-inch) Altazimuth Telescopes on Tripod Stands

Figs. 10 and 11

The prices of Nos. 25—30 include:

No.	
	1 Telescope objective of 130 mm. (5⅛ in.) aperture
280	1 Kellner eyepiece, f = 50 mm. (2 in.)
252, 254	2 Huygens eyepiece, f = 25, 12.5 mm. (1, ½ in.)
265, 266, 268	3 Orthoscopic eyepiece, f = 9, 7, 5 mm. ($\frac{1}{3}\frac{1}{2}$, $\frac{9}{32}$, $\frac{5}{16}$ in.)
126	1 Sun glass
127	1 Moon glass
131	1 Yellow glass
115	1 Erecting prisms
101, 102	1 Tube mounting with
	1 Eyepiece draw tube
62, 63	1 Changing device
247	1 Eyepiece sliding sleeve
111	1 Triple revolver
118	1 ×10 Finder
	1 Sun shade
	1 Counterpoise
	1 Case for telescope
90, 93	1 Elevating gear for tripod
	1 Small polished box for above eyepieces and accessories
	1 Cover for tripod head

Astro 30 No.	Description	To be quoted when ordering: Codeword	Identification No.
	130-mm. (5⅛-in.) **Altazimuth Telescope** with rigid pyramid tripod No. 90, Fig. 10, with casters and levelling screws		
25	with E-objective No. 220, focal length 195 cm. (77 in.) Magnification astro. and terr: ×39, ×78, ×156, ×216, ×279, ×390 Field of view: 1°5′ 37′ 18′ 11′ 10′ 6′.5 Exit pupil: 3.3 1.7 0.8 0.6 0.5 0.3 mm.	*Asantes*	51 20 41
26	with A-objective No. 230, focal length 233 cm. (92 in.) Magnification astro. and terr: ×47, ×93, ×186, ×259, ×333, ×466 Field of view: 54′ 32′ 15′ 11′ 10′ 5′.6 Exit pupil: 2.8 1.4 0.7 0.5 0.4 0.3 mm.	*Asaph*	51 20 42
27	with B-objective No. 236, focal length 195 cm. (77 in.) Magnification astro. and terr: ×39, ×78, ×156, ×216, ×279, ×390 Field of view: 1°5′ 37′ 18′ 11′ 10′ 6′.5 Exit pupil: 3.3 1.7 0.8 0.6 0.5 0.3 mm.	*Asaphes*	51 20 43
	130-mm. (5⅛-in.) **Altazimuth Telescope** with folding field tripod No. 93, Fig. 11, made of steel tubing with adjustable stays		
28	with E-objective No. 220, focal length 195 cm. (77 in.) Magnification astro. and terr: ×39, ×78, ×156, ×216, ×279, ×390 Field of view: 1°5′ 37′ 18′ 11′ 10′ 6′.5 Exit pupil: 3.3 1.7 0.8 0.6 0.5 0.3 mm.	*Asaphia*	51 20 21
29	with A-objective No. 230, focal length 233 cm. (92 in.) Magnification astro. and terr: ×47, ×93, ×186, ×259, ×333, ×466 Field of view: 54′ 32′ 15′ 11′ 10′ 5′.6 Exit pupil: 2.8 1.4 0.7 0.5 0.4 0.3 mm.	*Asaphus*	51 20 22
30	with B-objective No. 236, focal length 195 cm. (77 in.) Magnification astro. and terr: ×30, ×78, ×156, ×216, ×279, ×390 Field of view: 1°5′ 37′ 18′ 11′ 10′ 6′.5 Exit pupil: 3.3 1.7 0.8 0.6 0.5 0.3 mm.	*Asarabacca*	51 20 23

Additional Accessories recommended for Nos. 25—30:

No.	
281	Kellner eyepiece, f = 40 mm. (1$\frac{9}{16}$ in.)
253	Huygens eyepiece, f = 18 mm. ($\frac{11}{16}$ in.)
125	Binocular eyepiece
122	Eyepiece prism
124	Zenith prism
141*	Herschel sun prism or
138, 139	Colzi polarizing solar prism
130—133	Set of coloured glasses
135	Revolving colour disc
145	Solar projection screen
166	Eyepiece spectroscope
152	Ring micrometer
70	Slow motion
434	Observatory ladder

For particulars of dimensions and weights see page 124 — **Price List at end of catalogue**

Fig. 11

1 Field tripod
2 Tread
3 Stays with clamping screw
4 Rack and tooth elevating gear
5 Clamp for elevating gear
6 Clamp for rotation in azimuth
12 Telescope fork
13 Trunnion clip
14 Telescope trunnion sleeve
15 Telescope
16 Dew cap
17 Eyepiece draw-tube with rack and pinion motion
18 Clamp for eyepiece draw-tube
19 Counterpoise
20 Changing device
22 Finder
23 Triple revolver
25 Lens cap
26 Objective sun shade
27 Fitted case for telescope
28 Cover for elevating gear and telescope fork
29 Directions for keeping telescope in good order
30 Small polished wood box for eyepieces and accessories
31 Small polished wood box for telescope objective
34 Astro-eyepieces
35 Dark glasses
37 Erecting prisms

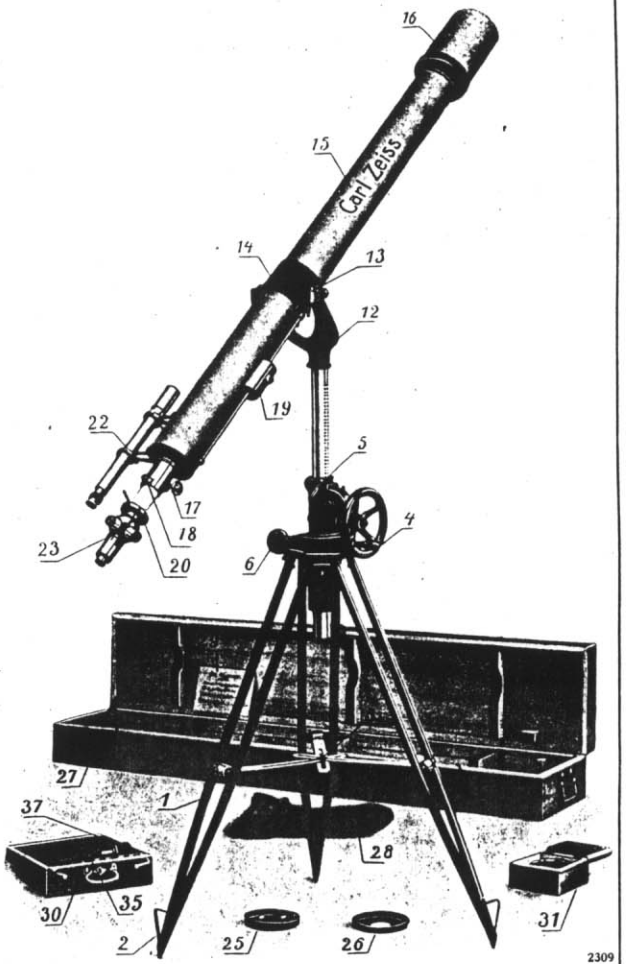
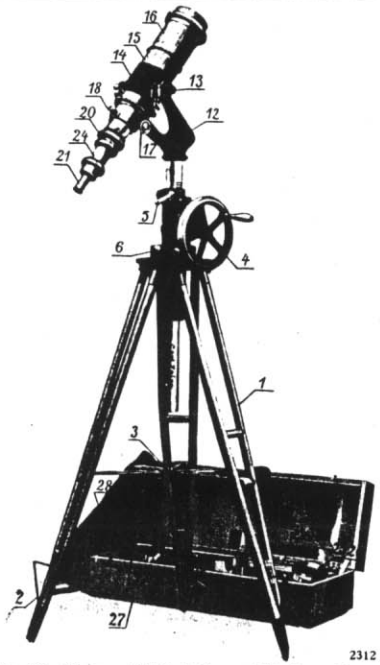


Fig. 11

130-mm. (52⅛-inch) Altazimuth Telescope

Nos. 25—30



2312

Fig. 12. 80-mm. (3⅛-in.) Comet Finder. No. 32

80-mm. (3⅛-inch) Comet Finder

An altazimuth telescope of great light gathering power and short focal length for astronomical and terrestrial use

Fig. 12

1 Field tripod
2 Tread
3 Stays with clamping screw
4 Rack and tooth elevating gear
5 Clamp for elevating gear
6 Clamp for horizontal rotation
12 Telescope fork
13 Trunnion clip
14 Telescope trunnion sleeve
15 Telescope
16 Dew cap, to unscrew
17 Eyepiece draw-tube with rack and pinion motion
18 Clamp for eyepiece draw-tube
20 Changing device
21 Eyepiece sliding sleeve
23 Triple revolver
24 Balancing and extension tube
25 Lens cap
26 Objective sun shade
27 Fitted case for all telescope parts
28 Cover for elevating gear and telescope fork
34 Astro-eyepiece
35 Sun glass
37 Erecting prisms

The prices for Nos. 31 and 32 include:

No.	
243	1 C-objective, 80 mm. (3⅛ in.) aperture, 49 cm. (19¼ in.) focal length
281	1 Kellner eyepiece, f = 40 mm. (1 9/16 in.)
252, 253, 254	3 Huygens eyepieces, f = 25, 18, 12.5 mm. (1, ¾, ½ in.)
126	1 Sun glass
114	1 Erecting prisms
111	1 Triple revolver
247	1 Eyepiece sliding sleeve
62, 63	1 Changing device
	1 Tube mounting with eyepiece draw-tube and sun shade
	1 Balancing and extension tube
	1 Fitted case for the telescope parts
	1 Cover for tripod head and telescope fork
90a, 94	1 Elevating gear for tripod

Astro 30 No.	Description	To be quoted when ordering: Codeword	Identification No.
31	**80-mm. (3⅛-in.) Comet Finder,** Fig. 12, with pyramid tripod No. 90a, Fig. 10, with foot screws and casters Magnification, astro. and terr: ×12, ×20, ×27, ×39 Field of view: 3°45′ 2°23′ 1°49′ 1°13′ Exit pupil: 7.5 4.0 3.0 2.1 mm.	*Asaraban*	51 13 64
32	**80-mm. (3⅛-in.) Comet Finder,** Fig. 12, with field tripod No. 94, folding, made of steel tubing, with adjustable stays Magnification, astro. and terr: ×12, ×20, ×27, ×39 Field of view: 3°45′ 2°23′ 1°49′ 1°13′ Exit pupil: 7.5 4.0 3.0 2.1 mm.	*Asaraca*	51 13 44

For particulars of dimensions and weights see page 124 — **Price List at end of catalogue**

200-mm (8-inch) Comet Finder

An equatorial telescope of great light gathering power and short focal length for astronomical use

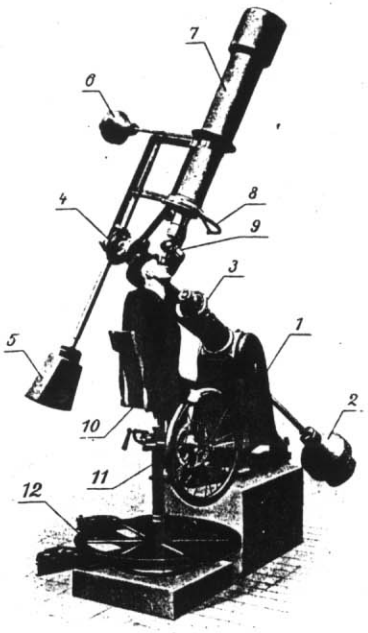
Fig. 14

1 Telescope base with azimuth and altitude correction
2 Counterpoise of telescope parts with respect to telescope base
3 Polar axis with divided circle
4 Declination axis with divided circle
5 Counterpoise of telescope with respect to declination axis
6 Counterpoise of telescope with respect to polar axis
7 Telescope
8 Handle for displacing telescope
9 Eyepiece draw-tube and triple revolver
10 Revolving seat, adjustable in height
11 Handwheel for rotating dome from seat
12 Transmission of rotatory motion from handwheel to dome ring by means of rollers and wire rope



2325

Fig. 13. 200 mm. (8-inch) Comet Finder in wooden dome
The wooden dome No. 35, shown without sheathing



2319

Fig. 14
200-mm. (8-inch) Comet Finder, Nos. 33 and 34

Astro 30 No.	Description	To be quoted when ordering: Codeword	Identification No.
33	**200 mm. (8-inch) Comet Finder,** Fig. 14 The equatorial mounting being so arranged that the eyepiece is situated at the point of intersection of the polar and declination axes, the observer is enabled to always make his observations from a fixed position. The instrument is fitted with a D-Objective No. 246 of 200 mm. (8-in.) aperture and 133 cm. (52½ in.) focal length; a Kellner eyepiece, f = 30 mm. (1 3/16 in.), No. 282, three Huygens eyepieces, f = 50, 18, 12.5 mm. (2, ¾, 1 in.), Nos. 250a, 253, 254; two orthoscopic eyepieces, f = 7 and 5 mm. (9/32 and 3/16 in.), Nos. 266, 268; a triple revolver No. 111. Magnification, Astro: ×27, ×44, ×74, ×106, ×190, ×265 Field of view: 1°49′ 58′ 39′ 28′ 13′ 10′ Exit pupil: 7.7 4.6 2.7 1.9 1.1 0.8 mm.	*Asareel*	51 37 20
34	**Observation Chair,** Fig. 14, with revolving, adjustable seat and handwheel with running gear for dome	*Asarero*	51 98 51
35	**Wooden Dome of 3.3 m. (11 ft.) internal diameter** (page 116) with live ring, venetian shutter, and drive actuated from the observation chair.	*Asaret*	51 96 11

For particulars of dimensions and weights see page 126 — **Price List at end of catalogue**

Monocular and Binocular High-power Look-out Telescopes

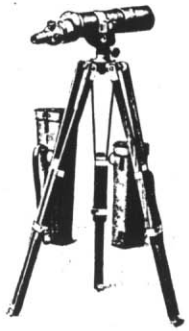


Fig. 15
80-mm. Monocular Look-out Telescopes
Magn.: ×12, ×20, ×40
Ident. Nos. 51 14 24 Codeword: *Asacanda*

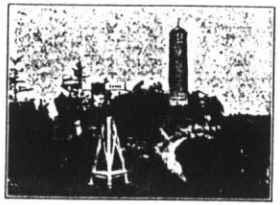


Fig. 16. Fox Tower near Jena
110-mm. Automatic Telescope
Magn.: ×33, ×52, ×72
Ident. Nos. 51 17 61 Codeword: *Asacar*



Fig. 17
80-mm. Binocular Look-out Telescope
Magn.: ×12, ×20, ×40
Ident. Nos. 51 14 79 Codeword: *Asaltanli*



Fig. 18 Inselsberg in Thuringia
130-mm. Automatic Telescope
Magn.: ×35, ×58, ×116
Ident. Nos. 51 21 51 Codeword: *Asalirco*



Fig. 19. Riffelalp above Zermatt
130-mm. Mon. Look-out Telescope
Magn.: ×35, ×58, ×116
Ident. Nos. 51 21 31 Codeword: *Asaliter*

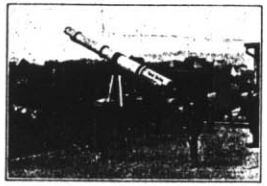


Fig. 20
240-mm. Look-out Telescope
Magn.: ×60, ×90, ×144
Ident. Nos. 51 23 61 Codeword: *Asalak*



Fig. 21
110-mm. Mon. Look-out Telescope
Magn.: ×33, ×52, ×72
Ident. Nos. 51 17 31 Codeword: *Asalumen*



Fig. 22
130-mm. Bin. Look-out Telescope
Magn.: ×35, ×58, ×116
Ident. Nos. 51 22 31 Codeword: *Asal*



Fig. 23
110-mm. Bin. Look-out Telescope
Magn.: ×33, ×52, ×72
Ident. Nos. 51 18 31 Codeword: *Asaltur*

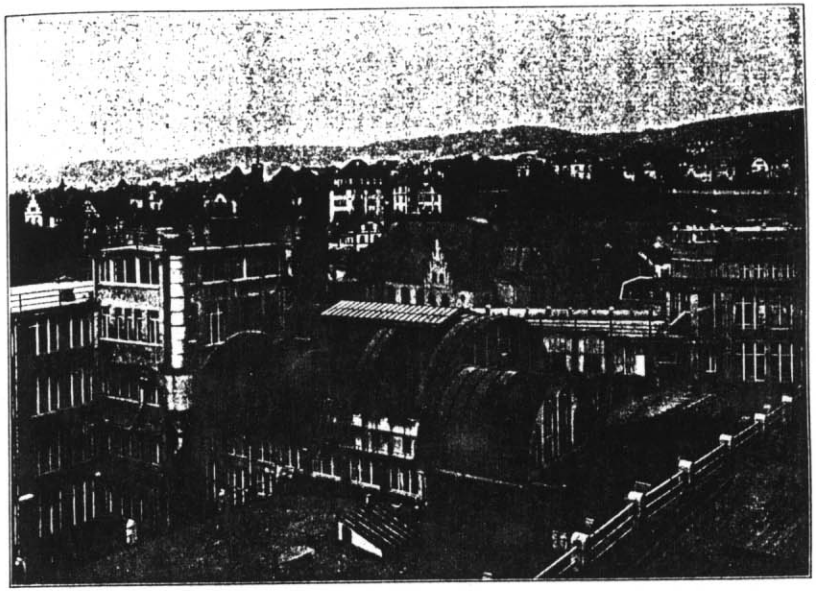


Fig. 24 2306

Erecting-Shop for Astronomical Instruments

The arched roof of the erecting shop is of the sliding type for testing instruments upon astronomical objects. At the rear of the erecting shop will be seen the arched roof of the dome erecting shop. (Page 115, Fig. 159)

Equatorially Mounted Telescopes

of 80—200 mm. (3¼—8 in.) aperture

Equatorial mountings, being intended exclusively for astronomical observations, vary very considerably in their elaboration and mechanical equipment according to the size of the objective and the scope of the investigations to which it lends itself. To meet these different requirements the instruments are variously equipped with the requisite auxiliary aids to observation, such as divided circles, slow motions and clock drive, or with such accessory apparatus as may be required for astrophysical (including astrophotographic) investigations, such as electric slow motion gears, seconds control for the driving clock.

The instruments are available for installation in latitudes ranging from $\varphi = 0°$ to $+ 70°$ (Polar adjustment). Where telescopes are intended for use in the southern hemisphere this should be expressly stated in the order in all cases when driving clocks and R. A. and declination circles are required or where it is proposed to add them subsequently. Also, when ordering, the latitude of the place of observation should be stated, so that the necessary adjustment for the required latitude may be carried out at the works.

Prices of equatorially mounted telescopes with objective apertures over 200 mm. (8 in.), as well as refractors of special mechanical construction and with special equipment for astro-photographic purposes will be quoted on demand.

Respecting the choice of telescopes to suit the nature of the proposed investigation see page 114

80-mm. (3⅛-inch) Equatorial Telescopes. Figs. 25 and 26.

Items included in the prices of Nos. 36—41:

The numbers in brackets refer to the items on the accompanying figures.

No.

1 Telescope objective of 80 mm. (3⅛ in.) aperture
251, 253, 254 3 Huygens eyepieces, f = 40, 18, 12.5 mm. (1 9/16, 11/16, ½ in.)
266 1 Orthoscopic eyepiece, f = 7 mm. (9/32 in.)
126 1 Sun glass
127 1 Moon glass
1 Tube mounting (31) with
1 Eyepiece draw-tube (36)
247 1 Eyepiece sliding sleeve
1 Objective sun shade (49), fig. 26
1 Counterpoise in declination (35)
1 Equatorial head without R. A. and declination circles
1 Slow motion in R. A. by flexible shaft (14)
1 Clamp in declination with key (15) actuated from the eye end
1 Polished wood box (50) for above eyepieces and accessory apparatus
1 Travelling case for the telescope (31) with cradle (29)

Astro 30 No.	Description	To be quoted when ordering: Codeword	Identification No.
	80-mm. (3⅛-in.) Equatorial Telescope with rigid pyramid tripod (2), Fig. 26, with foot screws and casters		
36	with E-objective No. 218, focal length 120 cm. (47¼ in.) Magnification Astro: × 30, × 67, × 96, × 171 Field of view: 1°35′ 46′ 31′ 15′ Exit pupil: 2.7 1.2 0.8 0.5 mm.	*Asargadas*	51 28 31
37	with A-objective No. 228, focal length 141 cm. (55⅝ in.) Magnification Astro: × 35, × 78, × 113, × 201 Field of view: 1°22′ 37′ 27′ 12′ Exit pupil: 2.4 1.1 0.7 0.4 mm.	*Asari*	51 28 32
38	with B-objective No. 234, focal length 120 cm. (47¼ in.) Magnification Astro: × 30, × 67, × 96, × 171 Field of view: 1°35′ 46′ 31′ 15′ Exit pupil: 2.7 1.2 0.8 0.5 mm.	*Asariamos*	51 28 33
	80 mm. (3⅛-in.) Equatorial Telescope with folding field tripod (3), Fig. 25, made of steel tubing with adjustable stays		
39	with E-objective No. 218, focal length 120 cm. (47¼ in.) Magnification Astro: × 30, × 67, × 96, × 171 Field of view: 1°35′ 46′ 31′ 15′ Exit pupil: 2.7 1.2 0.8 0.5 mm.	*Asarina*	51 28 35
40	with A-objective No. 228, focal length 141 cm. (55⅝ in.) Magnification Astro: × 35, × 78, × 113, × 201 Field of view: 1°22′ 37′ 27′ 12′ Exit pupil: 2.4 1.1 0.7 0.4 mm.	*Asarinos*	51 28 36
41	with B-objective No. 234, focal length 120 cm. (47¼ in.) Magnification Astro: × 30. × 67, × 96, × 171 Field of view: 1°35′ 46′ 31′ 15′ Exit pupil: 2.7 1.2 0.8 0.5 mm.	*Asarium*	51 28 37

Additional Accessories recommended for Nos. 36—41:

No.

252 Huygens eyepiece, f = 25 mm. (1 in.)
265 Orthoscopic eyepiece, f = 9 mm. (1 1/32 in.)
125 Binocular eyepiece
110 Double revolver or
111 Triple revolver
122 Eyepiece prism
124 Zenith prism
130, 133 Coloured glasses or
135 Revolving colour disc
141 Herschel sun prism or
138 Colzi polarizing solar prism
144 Solar projection screen
117 × 8 Finder
62, 63 Changing device
166 Eyepiece spectroscope
152 Ring micrometer
153 Eyepiece screw micrometer
167 Abbe Spectroscopic eyepiece
106 Abbe Dark ground illumination
71 Hour circle (12) with vernier, and declination circle (17) with vernier
76 Spring-driven clock (21)
434 Observation ladder

For particulars of dimensions and weights see page 126 — **Price List at end of catalogue**

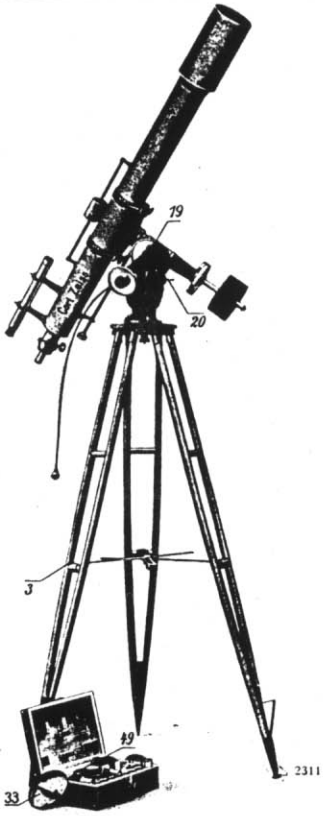


Fig. 25

80-mm. (3⅛-in.) Equatorial Telescope on field tripod stand Nos. 39—41

2 Pyramid tripod stand
3 Field tripod with adjustable stays
4 Foot screws with casters
5 Clamping screw for adjustment in azimuth
7 Tripod head with adjustment in latitude (1°—70°)
9 Polar axis
10 Declination axis
12 Hour circle divided in 10 min., reading to 1 min. by two verniers
13 Clamp in R. A.
14 Slow motion in R. A. by means of flexible shaft
15 Clamp in declination by means of key actuated from eye end
17 Declination circle divided in degrees and reading to 5 min. by two verniers
19 Clock circle
20 Helical drive to clock circle (19)
21 Spring-driven clock, No. 76, for motion in R. A.

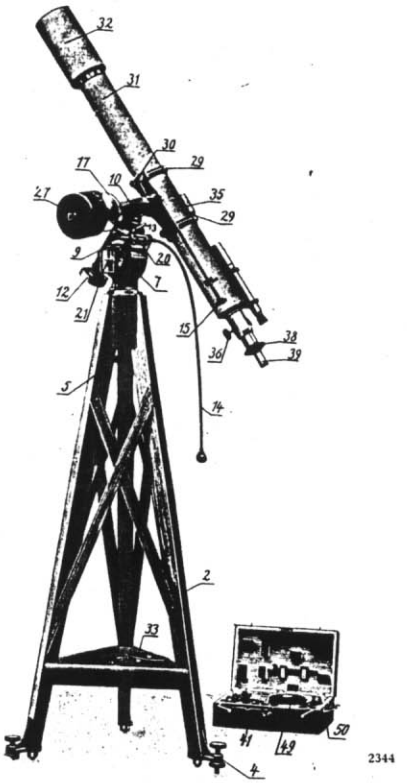


Fig. 26

80-mm. (3⅛-in.) Equatorial Telescope on pyramid tripod stand Nos. 36—38

27 Adjustable counterpoise of telescope with respect to polar axis
29 Telescope cradle with two clamping rings for fixing the telescope
30 Clamping screw of (29) for fixing the telescope to the declination axis
31 Telescope
32 Dew cap
33 Lens cap
35 Counterpoise with respect to declination axis
36 Eyepiece draw-tube with rack and pinion motion
38 Changing device
39 Eyepiece sliding sleeve
41 Eyepieces
49 Objective sun shade
50 Polished wood box for eyepieces and accessories

80 and 110-mm. ($3\frac{1}{8}$ and $4\frac{1}{4}$-inch) Equatorial Telescopes

Figs. 27 and 28

Items included in the prices of Nos. 42—47:

The numbers in brackets refer to the parts shown in the accompanying illustrations

No.	
	1 Telescope objective of 80 mm. or 110 mm. ($3\frac{1}{8}$ or $4\frac{1}{4}$ in.) aperture
126	1 Sun glass
127	1 Moon glass
	1 Tube mounting (31)
	1 Eyepiece draw-tube with rack and pinion motion
247	1 Eyepiece sliding sleeve
	1 Objective sun shade (49)
	1 Counterpoise with respect to declination (35)
117	1 Finder, ×8 (44)
	1 Equatorial head with hour circle (12) and declination circle (17)
	1 Clamp and slow motion in declination (15, 16) actuated from eye end by means of key
	1 Clamp and slow motion in R. A. (13, 14) actuated by means of draw-cords
	1 Polished wooden box (52), for above eyepieces and accessories
	1 Travelling case for telescope with cradle (29)
	1 Pyramid tripod stand (2), with foot screws and casters
	1 Fitted box for the 110-mm. objective

Astro 30 No.	Description	To be quoted when ordering: Codeword	Identification No.
	80-mm. ($3\frac{1}{8}$-in.) **Equatorial Telescope** with Nos. 251, 253, 254, 3 Huygens eyepieces, f = 40, 18, 12.5 mm. ($1\frac{9}{16}$, $\frac{11}{16}$, $\frac{1}{2}$ in.) and No. 266, orthoscopic eyepiece, f = 7 mm. ($\frac{9}{32}$ in.), No. 148, 1 cross-line diaphragm for eyepiece No. 266		
42	with E-objective No 228, focal length 120 cm. ($47\frac{1}{4}$ in.) Magnification Astro: ×30, ×67, ×96, ×171 Field of view: 1°35′ 46′ 31′ 15′ Exit pupil: 2.7 1.2 0.8 0.5 mm.	*Asarki*	51 28 81
43	with A-objective No. 228, focal length 141 cm. ($55\frac{3}{8}$ in.) Magnification Astro: ×35, ×78, ×113, ×201 Field of view: 1°22′ 37′ 27′ 12′ Exit pupil: 2.4 1.1 0.7 0.4 mm.	*Asaro*	51 28 82
44	with B-objective No. 234, focal length 120 cm. ($47\frac{1}{4}$ in.) Magnification Astro: ×30, ×67, ×96, ×171 Field of view: 1°35′ 46′ 31′ 15′ Exit pupil: 2.7 1.2 0.8 0.5 mm.	*Asaroide*	51 28 83
	110-mm. ($4\frac{1}{4}$-in.) **Equatorial Telescope** with Nos. 250a, 252, 254, 3 Huygens eyepieces, f = 50, 25, 12.5 mm. (2, 1, $\frac{1}{2}$ in.); Nos. 265, 267, 2 orthoscopic eyepieces, f = 9,6 mm. ($\frac{3}{8}$ in.), No. 148, 1 cross-line diaphragm for eyepiece No. 265		
45	with E-objective No. 219, focal length 165 cm. (65 in.) Magnification Astro: ×33, ×66, ×132, ×184, ×275 Field of view: 1°27′ 45′ 23′ 14′ 9′.9 Exit pupil: 3.4 1.7 0.9 0.6 0.4 mm.	*Asarona*	51 30 31
46	with A-objective No. 229, focal length 204 cm. ($80\frac{1}{2}$ in.) Magnification Astro: ×41, ×82, ×164, ×226, ×340 Field of view: 1°9′ 35′ 17′ 11′ 7′.9 Exit pupil: 2.8 1.4 0.6 0.5 0.4 mm.	*Asaroli*	51 30 32
47	with B-objective No 235, focal length 165 cm. (65 in.) Magnification Astro: ×33, ×66, ×132, ×184, ×275 Field of view: 1°27′ 45′ 23′ 14′ 9′.9 Exit pupil: 3.4 1.7 0.9 0.6 0.4 mm.	*Asarolica*	51 30 33

Additional Accessories recommended for Nos. 42—47:

No.	
125	Binocular eyepiece
250	Huygens eyepiece, f = 60 mm. ($2\frac{3}{8}$ in.)
111	Triple revolver
122	Eyepiece prism
124	Zenith prism
130—133	Set of coloured glasses or
135	Revolving colour disc
141	Herschel solar prism or
138, 139	Colzi polarizing prism
144, 145	Solar projection screen
62, 63	Changing device
76	Spring-driven clock or
77	Weight-driven clock
166	Eyepiece spectroscope
167	Abbe spectroscopic eyepiece
152	Ring micrometer
153	Eyepiece screw micrometer
154	Filar position micrometer
169	Prominiscence spectroscope
106	Abbe dark ground illumination
176—178	60-mm. ($2\frac{3}{4}$-in.) Astro camera
173	Sun and moon camera
434	Observation ladder
422, 423	Observatory dome

For particulars of dimensions and weights see page 126 — **Price List at end of catalogue**

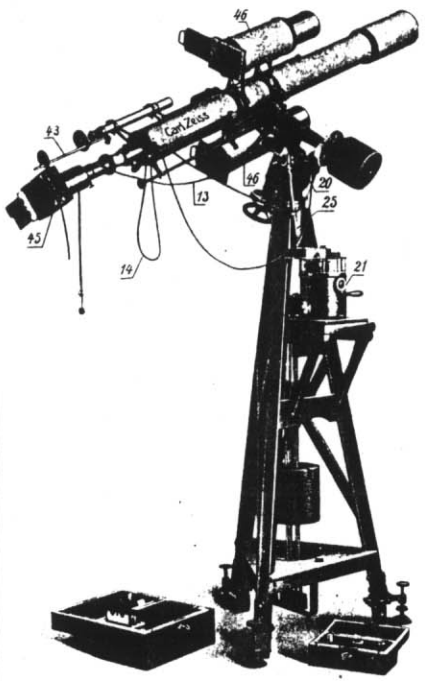


Fig. 27

80-mm. ($3\frac{1}{8}$-in.) **Equatorial Telescope**
Nos. 42—44 with two Astro cameras
Nos. 176 to 178 and a sun and moon camera No. 173

2 Pyramid tripod stand
4 Foot screws with foot plates and casters
5 Correction in azimuth
7 Tripod head with polar adjustments
9 Polar axis
10 Declination axis
11 Quick motion in R. A.
12 R. A. circle graduated in 10 minutes and reading to 1 minute by two verniers
13 Clamp in R. A. by means of draw cord
14 Slow motion in R. A. by means of draw cord and planet wheels
15 Clamp in declination by key actuated from eye end
16 Slow motion in declination by means of key actuated from eye end
17 Declination circle, graduated in degrees and reading to 5 minutes by two verniers
19 Clock circle
20 Helical drive for clock circle (19)
21 Clock No. 77 for motion in R. A.
22 Driving weight for clock (21)

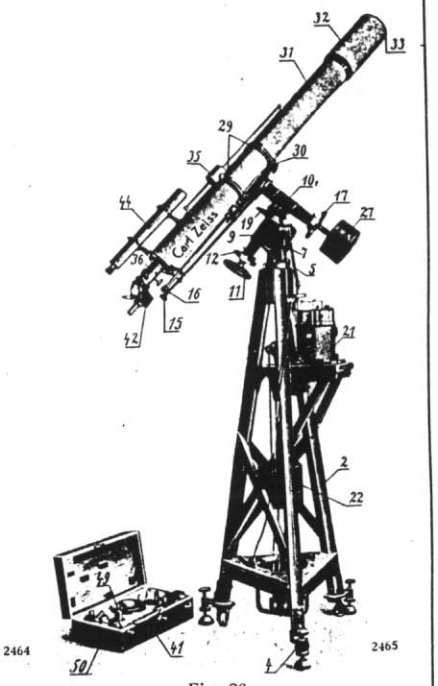


Fig. 28

110-mm. ($4\frac{1}{4}$-in.) **Equatorial Telescope**
Nos. 45—47 with polarizing solar prism No. 139

25 Transmission shaft from clock to (20)
27 Adjustable counterpoise of telescope with respect to the polar axis
29 Telescope cradle with clamping rings for fixing telescope
30 Clamping screws for fixing telescope with cradle to declination axis
31 Telescope
32 Dew cap
33 Lens cap
35 Counterpoise with respect to the declination axis
36 Eyepiece draw-tube with rack and pinion motion
41 Eyepieces
42 Colzi polarizing solar prism
43 Solar projection screen
44 Finder, ×8, No. 117
45 Sun and moon camera No. 173
46 60-mm. ($2\frac{3}{4}$-in.) Astro-camera Nos. 176—178
49 Objective sun shade
50 Box for accessories and eyepieces

110-mm and 130-mm. (4¼ and 5⅛-inch) Refractors

Figs. 29, 30, 33—35

Items included in the prices of Nos. 48—53:

The numbers in brackets refer to the parts shown in the accompanying illustrations

No.	
	1 Telescope objective of 110 mm. or 130 mm. (4⅛ or 5⅛ in.) aperture
126	1 Sun glass
127	1 Moon glass
130—133	1 Set of coloured glasses
	1 Tube mounting (31) with
	1 Objective sun shade
	1 Eyepiece draw-tube with rack and pinion motion
64	1 Changing device
65	4 Changing rings
247	1 Eyepiece sliding sleeve
111	1 Triple revolver
	1 Counterpoise in declination
118	1 Finder, ×10

No.	
124	1 Zenith Prism
141	1 Herschel sun prism
166	1 Eyepiece spectroscope
152	1 Ring micrometer
	1 Telescope standard with equatorial head
	1 Hour circle with vernier (12)
	1 Declination circle with vernier (17)
	1 Clamp and slow motion in R. A. (13, 14) by means of draw-cords and planet wheels
	1 Clamp and slow motion in declination (15, 16) by means of key actuated from eye end
	1 Polished wooden box for above eyepieces and accessories
	1 Fitted box for telescope objective

Astro 30 No.	Description	To be quoted when ordering: Codeword	Identification No.
	110-mm. (4⅜ inch) **Refractor** with No. 250a, 252, 253, 3 Huygens eyepieces, f = 50, 25, 12.5 mm. (2, 1, ½ in.); No. 265, 267, 2 orthoscopic eyepieces, f = 9.6 mm. (⅜ in.) No. 148, 1 cross-line diaphragm for eyepiece No. 265		
48	with E-objective No. 219, focal length 165 cm. (65 in.) Magnification Astro: ×33, ×66, ×132, ×184, ×275 Field of view: 1°27′ 44′ 23′ 14′ 9′.9 Exit pupil: 3.4 1.7 0.9 0.6 0.4 mm.	*Asaroticum*	51 30 61
49	with A-objective No. 229, focal length 204 cm. (80⅜ in.) Magnification Astro: ×41, ×82, ×164, ×226, ×340 Field of view: 1°9′ 35′ 17′ 11′ 7′.9 Exit pupil: 2.8 1.4 0.6 0.5 0.4 mm.	*Asarotorum*	51 30 62
50	with B-objective No. 235, focal length 165 cm. (65 in.) Magnification Astro: ×33, ×66, ×132, ×184, ×275 Field of view: 1°27′ 44′ 23′ 14′ 9′.9 Exit pupil: 3.4 1.7 0.9 0.6 0.4 mm.	*Asarotos*	51 30 63
	130-mm. (5⅛-in.) **Refractor** with No. 250a, 252, 254, 3 Huygens eyepieces, f = 50, 25, 12.5 mm. (2, 1, ½ in.); No. 265, 266, 268, 3 orthoscopic eyepieces, f = 9, 7, 5 mm. (⅓, 9/32, 3/16 in.); No. 148, 1 cross-line diaphragm for eyepiece No. 266		
51	with E-objective No. 220, focal length 195 cm. (77 in.) Magnification Astro: ×39, ×78, ×156, ×216, ×279, ×390 Field of view: 1°13′ 37′ 18′ 11′ 10′ 6′.5 Exit pupil: 3.3 1.7 0.8 0.6 0.5 0.3 mm.	*Asase*	51 31 31
52	with A-objective No. 230, focal length 233 cm. (92 in.) Magnification Astro: ×47, ×93, ×186, ×259, ×333, ×466 Field of view: 1°1′ 32′ 16′ 11′ 8′ 5′.6 Exit pupil: 2.8 1.4 0.7 0.5 0.4 0.3 mm.	*Asativas*	51 31 32
53	with B-objective No. 236, focal length 195 cm. (77 in.) Magnification Astro: ×39, ×78, ×150, ×216, ×279, ×390 Field of view: 1°13′ 37′ 18′ 11′ 10′ 6′.5 Exit pupil: 3.3 1.7 0.8 0.6 0.5 0.3 mm.	*Asayaba*	51 31 33

Additional Accessories recommended for Nos. 48—53:

No.	
125	Binocular eyepiece
250	Huygens eyepiece, f = 60 mm. (2⅜-in.)
135	Coloured glass revolver
138, 139	Colzi polarizing solar prism
145	Solar projection screen
77	Clock
80	Electric seconds control
79	Electric slow motion in R. A.
73	Hour circle for direct setting by stellar time
72	Hour angle circle
105	Illuminating device for declination circle
167	Abbe spectroscopic eyepiece

No.	
169, 170	Prominiscence spectroscope
153	Eyepiece screw micrometer
154	Filar position micrometer
106	Abbe dark ground illumination
176—178	60-mm. (2⅜-in.) Astro-camera
179—181	120 mm. (4¾-in.) Astro-camera
186a, 186b	Star guiding eyepiece head
173	Sun and moon camera
174	Sun camera
434, 435	Observation ladder
422, 423	Observatory dome

For particulars of dimensions and weights see page 126 — **Price List at end of catalogue**

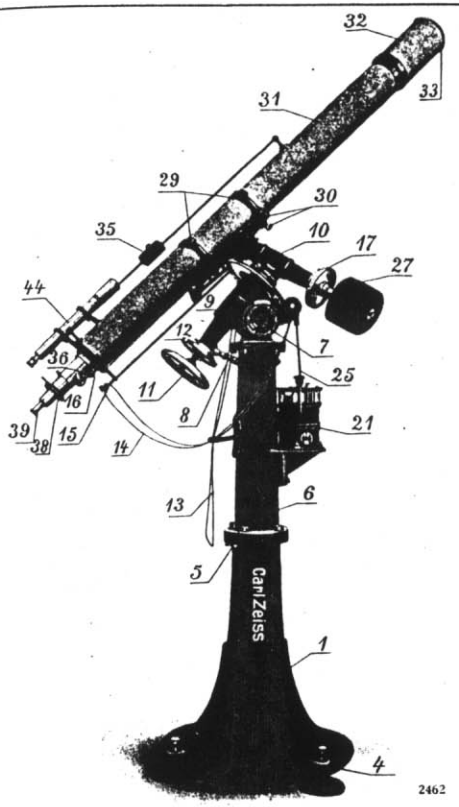


Fig. 29

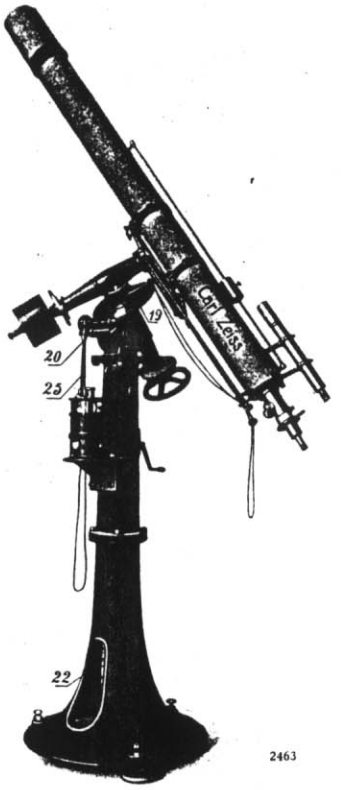


Fig. 30

110-mm. and 130-mm. (4¼ and 5⅛-in.) Refractors Nos. 48—53

1 Pedestal column
4 Foot screws with foot plates
5 Azimuth correction
6 Upper part of standard
7 Equatorial head with polar adjustments
8 Setting screw for polar adjustments
9 Hour axis
10 Declination axis
11 Quick motion in R. A.
12 Hour circle, graduated in 5 minutes and reading to 20 seconds by two verniers
13 Clamping device in R. A. actuated by cord
14 Slow motion in R. A. by means of draw-cord and planet wheels
15 Clamp in declination actuated by key from eye end
16 Slow motion in declination by means of key from eye end
17 Declination circle, graduated in degrees and reading to 5 minutes by two verniers
19 Clock circle
20 Helical drive for clock circle (19)
21 Clock for hour drive No. 77
22 Driving weight for clock (21)
25 Transmission shaft from clock to (20)
27 Adjustable counterpoise of telescopes with respect to hour axis
29 Telescope cradle with clamping rings for fixing telescope
30 Clamping screws for fixing telescope with cradle (29) to declination axis
31 Telescope
32 Dew cap
33 Lens cap
35 Counterpoise for declination axis
36 Eyepiece draw-tube with rack and pinion motion
38 Changing device No. 64
39 Eyepiece sliding sleeve
44 Finder × 10, No. 118

150-mm. and 200-mm. (6 and 8-inch) Refractors

Figs. 31, 32, 36, 37

Items included in the prices of Nos. 54—59:

The numbers in brackets refer to the parts shown in the accompanying illustrations

No.
- 1 Telescope objective of 150 mm. or 200 mm. (6 in. or 7¼ in.) aperture
- 250, 251—254 5 Huygens eyepieces, f = 60, 40, 25, 18, 12.5 mm. (2⅜, 1⅝, 1¼, ⅞ in.)
- 265, 266, 268 3 Orthoscopic eyepieces, f = 9, 7, 5 mm. (⅜, 2/9, 3/16 in.)
- 152 1 Ring micrometer
- 148 1 Cross line diaphragm fitted to eyepiece No. 266
- 126 1 Sun glass
- 127 1 Moon glass
- 130—133 1 Set of coloured glasses
- 124 1 Zenith prism
- 141 1 Herschel sun prism
- 166 1 Eyepiece spectroscope
- 1 Tube mounting (31) with

No.
- 1 Eyepiece draw-tube with rack and pinion motion
- 247 1 Ocular spring sleeve
- 1 Objective sun shade
- 1 Counterpoise in declination
- 112 1 Triple revolver
- 120 1 Finder, ×25
- 1 Standard with equatorial head
- 1 Hour circle with vernier (17)
- 1 Declination circle with vernier (17)
- 105 1 Illuminating device for declination circle
- 1 Clamp and slow motions in R. A. (13, 14) and in declination (15, 16) actuated from eye end by means of key
- 1 Polished wooden box for above eyepieces and accessories
- 1 Fitted box for telescope objective

Astro 30 No.	Description	To be quoted when ordering: Codeword	Identification No.
	150-mm. (6-in.) **Refractor,** Figs. 31, 32 and 105, with clock No. 77, changing device No. 64 and 4 changing rings No. 65		
54	with E-objective No. 221. focal length 225 cm. (88⅝ in.) Magnification Astro: ×38, ×56, ×90, ×125, ×180, ×250, ×321, ×450 Field of view: 1°20′ 53′ 33′ 24′ 16′ 11′ 7′.3 6′.0 Exit pupil: 4.0 2.8 1.6 1.3 0.8 0.6 0.5 0.4 mm.	*Asayabamos*	51 32 31
55	with A-objective No. 231, focal length 267 cm. (105⅛ in.) Magnification Astro: ×44, ×67, ×106, ×148, ×213, ×296, ×381, ×534 Field of view: 1°5′ 46′ 28′ 19′ 14′ 9′.3 6′.8 4′.9 Exit pupil: 3.5 2.3 0.5 1.0 0.7 0.6 0.4 0.3 mm.	*Asayado*	51 32 32
56	with B-objective 237, focal length 225 cm. (88⅝ in.) Magnification Astro: ×38, ×56, ×90, ×125, ×180, ×250, ×321, ×450 Field of view: 1°20′ 53′ 33′ 24′ 16′ 11′ 7′.3 6′.0 Exit pupil: 4.0 2.8 1.6 1.3 0.8 0.6 0.5 0.4 mm.	*Asayar*	51 32 33
	200-mm. (8-in.) **Refractor,** Figs. 36 and 37 with clock No. 78, changing device No. 66 and 4 changing rings No. 67		
57	with E-objective No. 222, focal length 300 cm. (118⅛ in.) Magnification Astro: ×50, ×75, ×120, ×167, ×240, ×334, ×429, ×600 Field of view: 57′ 38′ 25′ 18′ 12′ 8′ 5′.9 4′.2 Exit pupil: 4.0 2.7 1.7 1.2 0.9 0.7 0.5 0.3 mm.	*Asayaras*	51 33 31
58	with A-objective No. 232, focal length 360 cm. (142⅜ in.) Magnification Astro: ×60, ×90, ×144, ×200, ×288, ×400, ×514, ×720 Field of view: 50′ 33′ 20′ 14′ 11′ 6′.2 5′.0 3′.2 Exit pupil: 3.5 2.3 1.4 1.0 0.8 0.5 0.4 0.3 mm.	*Asayaron*	51 33 32
59	with B-objective No. 238, focal length 300 cm. (118⅛ in.) Magnification Astro: ×50, ×75, ×120, ×167, ×240, ×334, ×429, ×600 Field of view: 57′ 38′ 25′ 18′ 12′ 8′.1 5′.9 4′.2 Exit pupil: 4.0 2.7 1.7 1.2 0.9 0.7 0.5 0.3 mm.	*Asaz*	51 33 33

Additional Accessories recommended for Nos. 54—59 are:

No.
- 249 Huygens eyepiece, f = 80 mm. (3⅛ in.)
- 125 Binocular eyepiece
- 135 Coloured glass revolver
- 138, 139 Colzi polarizing solar prism
- 146 Solar projection screen
- 80, 81 Electric seconds control
- 79 Electric slow motion in R. A.
- 74, 75 Hour circle for direct setting by stellar time Eyepiece draw-tube with three-spindle action (9), Fig. 112, page 86

No.
- 72 Hour angle circle
- 167 Abbe spectroscopic eyepiece
- 169, 170 Prominiscence spectroscope
- 154 Filar position micrometer
- 106 Abbe dark ground illumination
- 179—184 120-mm. or 160-mm. (4¾ or 6¼-in.) Astro-camera
- 186a, 186b Star guiding eyepiece head
- 174, 175 Sun camera
- 434—439 Observation ladders
- 424—430 Observatory dome

For particulars of dimensions and weights see page 126 — **Price List at end of catalogue**

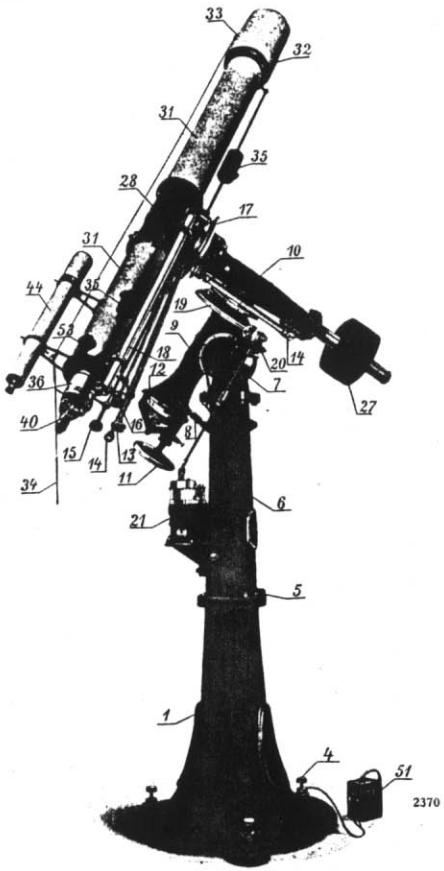


Fig. 31

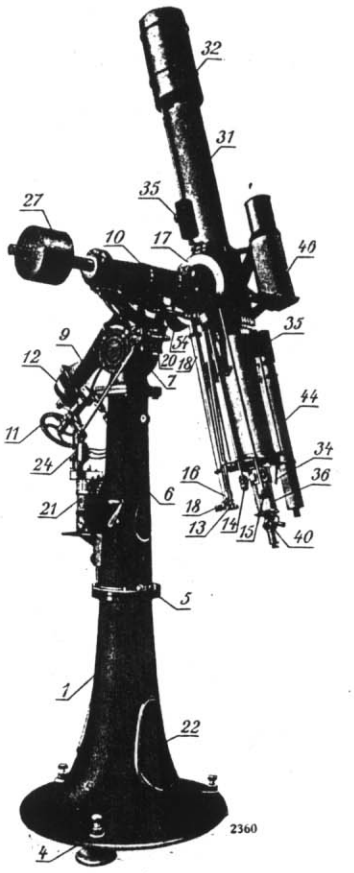


Fig. 32

150-mm. (6-inch) Refractor, Nos. 54—56

- 1 Standard
- 4 Foot screws with footplates
- 5 Azimuth correction
- 6 Upper part of standard
- 7 Standard head with polar adjustment
- 8 Adjustment screw for polar correction
- 9 Hour axis
- 10 Declination axis
- 11 Quick motion in R. A. by hand wheel with toothed gearing
- 12 Hour circle graduated in 2 minutes and reading to 5 seconds by two verniers
- 13, 14 Clamp and slow motion in R. A. actuated by a key from eye end
- 15, 16 Clamp and slow motion in declination actuated by a key from eye end
- 17 Declination circle graduated in 20′ and reading to 1′ by two verniers
- 18 Reading telescope for declination circle (17)
- 19 Clock circle
- 20 Helical drive for clock circle (19)
- 21 Clock No. 77, for hour motion
- 22 Driving weight for clockwork (21)
- 24 Electric slow motion in R. A.
- 27 Adjustable counterpoise of telescope to polar axis
- 28 Middle part of telescope body with flanges for screwing on astro-camera (46)
- 31 Telescope
- 32 Dew cap
- 33 Lens cap
- 34 Cord for opening lens cap (33)
- 35 Counterpoises to declination axis
- 36 Eyepiece draw-tube with rack and pinion motion
- 38 Changing device No. 64
- 40 Triple revolver No. 112
- 44 Finder, ×25, No. 120
- 46 60-mm. (2⅜-in.) Astro-camera Nos 176—178
- 51 4-volt accumulator for lighting declination circle and field of view
- 53 Plug contact for illumination of field of view
- 54 Counterpoise to Astro-camera (46)

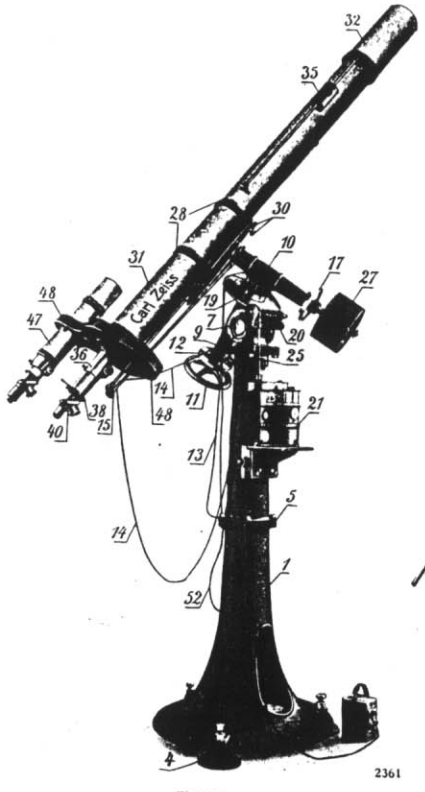


Fig. 33

130-mm. (5¼-in.) A-Refractor No. 52 with 80-mm. (3⅛-in.) Comet Finder No. 31

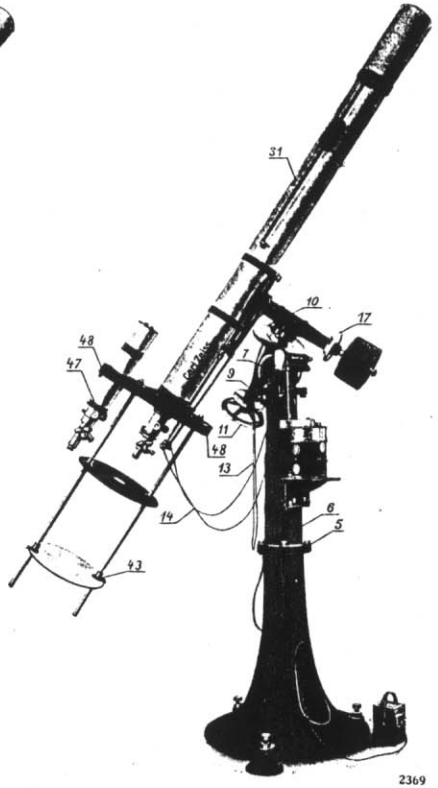


Fig. 34

130-mm. (5¼-in.) A-Refractor with 80-mm. (3⅛-in.) Comet Finder No. 31 and Solar Projection Screen No. 145

The comet finder is mounted on a braket piece capable of rotation about the telescope at such a distance from the telescope that observations can be made simultaneously with both telescopes by two persons

Key to Fig. 33, Fig. 34 and Fig. 35

1 Standard
4 Footscrews with footplates
5 Azimuth correction
6 Upper part of standard
7 Standard head with polar adjustment
9 Hour axis
10 Declination axis
11 Quick motion in R. A. by hand wheel
12 Hour circle graduated in 5 minutes and reading to 10 seconds by two verniers
13,14 Clamp and slow motion in R. A. by draw-cord
15,16 Clamp and slow motion in declination by a key actuated from eye end
17 Declination circle graduated in 1° and reading 5′ by two verniers
19 Clock circle
20 Helical drive for clock circle (19)
21 Clock No. 77 for R. A. drive
25 Transmission shaft from clock to (20)
27 Adjustable counterpoise of telescope for hour axis
28 Telescope cradle with clamping rings
30 Clamping srews for fixing (29) with telescope to declination axis
31 Telescope
32 Dew cap
35 Counterpoise to declination axis
36 Eyepiece draw-tube with rack and pinion motion
38 Changing device No. 64
40 Triple revolver
43 Solar projection screen No. 145
47 80-mm. (3⅛-in.) comet finder with triple revolver
48 Revolving holder with counterpoise for (47) with respect to telescope and for fixing solar projection screen (43)
51 4-volt accumulator for illuminating arrangement
52 Flexible conductor to illumination of the field of view

Key to Fig. 35

22 Driving weight for clock (21)
24 Electric slow motion in R. A. with contact key
33 Hinged lens cap in dew mount
34 Draw-cord for opening lens cap from eye end
44 Finder, ×15, No. 119
46 80-mm. (3⅛-in.) astrographic double camera 30×30 cm. (11¾×11¾ in.) with two 80-mm. (3⅛-in.) apochromatic Tessar lenses f = 840 mm. (329¾ in.) and with objective prism
50 Polished wooden box for eyepieces and accessories
52 Flexible conductors for illumination attachments to circles and field of view
53 Switch for illumination of circles
55 12×9-cm. (4¾×3½-in.) camera
56 Guiding eyepiece for (55)
57 Enlarging camera 12×9 cm. (4¾×3½ in.)

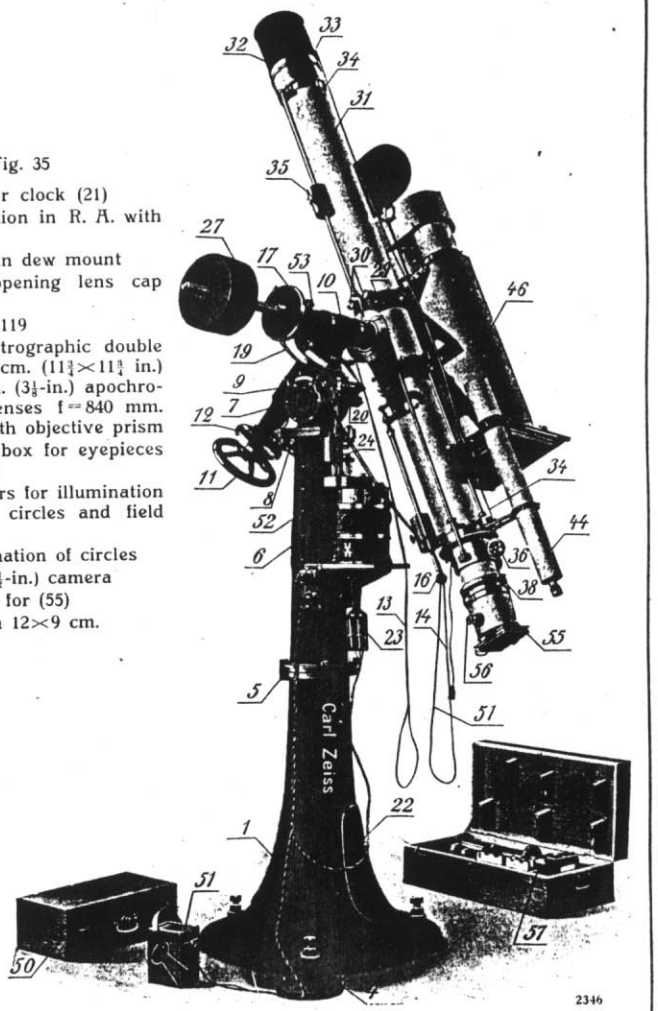


Fig. 35

130-mm. (5¼-inch) A-Refractor No. 52

with 80-mm. (3⅛-in.) astrographic double camera and 12×9-cm. (4¾×3½-in.) camera with guiding eyepiece on telescope draw-tube

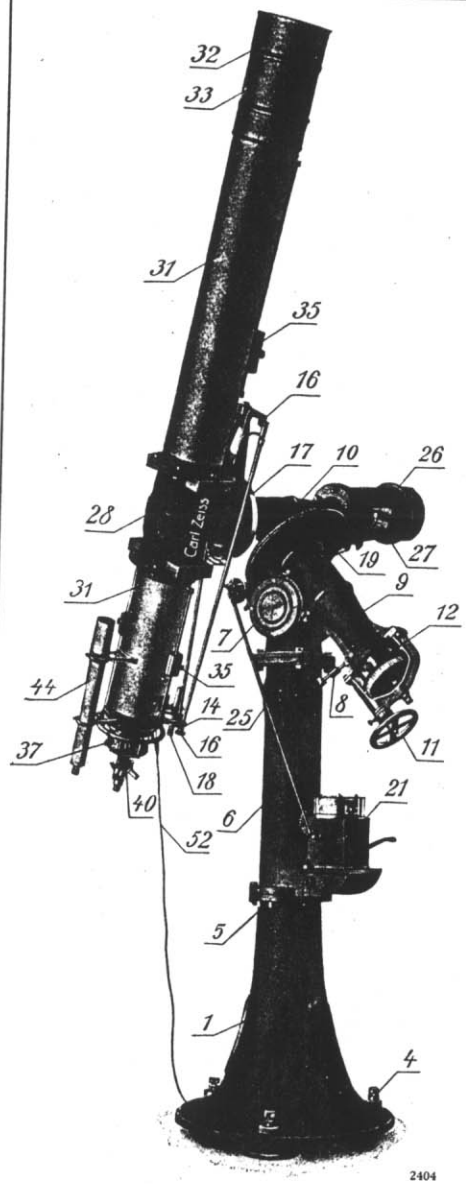


Fig. 36

Key to Fig. 36 and Fig. 37

1 Foot of standard

4 Foot screws with foot plates

5 Azimuth correction for setting hour axis in meridian

6 Upper part of standard

7 Equatorial head and polar adjustment with scale and index

8 Setting screw for polar adjustment

9 Hour axis

10 Declination axis

11 Quick motion in R. A. by handwheel with toothed gearing

12 Hour circle graduated in minutes of time and reading by two verniers to 2 seconds of time

13 Clamp in R. A. actuated by key from eye end

14 Slow motion in R. A. actuated by key from eye end

15 Clamp in declination actuated by key from eye end

16 Slow motion in declination actuated by key from eye end

17 Declination circle graduated in 15 minutes of arc and reading by two verniers to 30 seconds of arc

18 Reading telescope for declination circle

19 Clock circle for hour drive

20 Helical drive of clock circle (19)

21 Clock No. 78 for hour drive

22 Driving weight for clock (21)

Fig. 36

200-mm. (8-inch) Refractor Nos. 57—59

For particulars of dimensions and weights see page 126

Key to Figs. 36 and Fig. 37

25 Transmission shaft from clock to helical drive to clock circle (19)

26 Fixed counterpoise to telescope with respect to hour axis

28 Middle part of telescope body with seatings for attaching 120-mm or 160-mm ($4\frac{3}{4}$ or $6\frac{1}{4}$-in.) Astro-cameras Nos. 179—184

31 Front and back parts of telescope

32 Dew cap

33 Lens cap hinged inside dew cap mount

34 Draw-cord for opening lens cap (33)

35 Counterpoise to declination axis

37 Eyepiece draw-tube with three-spindle motion (Fig. 112, page 86)

38 Changing device No. 66

40 Triple revolver No. 112

44 Finder telescope No. 120

46 160-mm. ($6\frac{1}{4}$-in.) Astro-camera No. 181—184

54 Counterpoise for Astro-camera (46) with respect to declination axis

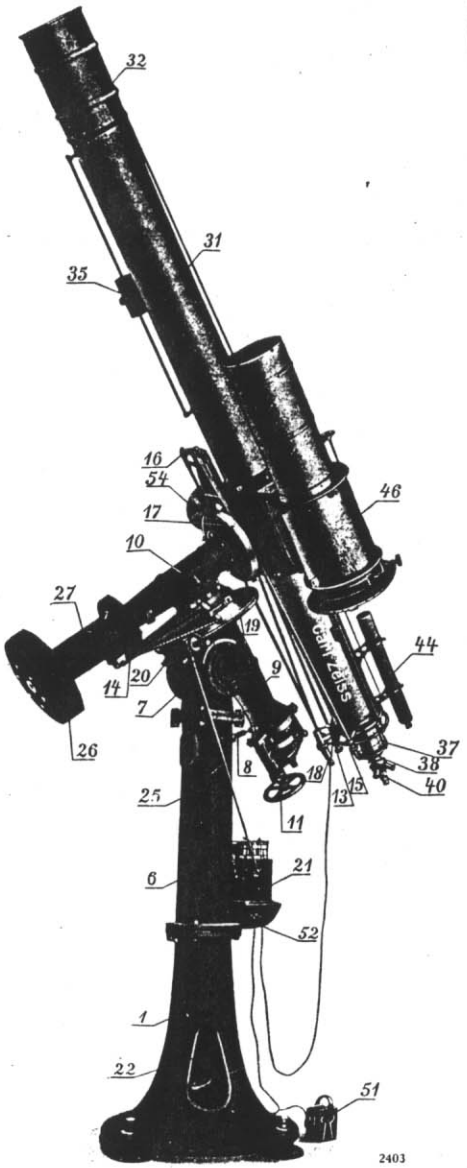
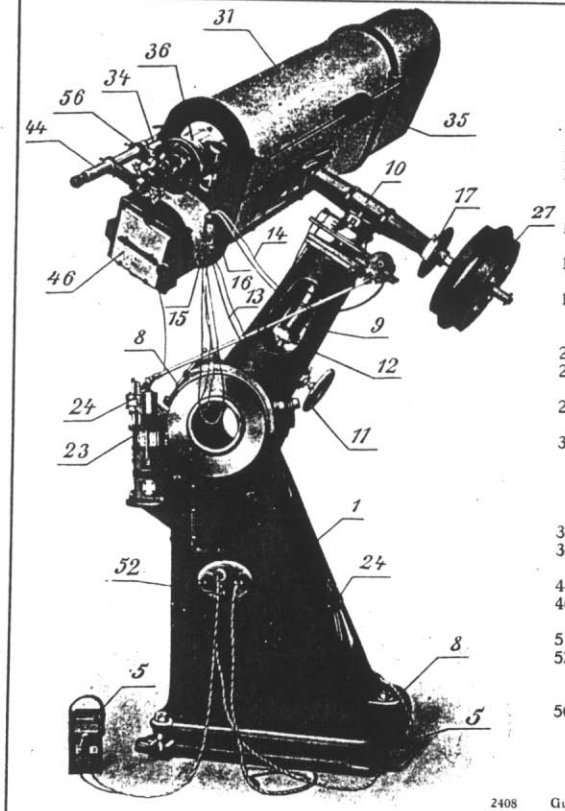


Fig. 37

200-mm. (8-inch) Refractor Nos. 57—59 with 160-mm. ($6\frac{1}{4}$-in.) Astro-camera No. 183

Fig. 37



1 Base
5 Azimuth correction
8 Setting screw for polar adjustment
9 Hour axis
10 Declination axis
11 Coarse setting in R. A.
12 Hour circle graduated in 5 minutes and reading by two verniers to 20 seconds
13, 14 Clamp and slow motion in R. A. actuated by draw-cord
15, 16 Clamp and slow motion in declination actuated by key
17 Declination circle graduated in degrees and reading by two verniers to 5 minutes
23 Electric seconds control
24 Electric slow motion in R. A. with key switch
27 Adjustable counterpoise to telescope with respect to hour axis
31 Telescope body common to guiding telescope of 110 mm. (4¼ in.) aperture and astro-camera of 160 mm. (6¼ in.) aperture
35 Counterpoise to declination axis
36 Eyepiece draw-tube with rack and pinion motion
44 ×10 Finder
46 Astro-camera for 16×16-cm. (6¼×6¼-in.) plates
51 4-volt accumulator
52 Electric conductors for slow motion in R. A., illumination and seconds control
56 Guiding eyepiece head No. 186b

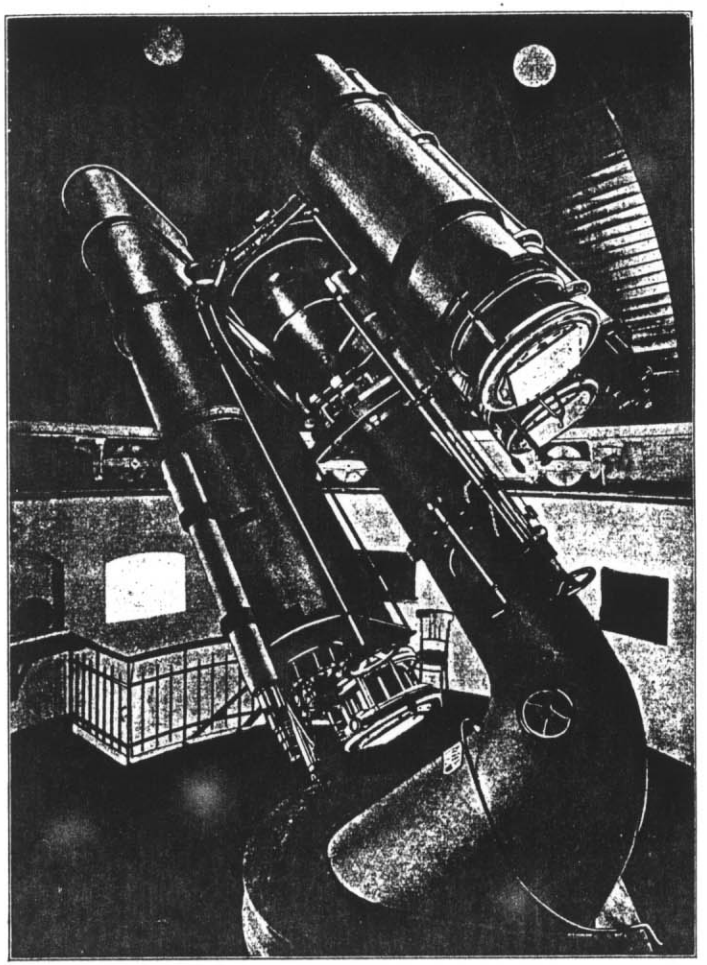
Fig. 38

160-mm. (6¼-in.) Astrograph

2408 Guiding telescope: 110-mm. (4¼ in.) aperture, 130 cm. (50⅛ in.) focal length. Astro-camera: 160-mm. (6¼-in.) Astro-Petzval 1:5, No. 323

Astro 30 No.	Description	To be quoted when ordering: Codeword	Identification No.
60	**160-mm. (6¼-in.) Astrograph,** Fig. 38 1 C-Objective, 110-mm. (4¼ in.) aperture, 130 cm. (51⅛ in.) focal length, No. 241 1 Astro-Petzval, 160 mm. (6¼ in.) aperture, 80 cm. (31½ in.) focal length, No. 323 2 Huygens eyepieces, f = 60, 40 mm. (2⅜, 1⅝ in.) Nos. 250, 251 4 Orthoscopic eyepieces, f = 25, 12.5, 7.5 mm. (1, ½, ⅛ in.), Nos. 260, 264, 266, 268 1 Eyepiece prism No. 122 1 Changing device No. 64 4 Changing rings No. 65 1 ×10 Finder No. 118 1 Guiding eyepiece head No. 186b 1 Astro-camera with 3 metal slides 16×16 cm. (6¼×6¼ in.) 1 Clock No. 77 1 Electric seconds control No. 80 1 Electric slow motion in R. A. No. 79 1 Polished wooden box for the eyepieces and accessories included in the price of the instrument Equatorial head with slow motion and R. A. and declination circles Magnification Astro: ×22, ×33, ×52, ×104, ×186, ×260 Field of view: 2°13′ 1°28′ 48′ 24′ 13′ 10′ Exit pupil: 5.0 3.3 2.1 1.1 0.6 0.4 mm.	*Asbergo*	51 36 16

For particulars of dimensions and weights see page 126 — **Price List at end of catalogue**



2366

Fig. 39

340-mm. (13½-inch) Lippert Astrograph of the Hamburg Observatory

at Bergedorf. Constructed by Carl Zeiss, Jena, 1911

Left: Astrophotographic telescope with U. V. triplet of 340 mm. (13½ in.) aperture and 3.4 m. (11¼ ft.) focal length, guide telescope with E-objective of 230 mm. (9 in.) aperture and 3.4 m. (11¼ ft.) focal length.

Right: Two Astro-cameras with triplet and Astro-Petzval of 300 mm. (12 in.) aperture and 1.5 m. (5 ft.) focal length, and guide telescope with E-objective of 200 mm. (8 in.) aperture and 2.7 m. (9 ft.) focal length.

Size of plate for all cameras 30×30 cm. (11¾×11¾ in.)

Price: On application. Codeword: *Asbestas.* Ident. No.: 51 36 34

Equatorial Telescope Mountings

with stress relieving system to telescope and equatorial axes

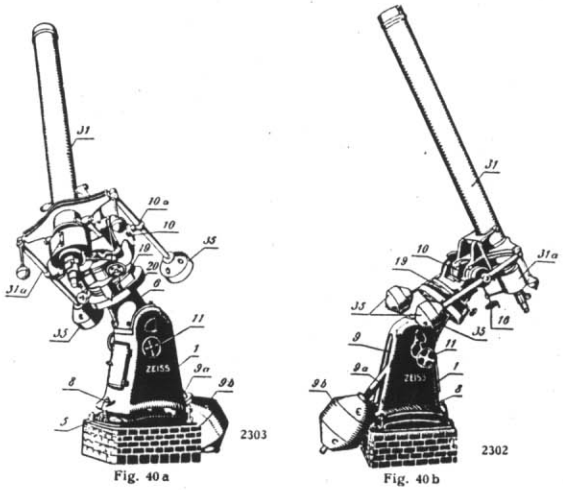


Fig. 40a Fig. 40b

300-mm. (12-inch) Refractor with stress relieving system to telescope and equatorial axes

1 Base
5 Azimuth correction
6 Upper part of body
8 Polar correction
9 Hollow hour axis for reception of
9a Hour relieving axis with
9b Counterpoise to movable parts with respect to centre of base (1)
10 Hollow declination axis for reception of
10a Declination relieving axis
11 Coarse adjustment in R. A.
16 Adjustment in declination
19 Clock circle
20 Drive by two diametrically engaging worm gears (19)
31 Telescope with outer tube and an inner relief tube for counteracting flexure
31a Counterpoise of telescope against flexure
35 2 Counterpoises of telescope for declination axis

The movable parts of the equatorial mounting are divided up into two distinct equatorial components, viz. —

1) an equatorial directing system comprising the optical parts and enabling the telescope to be directed upon astronomical objects in terms of the coordinates (hour angle and declination);
2) an equatorial system of carriers for taking up any stresses in the directing system.

The equatorial telescope mountings with stress relieving system fulfil the following requirements:

1) They obviate flexure in the telescope and in the polar and declination axes, and ensure easy movement of the axes by reason of all stresses being completely relieved in the carrying system.
2) Several telescopes may be assembled side by side on one mounting and any mutual tendency to deformation compensated by the stress relieving system.
3) The tubes are freely movable through all ranges of the hour and declination angles without encountering obstruction by any part of the mounting or stand.
4. The tubes are so mounted as to confine the movements of the eye end within a very small range, the eye being applied at a point near the intersection of the polar and declination axis.
5) The design affords easy access from the observer's position at the eye end to all attachments, such as astro-photographic cameras, Fig. 43.

Prices of refractors with objective apertures exceeding 200 mm. ($7\frac{7}{8}$ in.) will be furnished on application

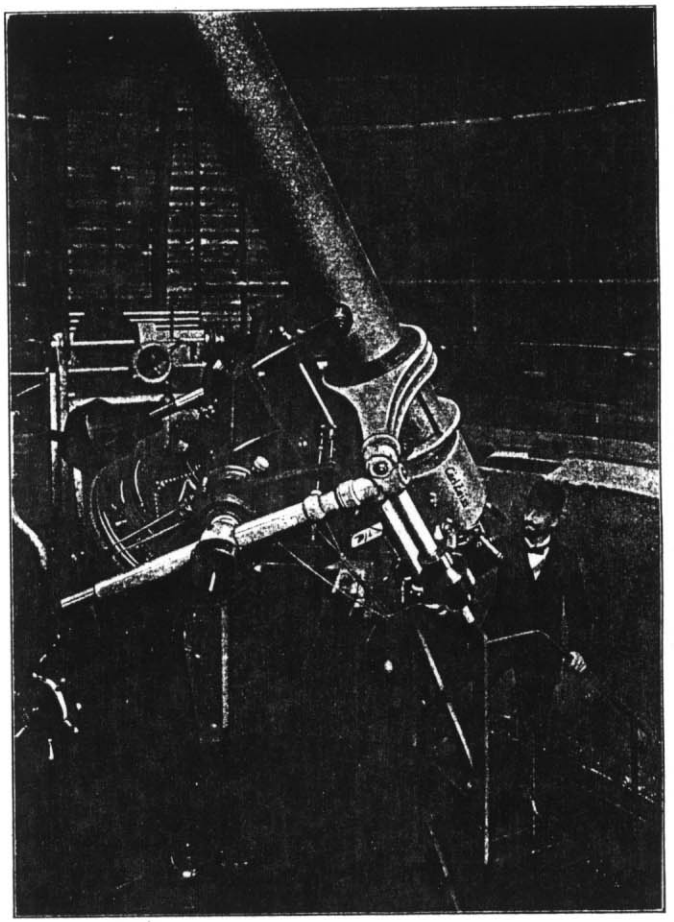


Fig. 41

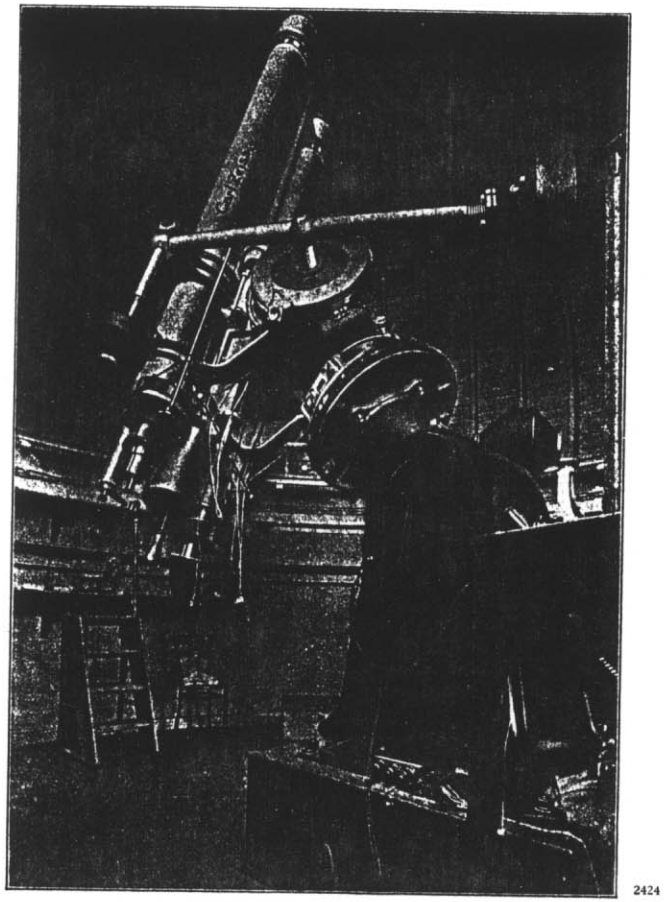
300-mm. (12-inch) Refractor of the "Urania", Zürich.

Constructed by Carl Zeiss, Jena, 1906

Optical parts: E - Objective of 300 mm. (12 in.) aperture and 5 m. ($16\frac{1}{2}$ ft.) focal length

Mechanical parts: Equatorial telescope mounting with stress relieving system to telescope and equatorial axes

Price: On application. Codeword: *Asbestine.* Ident. No.: 51 37 30



2424

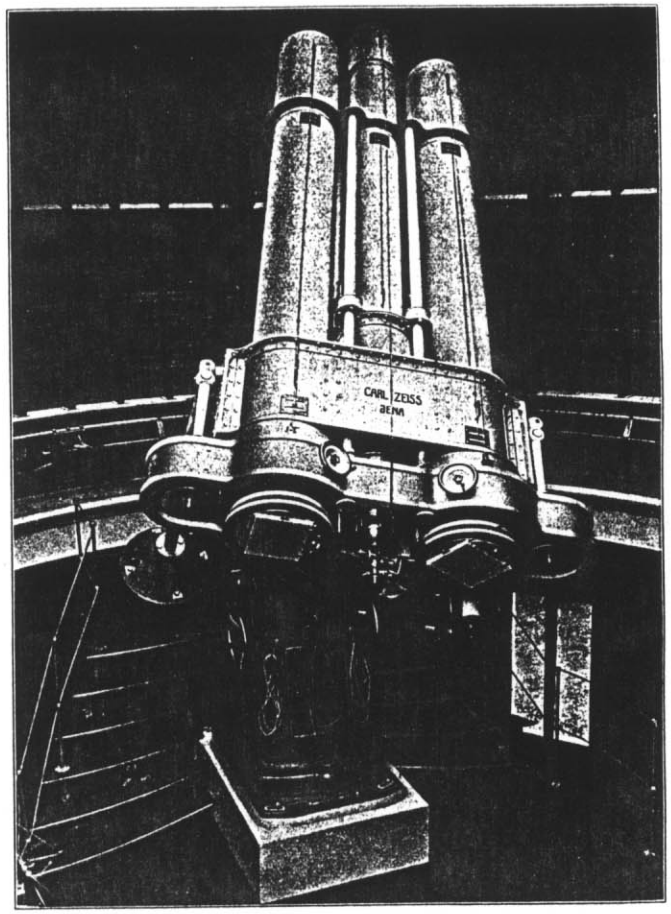
Fig. 42

Double Photographic Refractor of the Observatory of Dr. Rudolf König at Wien
Constructed by Carl Zeiss, Jena, 1908

Optical equipment: Guide telescope (left) with E-Objective of 180 mm. (7¼ in.) aperture and 3.4 m. (11 ft.) focal length. Photographic telescope (right) with two-lens U. V. objective of 210 mm. (8¼ in.) aperture and 3.4 m. (11 ft.) focal length.

Mechanical equipment: Equatorial telescope mounting with stress relieving system to telescopes and equatorial axes. Planet camera No. 187 on photographic telescope (right)

Price: On application. Codeword: *Asbestinum.* Ident. No.: 51 37 21



2245

Fig. 43

Triple Photographic Refractor

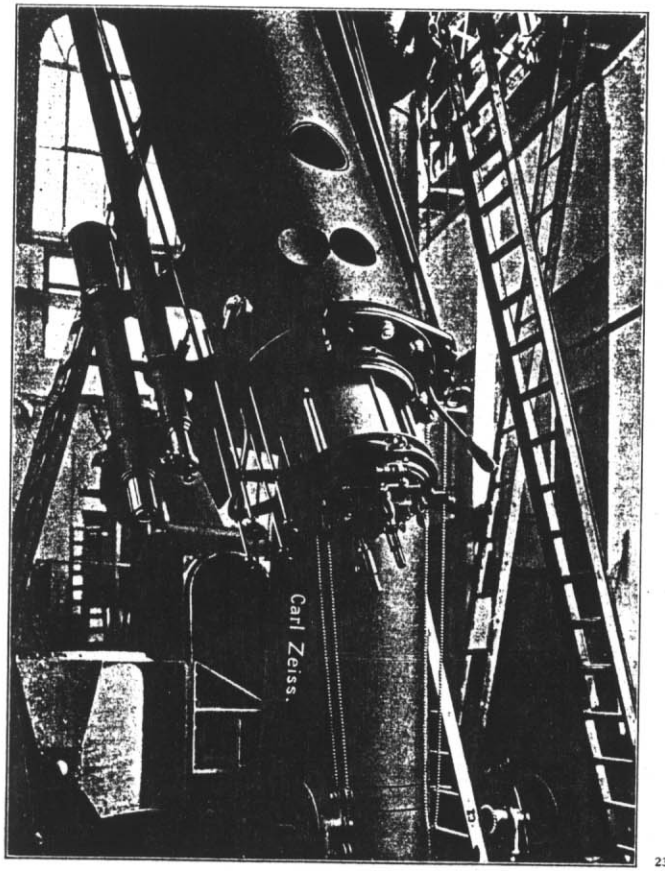
of the Observatory at Neuenburg (Switzerland)
Constructed by Carl Zeiss, Jena, 1910

Optical equipment: Guide telescope (central tube) with E-Objective of 300 mm. (12 in.) aperture and 5 m. (16½ ft.) focal length. Photographic telescopes (left and right) with U. V. triplets of 360 mm. (14¼ in.) aperture and 4.5 m. (14¾ ft.) focal length, Fig. 156, page 109.

Mechanical equipment: Equatorial telescope mounting with stress relieving system to telescopes and equatorial axes. Camera adjustment by three-spindle motion and metal dark-slides for 30×24-cm. (19¼×11¾-in.) plates.

Price: On application. Codeword: *Asbite.* Ident. No.: 51 37 36

Prices of refractors with objective apertures exceeding 200 mm. (7¼ in.) will be furnished on application



2350

Fig. 44

650-mm. (25½-inch) Refractor (Eye end)

of the Observatory at Babelsberg near Berlin.
Constructed by Carl Zeiss, Jena, 1914

The eyepiece draw-tube is fitted with three-spindle motion and has a range of 55 cm. (21⅝ in.) and a clear diameter of 33 cm. (13 in.). The eyepiece draw-tube has attached to it a double dark-slide with guiding and focussing microscope. Size of plate 12 × 9 cm. (4¾ × 3½ in.).

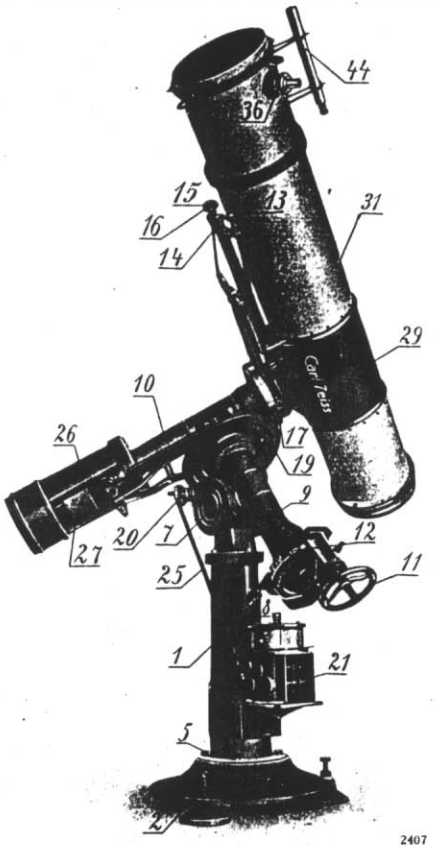
Prices of refractors with objective apertures exceeding 200 mm. (7⅞ in.) will be stated on application

Reflecting Telescopes

Fig. 45

1 Base
2 Foot screws and foot plates
5 Azimuth correction
7 Standard head with polar adjustment (0°—70°)
8 Setting screw for polar adjustment
9 Polar axis
10 Declination axis
11 Coarse adjustment in R. A. by toothed wheel gearing
12 Hour circle graduated in minutes and reading by two verniers to 2 seconds
13, 14 Clamp and slow motion in R. A. actuated by means of key from eye end
15, 16 Clamp and slow motion in declination actuated by means of key from eye end
17 Declination circle graduated in 15 minutes reading by two verniers to 30 seconds
19 Clock circle
20 Helical drive for (19)
21 Clock No. 78
25 Transmission shaft from clock (21) to (20)
26 Stationary counterpoise to telescope with respect to hour axis
27 Adjustable counterpoise to telescope with respect to hour axis
29 Tube clip with ball bearings for rotating the reflector tube about its axis with the aid of handles at upper end of tube
31 Newtonian reflector tube with silvered glass reflector of 300 mm. (12 in.) aperture and 2.4 m. (8 ft.) focal length
36 Eyepiece draw-tube with spiral groove
44 Finder × 10

Prices and particulars of reflecting telescopes of other dimensions will be furnished on application



2407

Fig. 45

300-mm. (12-in.) Newtonian Reflecting Telescope, No. 61

Astro 30 No.	Description	To be quoted when ordering: Codeword	Identification No.
61	**300-mm. (12-in.) Newtonian Reflecting Telescope, Fig. 45** with: 1 Silvered parabolic glass reflector of 300 mm. (12 in.) aperture and 2.4 m. (8 ft.) focal length, No. 341 1 Elliptical reflector 4 Huygens eyepieces, f = 60, 40, 25, 12.5 mm. (2⅜, 1⅝, 1, ½ in.), Nos. 250, 251, 252, 254 2 Orthoscopic eyepieces, f = 7, 5 mm. (3/32, 3/16 in.), Nos. 266, 268 1 Cross line diaphragm No. 148 fitted to eyepiece No. 266 1 Finder telescope, × 10, No. 118 1 Polished wooden box for the eyepieces included in the price of the instrument 1 Clock No. 78 Telescope-mounting, R. A. and declination circles and slow motions as in Fig. 45 Magnification Astro: × 40, × 60, × 96, × 192, × 340, × 480 Field of view: 1°10′ 49′ 31′ 15′ 7′.9 5′.4 Exit pupil: 7.5 5.0 3.1 1.6 0.9 0.6 mm.	*Asbolane*	51 38 30

For particulars of dimensions and weights see page 126 — **Price List at end of catalogue**

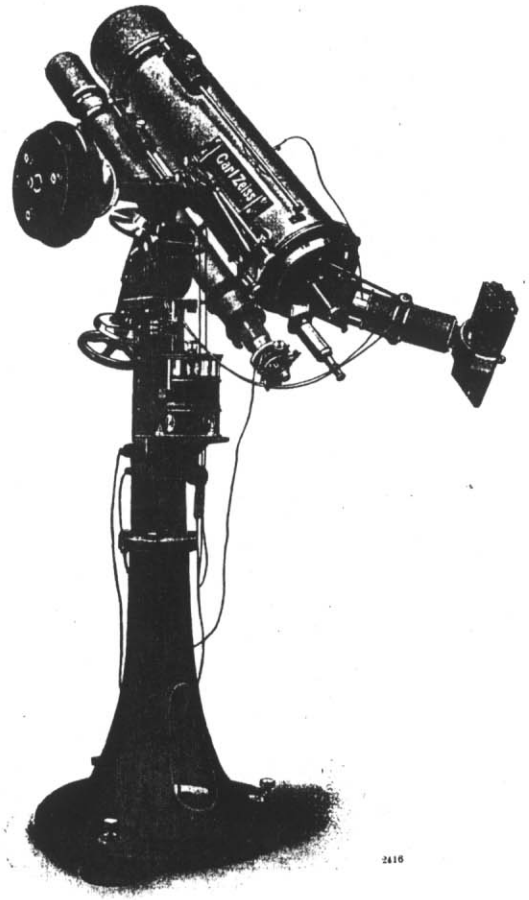


Fig. 46

Astrograph with Cassegrain Reflecting System

Optical equipment: Guide telescope with E-Objective of 100 mm. (4 in.) aperture and 1.5 m. (5 ft.) focal length, reflector tube with silvered Cassegrain glass reflector of 260 mm. (10¼ in.) aperture and 1.8 m. (6 ft.) focal length, spectrograph with 60° U. V. prism and three-lens U. V. Schwarzschild camera objective of 64 mm. (2½ in.) aperture and 300 mm. (12 in.) focal length No. 335.

Mechanical equipment: Equatorial mounting with clock, electric slow motion in R. A., guiding eyepiece head with compound slides No. 186a.

Price: On application. Codeword: *Asboli.* Ident. No.: 51 38 26

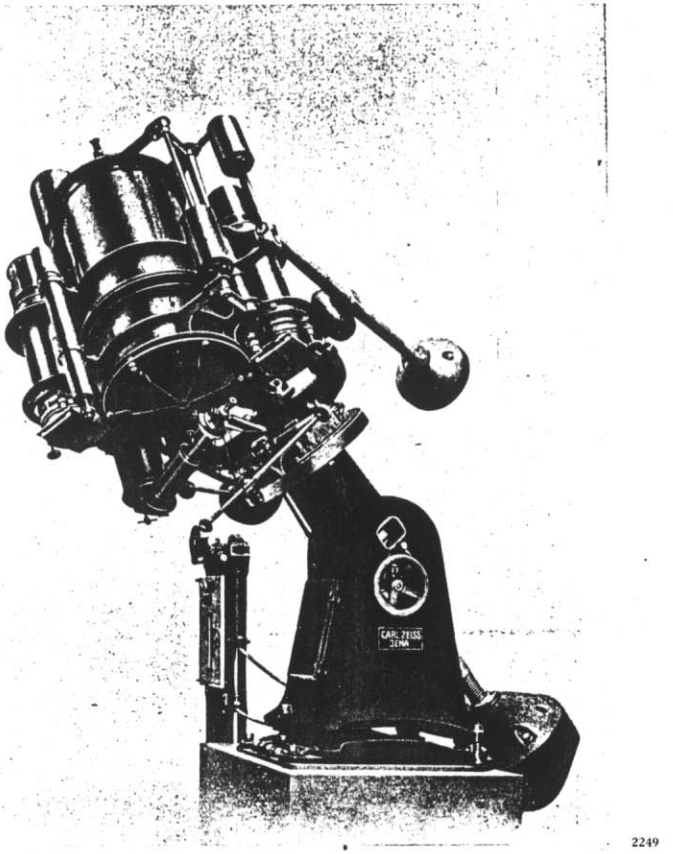


Fig. 47

400-mm. (15¾-inch) Reflecting Telescope of the Observatory at Innsbruck

Constructed by Carl Zeiss, Jena, 1905

Optical equipment: Parabolic silvered glass reflector of 100 mm. (4 in.) aperture and 1 m. (39¼ in.) focal length. Two 80-mm. (3⅛-in.) U.V. Astro-cameras, focal length 0.8 m. (31½ in.). Guide telescope with 180 mm. (7⅛ in.) aperture. Finder telescope with 75 mm. (3 in.) aperture.

Mechanical equipment: Equatorial telescope mounting with stress relieving system to telescopes and equatorial axes.

Price: On application. Codeword: *Asbolos.* Ident. Nr.: 51 39 40

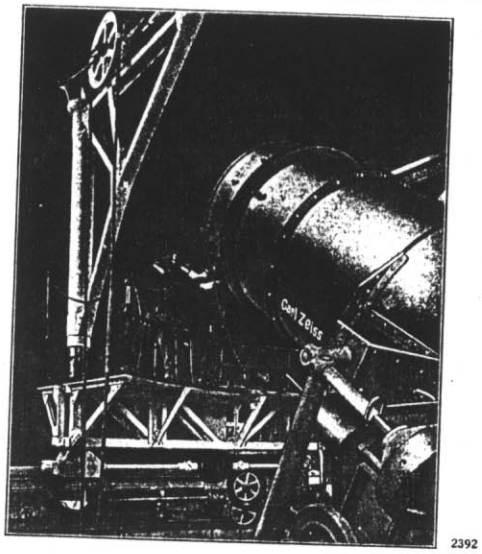


Fig. 48
Reflector of the Hamburg Observatory at Bergedorf
Eye end of the reflector tube with guiding attachment for photographic work. The rising observation platform is fixed to the dome, Fig. 172, page 119, and rotates horizontally with the latter.

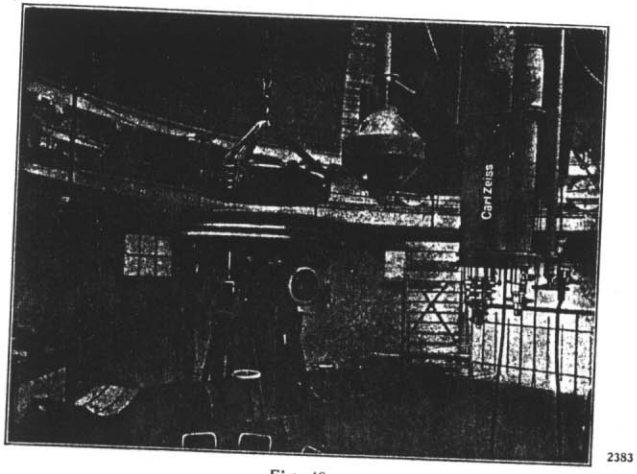


Fig. 49
Reflector of the Hamburg Observatory at Bergedorf
The truck (centre of illustration) serves for conveying the speculum to the silvering shop and also for its reception whilst being silvered.

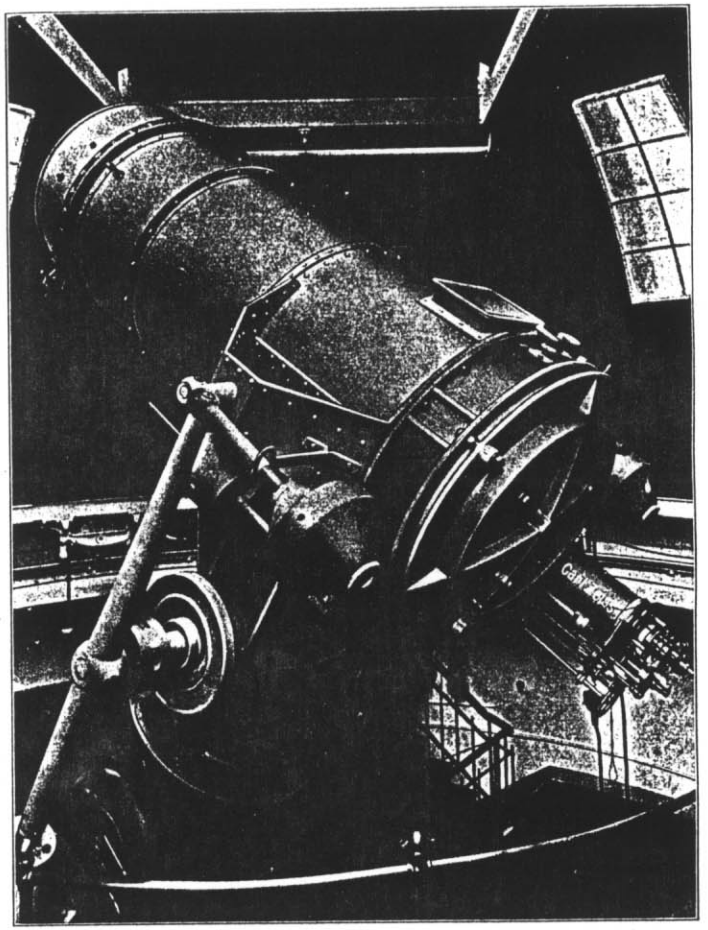


Fig. 50

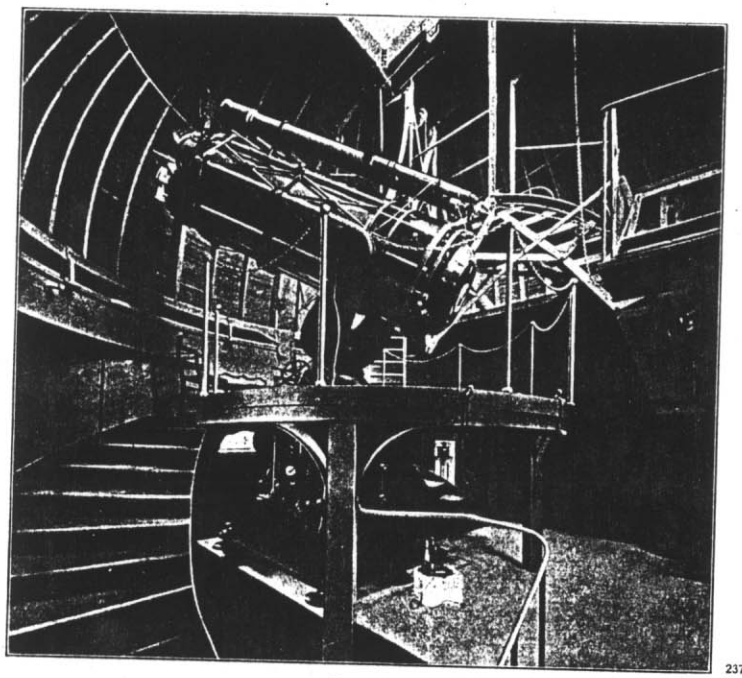
Reflector of the Hamburg Observatory at Bergedorf

Constructed by Carl Zeiss, Jena 1911

Optical equipment: Silvered parabolic glass reflector of 1000 mm. (39¼ in.) aperture and 3 m. (10 ft.) focal length. Guide telescope with E-Objective of 200 mm. (7⅞ in.) aperture and 3.5 m. (11½ ft.) focal length.

Mechanical equipment: Equatorial telescope mounting with relieving system to telescopes and equatorial axes.

Price: On application. Codeword: *Ascalabos.* Ident. No.: 51 39 10



2377

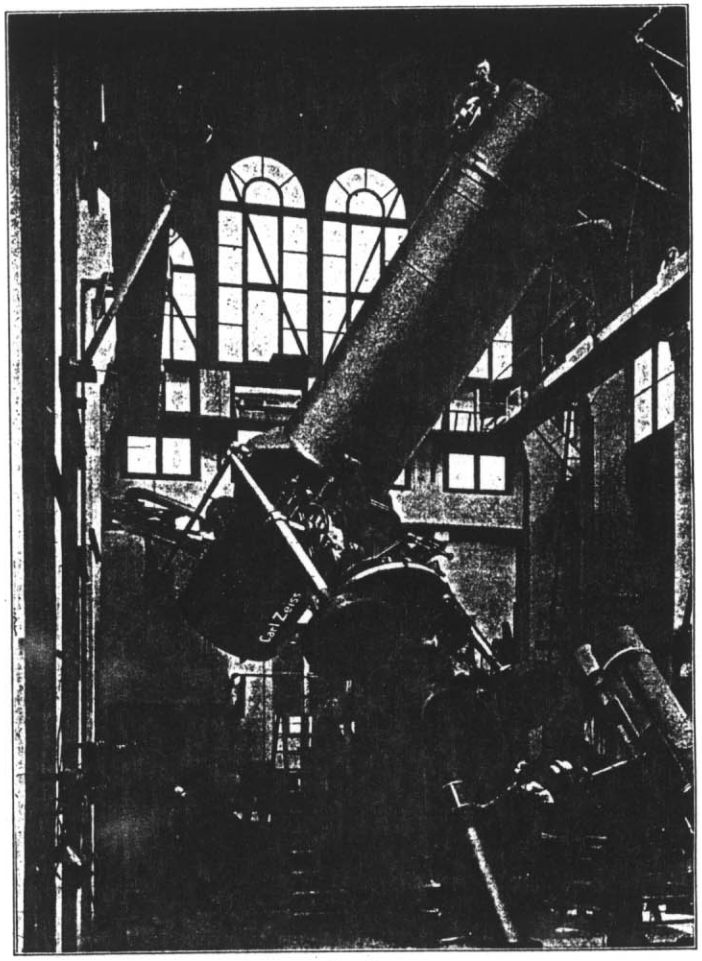
Fig. 51

Reflector of the Observatory at Heidelberg (Königstuhl)

Constructed by Carl Zeiss, Jena 1904

Silvered parabolic glass reflector of 720 mm. (28¼ in.) aperture and 2.8 m. (11¾ ft.) focal length; guide telescope with E-Objective of 610 mm. (24 in.) aperture and 2.4 m. (8 ft.) focal length; finder of 60 mm. (2⅜ in.) aperture, magnification 25×; double dark-slide for 12×9-cm. (4¾×3½-in.) plates, Fig. 114, page 88; two-prism U. V. spectrograph, Fig. 118, page 90.

Price: On application. Codeword: *Ascalabota.* Ident. No.: 51 39 72



2384

Fig. 52

Reflector of the Observatory at Berlin-Babelsberg

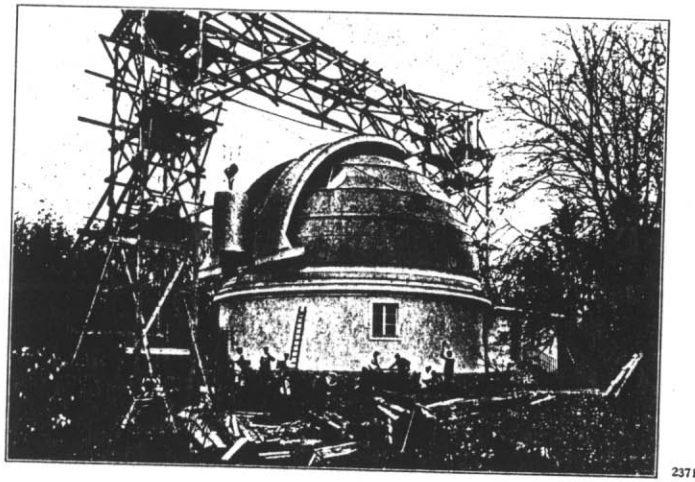
Constructed by Carl Zeiss, Jena, 1915

Showing the reflector under construction in the erecting shop.

Optical equipment: Silvered parabolic glass reflector of 1220 mm. (48½ in.) aperture with auxiliary Newtonian mirror, focal length 8.4 m. (27½ ft.); with auxiliary Cassegrain mirror, focal length 24 m. (78¾ ft.).

Mechanical equipment: Equatorial telescope mounting with stress relieving system to reflector tube and equatorial axes.

Price: On application. Codeword: *Ascalia.* Ident. No.: 51 39 12



2371

Fig. 53

Observatory at Berlin-Babelsberg

Scaffolding for housing the great reflector
Fig. 52, page 49



A 131

Fig. 54
Machine shop in the works of Carl Zeiss, Jena

Accessories

The interposition between the eyepiece and the eyepiece draw-tube necessitates a certain reduction in the length of the draw-tube extension corresponding to the lengthening of the optical path occasioned by the added aparatus. This difference in the focal adjustment will be referred to in the succeeding pages as the "tube shortening" and will in every case be stated in millimetres. The owner of a telescope will thus be enabled to decide whether, without any alteration, his instrument will accommodate the accessory in question. Where this is not the case, the focal length of the objective should either be appropriately increased by the interposition of a concave lens, or the tube mount should be suitably reduced in length. Either change will be made to order at a cost depending upon the circumstances. In the case of the accessories supplied with, or recommended for use with, Telescopes Nos. 1—61 no alteration is necessary as the eyepiece draw-tube of these telescopes has the requisite length for their addition.

When ordering any accessory it is sufficient to state the factory number of the instrument, which is inscribed on the eyepiece draw-tube below the firm's name. In the event of the telescope not being of our make it will be necessary to send a fitting bearing the screw thread of the eyepiece draw-tube. When it is intended to use an apparatus with one of the changing devices Nos. 62—67 the exact outer diameter of the existing fitting should be stated to enable us to provide a suitable changing collar, the latter being subject to a separate charge.

The smaller accessories are supplied in plain boxes, the larger ones in polished wooden cases, except where they are either permanently fitted to the telescope or intended to be kept in the telescope case. The prices of these cases or boxes are included in those stated in the succeeding pages.

Mechancial Accessories and Separate Parts of Telescopès

Astro 30 No.	Description	To be quoted when ordering: Codeword	Identification No.
	Changing Device, Fig. 55 This device, which is designed after the manner of a bayonet catch, admits of the attachment of any accessory to the eyepiece draw-tube without the use of screw threads. Each accessory has a changing ring (2) attached to it. The three lugs on this ring are introduced into the three recesses of (1), the ring is then turned until it comes to a stop, and is then clamped by means of the lever (3)		
62	**Model II,** diameter of field of view 40 mm. ($1\frac{5}{16}$ in.), tube shortening 16 mm. ($\frac{5}{8}$ in.), without changing rings	*Ascaliarum*	51 42 11
63	**1 Changing Ring** for No. 62	*Ascalon*	51 42 12
64	**Model III,** diameter of field of view 55 mm. ($2\frac{1}{8}$ in.), tube shortening 20 mm. ($\frac{3}{4}$ in.), with clamping lever, without changing rings.	*Ascalonem*	51 42 21
65	**1 Changing Ring** for No. 64	*Ascalonius*	51 42 22
66	**Model VI,** diameter of field of view 100 mm. (4 in.), tube shortening 50 mm. (2 in.), with clamping lever, without changing rings.	*Ascalopam*	51 42 31
67	**1 Changing Ring** for No. 66	*Ascalpatur*	51 42 32
	Slow Motions in azimuth and altitude by means of helical gear and flexible shaft Fig. 10, page 17, including fitting to telescope and alterations to tripod and box		
68	for 80-mm. (3 -in.) altazimuth telescopes, Nos. 13—18 . .	*Ascalpemus*	51 43 11
69	for 110-mm. ($4\frac{1}{4}$-in.) altazimuth telescopes, Nos. 19—24 . .	*Ascalpens*	51 43 16
70	for 130-mm. ($5\frac{1}{8}$-in.) altazimuth telescopes, Nos. 25—30 . .	*Asecholas*	51 43 21
	R. A. and Declination Circles with verniers R. A. circle graduated in 10 min., reading to 1 min., Declination circle graduated in 1°, reading to 5'.		
71	for 80-mm. ($3\frac{1}{8}$-in.) equatorial telescopes, Nos. 36—41. . .	*Ascalpere*	51 43 31
72	**Hour Angle Disc, Fig. 56,** for direct reading of hour angle corresponding to any right ascension after setting to stellar time	*Ascalpis*	51 43 41
	Hour circle for direct setting by stellar time and R. A., Fig. 57 Circle (2) having been rotated with the aid of the milled head (4) and set by the vernier (1) to read stellar time at the instant of observation, the instrument may be set to any R. A. by rotating the telescope and with the aid of vernier (3). The graduation and the degree of accuracy with which readings can be taken are of the same order as with the single circles. The prices of Nos. 73—75 are additional to the equipment of the refractors Nos. 48—59 with simple hour circles.		
73	for 110—130-mm. ($4\frac{1}{4}$—$5\frac{1}{8}$-in.) refractors, Nos. 48—53 . . .	*Ascalpo*	51 43 51
74	for 150-mm. (6-in.) refractors, Nos. 54—56	*Ascalpunt*	51 43 55
75	for 200-mm. ($7\frac{7}{8}$-in.) refractors, Nos. 57—59	*Ascania*	51 43 61

For particulars of dimensions and weights see page 132 — **Price List at end of catalogue**

1 Clamping ring
2 Changing collar
3 Clamping lever
4 Rack and pinion focussing attachment on eyepiece draw-tube
5 Clamp for focussing attachment
6 Two small round-headed screws for taking up wear in (4)
7 Extension piece for eyepiece draw-tube
8 Eyepiece sliding sleeve No. 247 for astro-eyepieces
9 Unscrewing eye-cap for astro-eyepieces

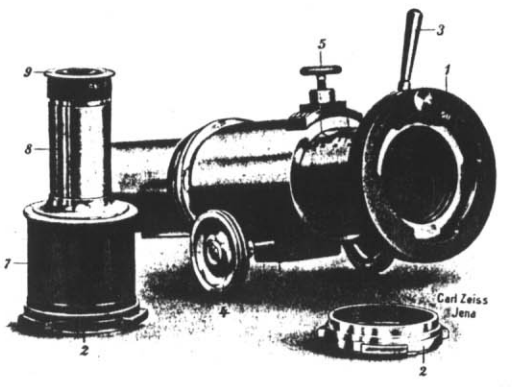


Fig. 55

Changing Attachment

No. 62—67

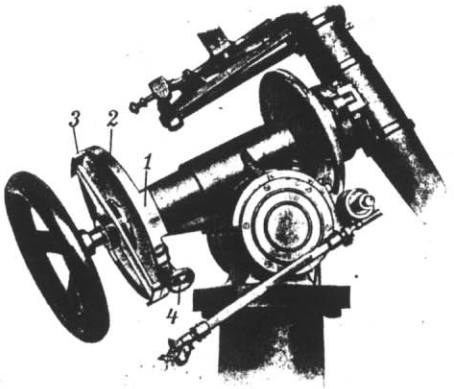


Fig. 57

Hour circle for direct setting by stellar time and R. A.

No. 73—75

1 Vernier for stellar time
2 Hour circle
3 Vernier for R. A.
4 Milled head for rotating circle (4)



Fig. 56

Hour Angle Disc

No. 72

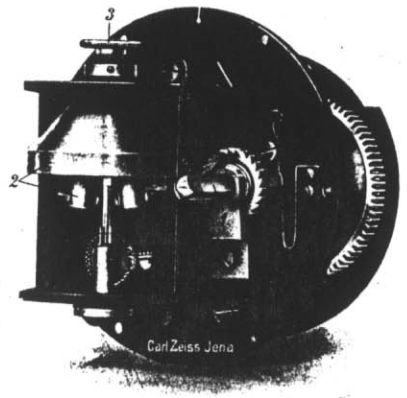


Fig. 58

Spring-driven Clock No. 76

1, Winding gear of clock, 2, Friction Governor, 3, Speed regulator

Astro 30 No.	Description	To be quoted when ordering: Codeword	Identification No.
	Clocks, Figs. 58—60, for equatorial telescope mountings including adaptation, winding gear, and driving weights		
76	Clock, *spring-driven,* for 80 to 110-mm. ($3\frac{1}{4}$—$4\frac{1}{4}$-in.) equatorial telescopes Nos. 36—47	*Ascaniora*	51 43 71
77	Clock, *weight-driven,* for 80 to 150-mm. ($3\frac{1}{8}$—6-in.) equatorial telescopes Nos. 42—56	*Ascanius*	51 43 76
78	Clock, *weight-driven,* for 200-mm. ($7\frac{7}{8}$-in.) refractors Nos. 57—59	*Ascarat*	51 43 81
79	**Electric Slow Motion in R. A., Figs. 59, 62,** for Nos. 77 and 78, 4 volts, 4 amps. including adaptation, switch, and wires	*Ascarento*	54 43 91
80	**Electric Seconds Control, Figs. 59 and 60,** for automatically regulating clock in conjunction with seconds pendulum clock. Prices include adaptation to clock and electric conductors on telescope for Clock No. 77	*Ascaride*	51 44 11
81	for Clock No. 78 } 4 volts, 2 amps.	*Ascaridum*	51 44 16
82	**Electric Accumulator** 4 volts, in wooden box, for Nos. 79—81, with connecting plug, without flexible wire	*Ascarina*	51 44 19

For particulars of dimensions and weights see page 132 — **Price List at end of catalogue**

Weight-Driven Clocks

with seconds control and electric slow motion in R. A.

Nos. 77 — 81

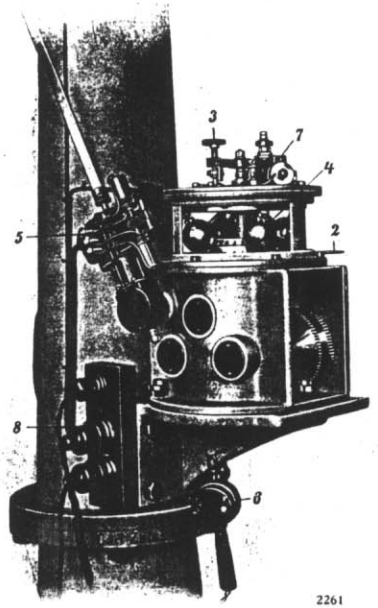


Fig. 59

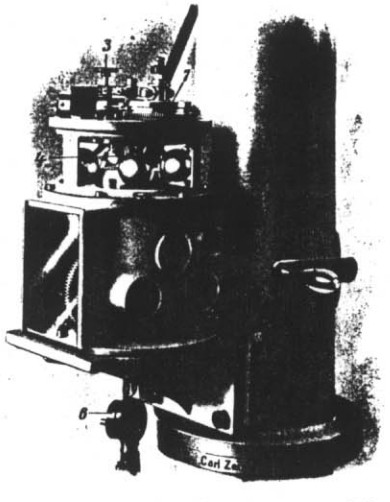
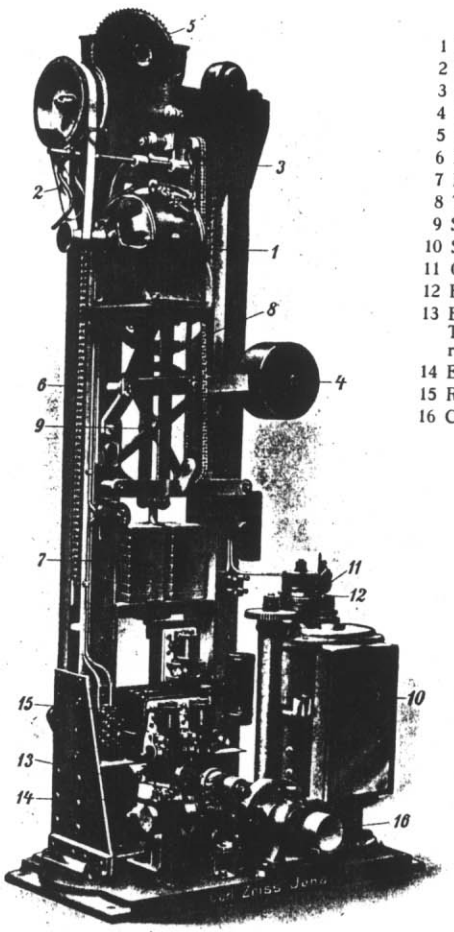


Fig. 60

1 Winding gear
2 Starting lever
3 Speed Change
4 Friction governor
5 Electric slow motion in R. A. No. 79
6 Switch for electric slow motion
7 Electric seconds control No. 80, 81
8 Connecting wires for electric slow motion (5), electric seconds control (7), and illuminating arrangements on telescope



2257

1 Electric motor (about $\frac{1}{8}$ H. P.)
2 Belt drive with two conical pulleys
3 Automatic belt shifting device
4 Weight for tightening belt
5 Worm drive
6 Endless chain
7 Driving weight
8 Tappet for (3)
9 Suspension for (7)
10 Spring friction governor
11 Governor speed change
12 Electric seconds control
13 Electro-magnetic slow motions in R. A. Two speeds each for acceleration and retardation
14 Electric motors for slow motions (13)
15 Reversing relays for electric motor
16 Coupling to refractor

Weight (7) is continuously wound by the electric motor (1). The tappet (8) and belt shifting device (3) vary the speed ratio at (2) so as to correct the speed changes arising from variations in the current supplied to the electric motor. Weight (7) remains approximately at the same height during the running of the mechanism and drives both the governor and the refractor

Fig. 61
Driving Clock for the motion in R. A. of large refractors and reflectors, No. 83

Astro 30 No.	Description	To be quoted when ordering: Codeword	Identification No.
83	**Driving Clock for the motion in R. A.** of large refractors and reflectors, Fig. 61, with switch for the two slow motions (two speeds) forward and backward, *not* including electric conductors	*Ascarius*	51 44 31

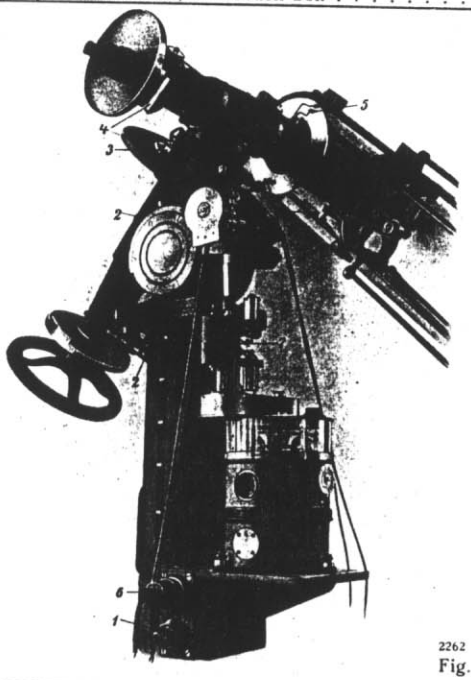
For particulars of dimensions and weights see page 132 — **Price List at end of catalogue**

Tripod Stands and Tube Mountings
for altazimuth telescopes

Astro 30 No.	Description	To be quoted when ordering: Codeword	Identification No.
	Table Tripod Stands, Fig. 4,		
84	for 60-mm. ($2\frac{3}{8}$-in.) telescopes Nos. 1—3 without telescope fork	*Ascaro*	51 40 01
85	for 80-mm. ($3\frac{1}{2}$-in.) telescopes Nos. 4—6 with telescope fork	*Ascaule*	51 40 03
	Tripod stands with standard socket pin for 60-mm. ($2\frac{3}{8}$-in.) Travelling Telescopes		
86	with altazimuth slow motion, Fig. 7, for 60-mm. ($2\frac{3}{8}$-in.) telescopes, Nos. 7—9	*Ascaulibus*	51 40 11
87	without altazimuth slow motion, Fig. 6, for 60-mm. ($2\frac{3}{8}$-in.) telescopes, Nos. 10—12	*Ascaulium*	51 40 16
87a	Extension rod for tripods of telescopes Nos. 7—12, Figs. 6 and 8, part 8, one end fitted with the standard pin, the other with socket and clamp	*Asegundais*	51 40 19
	Pyramid Tripod Stands, Fig. 10, made of wood with casters, foot screws, elevating gear and telescope fork		
88	for 80-mm. ($3\frac{1}{8}$-in.) telescopes Nos. 13—15	*Ascaunt*	51 40 43
89	for 110-mm. ($4\frac{1}{4}$-in.) telescopes Nos. 19—21	*Ascella*	51 40 45
90	for 130-mm. ($5\frac{1}{8}$-in.) telescopes Nos. 25—27	*Ascellarum*	51 40 63
90a	for 80-mm. ($3\frac{1}{8}$-in.) comet finder No. 31.	*Ascelletta*	51 40 44
	Field Tripods, Figs. 9 and 11, made of steel tubes, with elevating gear and telescope fork		
91	for 80-mm. ($3\frac{1}{8}$-in.) telescopes Nos. 16—18	*Ascenar*	51 41 03
92	for 110-mm. ($4\frac{1}{4}$-in.) telescopes Nos. 22—24	*Ascendaba*	51 41 05
93	for 130-mm. ($5\frac{1}{8}$-in.) telescopes Nos. 28—30	*Ascendado*	51 41 14
94	for 80-mm. ($3\frac{1}{8}$-in.) comet finder No. 32.	*Ascendam*	51 41 04
	Telescopes, Figs. 4—11, **Tube Mountings** without optical equipment, with tubular clip, eyepiece draw-tube, eyepiece sliding sleeve, movable counterpoise, sun shade and fitted case		
95	for 60-mm. ($2\frac{3}{8}$-in.) E- and B-Objectives	*Ascendanse*	51 10 01
96	for 60-mm. ($2\frac{3}{8}$-in.) A-Objectives	*Ascendar*	51 10 02
97	for 80-mm. ($3\frac{1}{8}$-in.) E- and B-Objectives	*Ascendaron*	51 13 01
98	for 80-mm. ($3\frac{1}{8}$-in.) A-Objectives	*Ascende*	51 13 02
99	for 110-mm. ($4\frac{1}{4}$-in.) E- and B-Objectives	*Ascendemos*	51 16 01
100	for 110-mm. ($4\frac{1}{4}$-in.) A-Objectives	*Ascendenlo*	51 16 02
101	for 130-mm. ($5\frac{1}{8}$-in.) E- and B-Objectives	*Ascendera*	51 20 01
102	for 130-mm. ($5\frac{1}{8}$-in.) A-Objectives	*Ascendia*	51 20 02
	Telescopes, Figs. 6—7, **Tube Mountings** without optical equipment, with tubular clip, eyepiece draw-tube, eyepiece sliding sleeve, fork with slow motion in altitude, and fitted case for "Travelling Models" with slow motions		
103	for 60-mm. ($2\frac{3}{8}$-in.) E- and B-Objectives	*Ascendiamo*	51 10 61
104	for 60-mm. ($2\frac{3}{8}$-in.) A-Objectives	*Ascendido*	51 10 62

Illuminating Devices

Astro 30 No.	Description	To be quoted when ordering: Codeword	Identification No.
105	**Illuminating device,** Fig. 62, for declination circles of refractors Nos. 42—53	*Ascendimus*	51 47 11
106	**Abbe Dark Ground Illumination Attachment,** Fig. 64, for the illumination of fiducial lines (bright lines on a dark ground) in field of view of eyepieces. The eyepiece cap (4), which has to be specially supplied for each eyepiece, allows only such rays to reach the eye from the graticule illuminated by (5) as have been deflected by diffraction. The price includes two eyepiece caps but no eyepieces. The latter, which should be of the orthoscopic type, f=25 to 5 mm. (1 to $\frac{3}{16}$ in.), and cross-line diaphragms, as may be required, should be ordered separately. Tube shortening: 60 mm. ($2\frac{3}{8}$ in.)	*Ascending*	51 47 15
107	**Cross Line Illumination Attachment,** Fig. 63 (bright-lines on a dark ground) for finder telescopes with cross-lines on glass plate	*Ascendisse*	51 47 21
108	**Osram Lamps** 4 volts, 0,4 amps. . . . . each	*Ascendol*	51 44 18
109	**Accumulator,** Figs. 33—35, pages 32, 33 4 volts, 16 ampère-hours (when discharging at 2 amps.) with switch, in wooden box	*Ascendome*	51 44 19



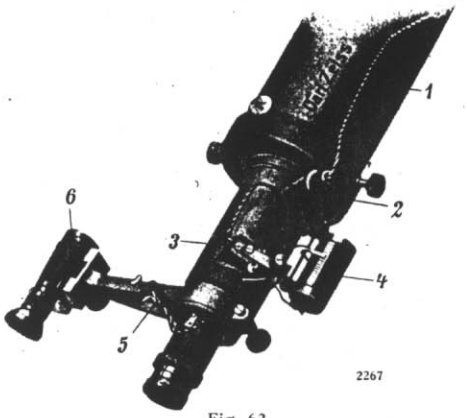
2262

Fig. 62

Illuminating Attachment for the declination circle and electric connections to the telescope No.105

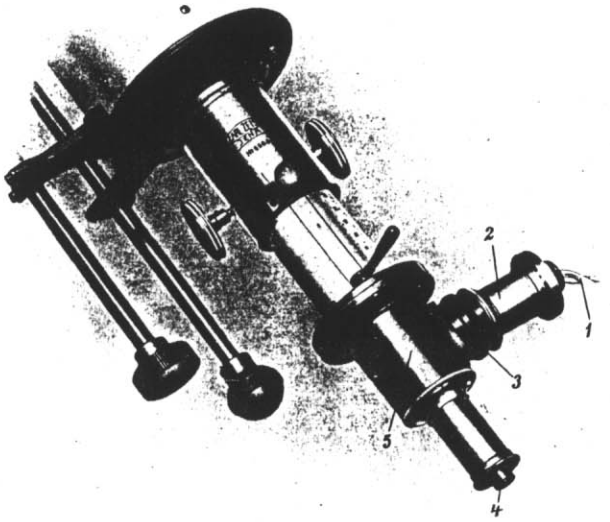
1 Plug for electric connections from accumulator (4 volts) to illuminating attachments
2 Electric connections and conductors on telescope
3 Sliding contact on hour circle
4 Illumination attachment to the declination circle (Osram lamp in casing with opal-glass front)
5 Sliding contact for the supply of current to telescope for the illumination of the field and cross-lines
6 Plug switch for current from accumulator (4 volts) to the
7 Electric slow motion in R. A.

1 Electric conductor
2 Plug connector
3 Switch
4 Resistance for varying the brightness of the cross-lines
5 Osram lamp (4-volt) in sliding socket
6 Finder, monocular field glass type



2267

Fig. 63
Cross-line Illuminating Attachment for Finders (Bright-lines on a dark ground)
No. 107



1 Electric conductors
2 Plug connector
3 Iris diaphragm for varying brightness of cross-lines
4 Eyepiece cap with small diaphragm in exit pupil
5 Casing with white illumination ring

2258

Fig. 64
Abbe Dark Ground Illuminating Attachment for the illumination of fiducial lines in the field of view of the eyepiece, showing bright lines on a dark ground, No. 106

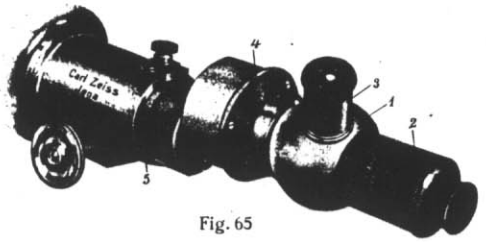


Fig. 65

Double Revolver No. 110

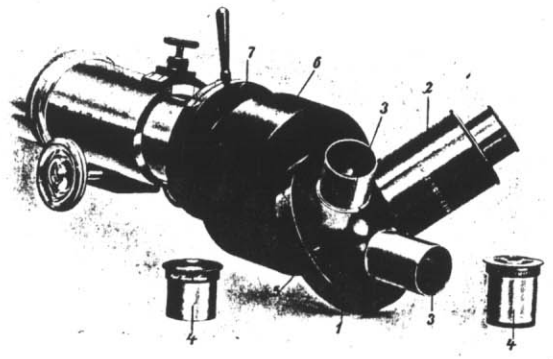
with erecting prisms No. 113

2268

1 Double revolver
2 Kellner eyepiece, f = 40 mm. ($1\frac{9}{16}$ in.) made to unscrew for use without revolver
3 Sliding sleeve for eyepieces, f = 25 to 5 mm. (1 to $\frac{3}{16}$ in.)
4 Erecting prisms
5 Eyepiece draw-tube

For astronomical observations the revolver (1) screws directly into the eyepiece draw-tube (5) without the erecting prisms

Astro 30 No.	Description	To be quoted when ordering: Codeword	Identification No.
110	**Double Revolver,** Fig. 65, with sliding sleeve for eyepieces of 25—5 mm. ($1-\frac{3}{16}$ in.) focus, screw socket for eyepieces up to f = 40 mm. ($1\frac{9}{16}$ in.). Tube shortening 60 mm. ($2\frac{3}{8}$ in.). In case, without eyepieces	*Ascendunt*	51 47 22
111	**Triple Revolver** (small model), Fig. 66, with 2 sliding sleeves for eyepieces of 25—5 mm. ($1-\frac{3}{16}$ in.) focus, screw socket for eyepieces up to f = 50 mm. (2 in.). Tube shortening 60 mm. ($2\frac{3}{8}$ in.). In case, without eyepieces	*Ascensae*	51 47 23
112	**Triple Revolver** (large model), Fig. 36, page 34, with sliding sleeve and 2 screw sockets for eyepieces up to f = 60 mm. ($2\frac{3}{8}$ in.). Tube shortening 95 mm. ($3\frac{3}{4}$ in.). In case, without eyepieces	*Ascensi*	51 47 33



2265

Fig. 66

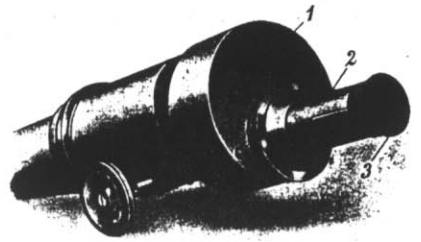
Triple Revolver No. 111

with erecting prisms No. 114

1 Triple revolver No. 111
2 Kellner eyepiece, f = 40 mm. ($1\frac{9}{16}$ in.), made to unscrew, for direct use without revolver
3 Sliding sleeve for
4 Eyepieces, f=25 to 5 mm. ($1-\frac{3}{16}$ in.)
5 Index to rotation of revolver
6 Erecting prisms
7 Changing attachment No. 62

For astronomical observations the revolver (1) should be unscrewed from the erecting prisms (6), and together with the changing ring used directly on the eyepiece draw-tube

Accessory Apparatus for Terrestrial Observations

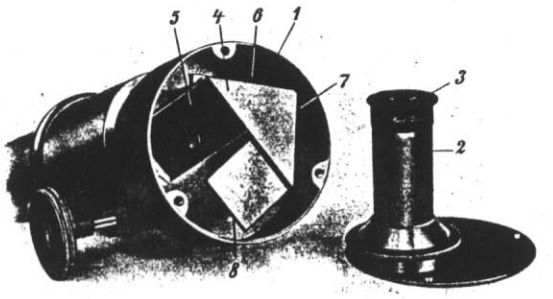


2270

Fig. 67
Erecting Prisms No. 113—116

1 Casing with erecting prisms
2 Eyepiece sliding sleeve ,
3 Eyepieces, f = 25—5 mm. ($1-\frac{3}{16}$ in.). Eyepieces, f = 60—30 mm. ($2\frac{3}{8}-1\frac{3}{16}$ in.) screwing to the casing (1) in the place of the sliding sleeve (2)

Astro 30 No.	Description	To be quoted when ordering: Codeword	Identification No.
	Erecting Prisms, Figs. 67 and 68, in conjunction with Astro-eyepieces, for erecting the image in terrestrial observations, with sliding sleeve for eyepieces of 25—5 mm. ($1-\frac{3}{16}$ in.) focus. In case.		
113	for Astro-eyepieces of 40—5 mm. ($1\frac{9}{16}-\frac{3}{16}$ in.) focus. Tube shortening 90 mm. ($3\frac{9}{16}$ in.)	*Ascensibus*	51 47 41
114	for Astro-eyepieces of 40—5 mm. ($1\frac{9}{16}-\frac{3}{16}$ in.) focus. Tube shortening 100 mm. (4 in.)	*Ascensione*	51 47 43
115	for Astro-eyepieces of 50—5 mm. ($2-\frac{3}{16}$ in.) focus. Tube shortening 120 mm. ($4\frac{3}{4}$ in.)	*Ascensiora*	51 47 45
116	for Astro-eyepieces of 60—5 mm. ($2\frac{3}{8}-\frac{3}{16}$ in.) focus. Tube shortening 150 mm. (6 in.)	*Ascensius*	51 47 47



2260

Fig. 68
Erecting Prisms with prism casing shown open
Nos. 113—116

1 Prism casing
2 Eyepiece sliding sleeve
3 Astro-eyepiece, f = 25—5 mm. ($1-\frac{3}{16}$ in.)
4 Erecting Prisms with four reflecting surfaces (5—8), at which the rays are totally reflected

Finders and Zenith Prisms

Astro 30 No.	Description	To be quoted when ordering: Codeword	Identification No.
	Finder, Fig. 10, 11, 31, with 1 two-lens objective, 1 Kellner eyepiece with crossed lines on glass plate, focussing b rotation of eye-cap, within multiple helix 2 brackets with adjusting screws for mounting and ranging the finders on the telescope An order for a finder to an existing telescope should be accompanied by a sketch giving length and diameter of the telescope tube for suitably dimensioning the brackets		
	Aperture of objective mm / Focal length of objective mm / Focal length of eyepiece mm / Magnification / Field of View / Exit pupil mm		
117	25 (1 in.) / 200 (7⅞ in.) / 25 (1 in.) / ×8 / 5°13′ / 3.1	*Ascensoir*	51 47 61
118	30 (1 1/16 in.) / 300 (11¾ in.) / 30 (1 3/16 in.) / ×10 / 4°10′ / 3.0	*Ascensorem*	51 47 63
119	45 (1¾ in.) / 360 (14 in.) / 25 (1 in.) / ×15 / 2°47′ / 3.0	*Ascensum*	51 47 65
120	60 (2⅜ in.) / 750 (30 in.) / 30 (1 3/16 in.) / ×25 / 1°40′ / 2.4	*Ascensuri*	51 47 67
121	**Monocular Field-glass** arranged as a Finder, Fig. 71. Free aperture 24 mm. (1⅛ in.) magnification ×6, field of view 6°48′, exit pupil 4 mm. . . . . The field glass is readily detachable and may be used independently. In case	*Ascentaar*	51 47 71
122	**Eyepiece Prism**, Figs. 69 and 70, consisting of a right angled prism in revolving mount for setting to any position angle, screwing on to eyepieces f = 40—5 mm. (1 1/16—3/16 in.) in place of eye-cap. . . . . This prism admits of the head being held in the normal position when observing stars near the zenith (a useful adjunct to the guide telescope in prolonged photographic exposures). In case	*Ascertain*	51 48 11
124	**Zenith Prism**, Fig. 72, consisting of a right angled prism for deflecting the rays through 90° and suitable for observations in the neighbourhood of the zenith. The mount can be rotated and clamped in position angles. Eyepiece sliding sleeve No. 247. Eyepieces of 50—5 mm. (2—3/16 in.) focus are *not* included in the price. Tube shortening 60 mm. (2⅜ in.). In case	*Ascesso*	51 48 25

For particulars of dimensions and weights see page 132 — Price List at end of calalogue



2331

Fig. 69

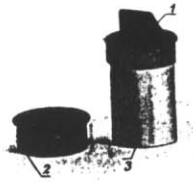


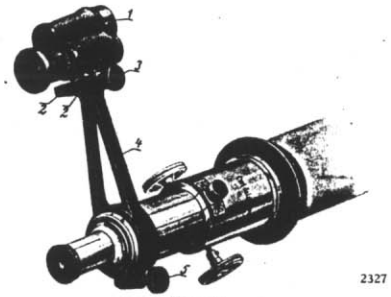
Fig. 70

1 The prism revolves about the axis of the eyepiece and screws to it in the place of the
2 Eye cap
3 Eyepiece

2356

Eyepiece Prism No. 122

1 Monocular field-glass, ×6, with cross-lines
2 Ranging adjustment for the field-glass with respect to the telescope
3 Clamp for fixing field-glass to the
4 Bracket, which is capable of rotation about the telescope axis
5 Clamp for fixing the bracket in position



2327

Fig. 71

Monocular Field-glass arranged as a Finder No. 121

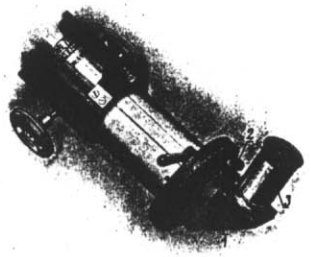


Fig. 72

Zenith Prism Nos. 123, 124

1 Zenith prism — a right angled reflecting prism in mount
2 Clamp for securing the prism against rotation about axis of telescope
3 Sliding sleeve for eyepieces of 25 to 5 mm. (1 to 3/16 in.) focus

The zenith prism facilitates the observation of objects at a great altitude

2345

Zeiss Field Glasses

Fig. 73—79

The subjoined list comprises those models of the Zeiss Field Glasses which are suitable for astronomical observation on account of their great light gathering power (exit pupil) and their extensive field of view, especially for the observation of variable stars and the like. Particulars of all models of Zeiss Field Glasses will be found in Catalogue „T 215"

Magnification	Weight of field-glasses oz.	in black stiff leather case with shoulder strap: Codeword (to be quoted on order)	in black stiff leather case with shoulder strap: Weight of case oz.	in brown stiff leather case with shoulder strap: Codeword (to be quoted on order)	in brown stiff leather case with shoulder strap: Weight of case oz.	in pocket case of soft calf with velvet finish: Codeword (to be quoted on order)	in pocket case of soft calf with velvet finish: Weight of case oz.
Field Glasses with Separately Focussing Eyepieces Figs. 73, 75, 78, 79							
4	9½	*Turol*	7½	*Turolba*	7½	*Turolwe*	3⅜
6	22	*Silvamar*	16	*Silvamarba*	16	*Silvamarwe*	4
7	40¾	*Binoctar*	22	*Binoctarba*	22	—	—
8	25½	*Deltrentis*	16	*Deltrentisba*	16	*Deltrentiswe*	4
Field Glasses with Twin Focussing Eyepieces Figs. 74, 76, 79a							
4	10⅜	*Turolem*	7½	*Turolemba*	7½	*Turolemwe*	3⅜
6	25½	*Silvarem*	15¾	*Silvaremba*	15¾	*Silvaremwe*	4
8	26½	*Deltrintem*	16	*Deltrintemba*	16	*Deltrintemwe*	4
Monocular Field Glasses Fig. 77							
6	10¾	*Simpsilv*	8	—	—	*Simpsilvpo*	2⅝
8	10	*Deltrintmo*	8½	*Deltrintmoba*	8½	*Deltrintwe*	2⅝

Optical Features of Field Glasses

Magnification	Exit pupil in	Effective diameter of objective in	Field of view: in angular measure degrees	Field of view: Diameter subtended at 1000 yds in yds	Faintest still visible stars, in magnitudes (see also page 114)
4	$\frac{3}{16}$	$\frac{3}{4}$	10°.3	182	7.4
6	$\frac{3}{16}$	$1\frac{3}{16}$	8°.4	150	8.2
8	$\frac{3}{16}$	$1\frac{9}{16}$	6°.3	110	8.7



Fig. 73. *Turol*, magnifying 4×
Diameter of 0.9. 20 mm. (¾ in.)
⅓ natural size



Fig. 74. *Turolem*, magnifying 4×
Diameter of 0.9. 20 mm. (¾ in.)
⅓ natural size

Price List at end of catalogue



Fig. 75. *Silvamar*, magnifying ×6
Diameter of o. g. 30 mm. (1$\frac{3}{16}$ in.)
⅓ nat. size



Fig. 76. *Silvarem*, magnifying ×6
Diameter of o. g. 30 mm. (1$\frac{3}{16}$ in.)
⅓ nat. size



Fig. 77. *Monocular Field Glass*
Magnifying ×6
Diameter of o. g. 30 mm. (1$\frac{3}{16}$ in.)



Fig. 78. *Binoctar*, magnifying ×7
Diameter of o. g. 50 mm. (2 in.)
⅓ nat. size



Fig. 79. *Deltrentis*, magnifying ×8
Diameter of o. g. 30 mm. (1$\frac{3}{16}$ in.)
⅓ nat. size



Fig. 79a. *Deltrintem*, magnifying ×8
Diameter of o. g. 30 mm. (1$\frac{3}{16}$ in.)
⅓ nat. size

Binocular Eyepieces, Dark Glasses, Revolving Colour Discs, Absorbing Wedges

Astro 30 No.	Description	To be quoted when ordering: Codeword	Identification No.
	Binocular Eyepiece, Fig. 82 This enables the observer to use both eyes on a single-tube astronomical telescope. The eyepiece is fitted with erecting prisms, so as to furnish erect images. It is accordingly available for terrestrial, as well as astronomical observations. Eyepieces f = 25 to 5 mm. (1 — $\frac{3}{16}$ in.), as may be desired. The eyepieces are not included in		
125	the price . . . . . In case	*Asceteria*	51 48 41
	Dark Glasses, Fig. 80 These consist of a small plate of neutral tint or coloured glass in mount with screw for attachment to the eyepieces in the place of the eye cap. The glass plates are held in position by means of a screw ring and are readily inserted and removed.		
	Neutral Dark Glasses, Fig. 80 These are used in the observation of bright objects, the sun, moon, planets and the like.		
126	Sun glass, absorbing power 13 magnitudes	*Asceterium*	51 48 61
127	Moon glass, dark „ „ 3,3 „	*Ascetery*	51 48 62
128	moon glass, light „ „ 1,6 „	*Ascetical*	51 48 63
129	Neutral glass, „ according to requirement	*Ascetismo*	
129a	Sun glass No. 126 *without* mount	*Asegunden*	51 48 65
	Coloured Dark Glasses, Fig. 80 These serve for obtaining sharper image by removing the disturbing effects of chromatic aberrations; also for viewing extended objects, such as the sun, moon or planets, details being rendered more distinct by the accentuation of contrasts.		
130	Red glass	*Ascetrias*	51 48 71
131	Yellow glass	*Ascham*	51 48 72
132	Green glass	*Aschbelt*	51 48 73
133	Blue glass	*Aschbus*	51 48 74
134	Coloured glass, thickness and kind as may be required .	*Aschemmer*	
	Revolving Colour Glass Discs, Fig. 83 with five different Colour Glasses, Nos. 127, 130—133,		
135	neutral, red, yellow, green, blue . . . . . In case	*Aschera*	51 48 81
	Absorbing Wedges, consisting of two cemented glass wedges, one being made of ordinary white optical glass, the other of dense neutral tint glass.		
	Absorbing Wedges, Fig. 81 for viewing bright objects, the sun etc., in mount with slide for displacing and screw for attachment to eyepieces in the place of the eye cap. Range of absorbing power 2.5 to 15.5 magnitudes. Travel		
136	of wedges 36 mm.	*Aschetos*	51 48 91
	Absorbing Wedges for photometric purposes. Wedge constant and dimensions		
137	of wedge according to requirement . . . . . In case	*Aschgat*	

For particulars of dimensions and weights see page 132 — **Price List at end of catalogue**

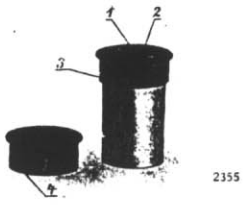


Fig. 80

Dark Glass No. 126—134

1 Dark glass
2 Retaining ring
3 Mount of moderating glass
4 Eyepiece cap



Fig. 81

Absorbing Wedge No. 136

1 Absorbing wedge
2 Mount with slide fitting and attachment screw
3 Eyepiece, f = 25 to 5 mm. (1 to $\frac{3}{16}$ in.)
4 Eyepiece cap

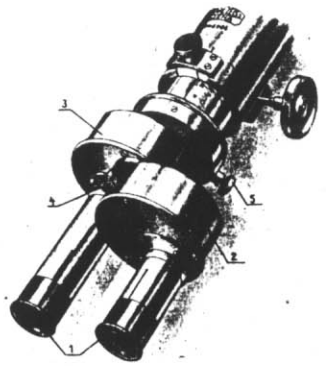


Fig. 82

Binocular Eyepiece No. 125

1 Eyepieces, f = 25 to 5 mm. (1 to $\frac{3}{16}$ in.) in sliding sleeve
2, 3 Erecting prisms
4 Scale showing distance between the eyes
5 Clamp for rotation about position axis

1 Five dark-glasses of different colours
2 Retaining rings
3 Notched revolving disc
4 Spring catch
5 Screw threads for attachment to eyepiece

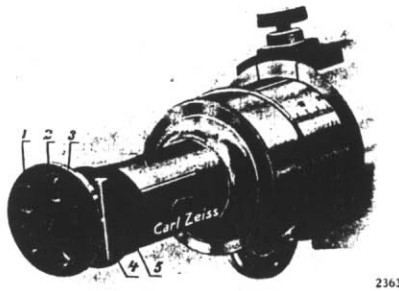


Fig. 83

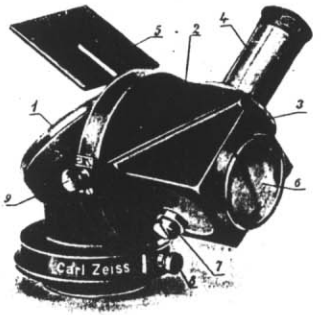
Revolving Colour Disc No. 135

Solar Prisms, Helioscopes and Projection Screens

Astro 30 No.	Description	To be quoted when ordering: Codeword	Identification No.
	Colzi Polarizing Solar Prism, Fig. 84, being a combination of a Herschel glass mirror (1) and a Pickering double prism (2) with a deflecting mirror (5) and a sliding sleeve (4) for eyepieces of 25 to 5 mm. (1 to $\frac{3}{16}$ in.) focus. Without eyepieces. By a suitable choice of liquid in (2) the sun's rays may be reduced to a convenient intensity for viewing the sun's image and the intensity varied within wide limits by rotating the prism body (2) with respect to the glass mirror (1). A full description will be found in our leaflet entitled "Colzi Polarizing Solar Prism".		
138	**Small Prism** for images of the sun up to 20 mm. ($\frac{3}{4}$ in.) diameter (as furnished by objectives of about 2 m. = $6\frac{1}{2}$ ft. focus); suitable for eyepieces of 25 to 5 mm. (1 to $\frac{3}{16}$ in.) focus. Tube shortening 70 mm. ($2\frac{3}{4}$ in.) . . . . . In case	*Aschhok*	51 49 11
139	**Large Prism** for images of the sun up to 35 mm. ($1\frac{3}{8}$ in.) diameter (as furnished by objectives of about 4 m. = 13 ft. focus); suitable for eyepieces of 40 to 5 mm. ($1\frac{9}{16}$ to $\frac{3}{16}$ in.) focus. Tube shortening 100 mm. (4 in.) . . . . . In case	*Aschiai*	51 49 21
139a	**Concave Lens** in mount for extending the focal length of the object glass.	*Aschiandor*	51 42 01
139b	**Fluid** in 50-grm. bottle for replenishing the chamber	*Asegundad*	51 49 25
141	**Herschel Solar Prism,** with absorbing wedge, Fig. 85, consisting of a glass wedge (1), having its front face inclined at an angle of 45° to the axis of the telescope and diverting about 95% of the incident light and heat; together with a sliding sleeve No. 247 and an absorbing wedge (3) for varying the intensity of the sun's image within a range of 16 magnitudes. The glass wedge (1) and the absorbing wedge (3) provide a means of reducing the intensity within magnitudes 4 to 20. Being fitted with a collar for rotation about the position axis, the solar prism may be used with comfort for observation with the sun at any distance from the zenith, much in the same way as the zenith prism. Eyepieces f=50 to 5 mm. (2 to $\frac{3}{16}$ in.), with which the prism can be used, are not included in the price. Tube shortening 73 mm. ($2\frac{7}{8}$ in.) . . . . . In case	*Aschiare*	51 49 41
	Polarizing Helioscope, Fig. 86, consisting of four plane mirrors mounted within the drums (1) and (2) and placed parallel in pairs, together with a sliding sleeve for eyepieces of 25 to 5 mm. (1 to $\frac{3}{16}$ in.) focus. The light of the sun is partially polarised by the pair (1) of mirrors. The rotation of the mirrors (2) about the position axis provides a means of varying within wide limits the intensity of the sun's image.		
142	**Small Helioscope** for eyepieces of 25 to 5 mm. (1 to $\frac{3}{16}$ in.) focus. Tube shortening 120 mm. ($4\frac{3}{4}$ in.). . . . . In case	*Aschiassi*	51 49 61
143	**Large Helioscope** for eyepieces of 40 to 5 mm. ($1\frac{9}{16}$ to $\frac{3}{16}$ in.) focus. Tube shortening 160 mm. ($6\frac{1}{4}$ in.). . . . . In case	*Aschiava*	51 49 71
	Solar Projection Screen, being a white screen with carrying rods and tube clip for attachment to the telescope, as well as a black protecting screen.		
143a	for finder telescopes, Fig. 107, page 82, part 4	*Asegundese*	51 49 90
144	for telescopes of 60–80 mm. ($2\frac{3}{8}$–$3\frac{1}{8}$ in.) aperture, Fig. 6, page 13	*Aschiera*	51 49 91
145	for telescopes of 110–130 mm. ($4\frac{1}{4}$–$5\frac{1}{8}$ in.) aperture, Fig. 34, part 32	*Aschierana*	51 49 93
146	for telescopes of 150–200 mm. (6–8 in.) aperture, Fig. 34, part 32	*Aschieremo*	51 49 95

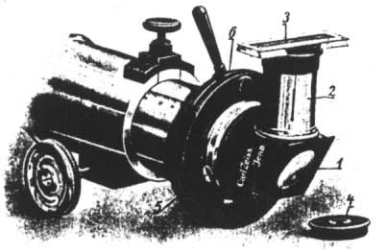
For particulars of dimensions and weights see pages 132 and 133 — Price List at end of catalogue

1 Glass mirror
2 Glass prism
3 Liquid prism
4 Sliding sleeve for eyepieces, f = 25 to 5 mm. (1 to $\frac{3}{16}$ in.)
5 Safety mirror
6 Transparent membrane
7 Screw plug
8 Clamp to rotation about position axis
9 Clamp to prism rotation for varying the intensity



2352

Fig. 84
Colzi Polarising Solar Prism Nos. 138, 139

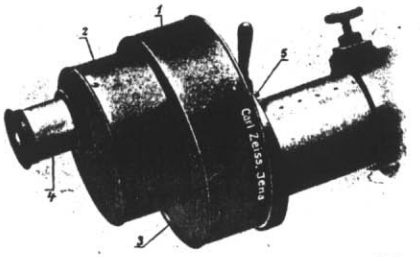


2334

1 Reflecting prism
2 Sliding sleeve for eyepieces, f = 25 to 5 mm. (1 to $\frac{3}{16}$ in.)
3 Absorbing wedge No. 136
4 Eyepiece cap
5 Clamp to rotation about axis of telescope
6 Changing device No. 62

Fig. 85
Herschel Solar Prism with Absorbing Wedge Nos. 140, 141

1 Polariser
2 Analyser capable of rotation about the position axis
3 Divided circle with index to (2)
4 Sliding sleeve for eyepieces, f = 25 to 5 mm. (1 to $\frac{3}{16}$ in.)
5 Changing device



2375

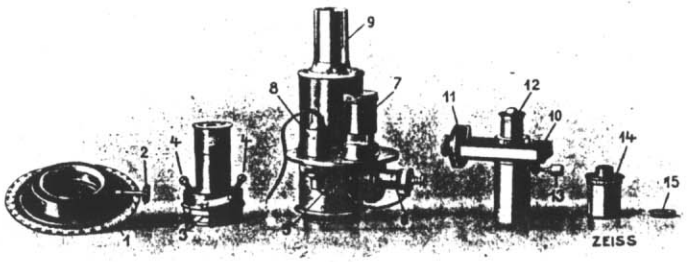
Fig. 86
Polarising Helioscope Nos. 142, 143

Micrometers

The eyepiece micrometers Nos. 147 to 152 are mounted in a special screw fitting, by means of which they can be adjusted to a sharp focus within the eyepiece. When ordering any of the micrometers Nos. 147 to 152 for use with existing eyepieces, these should be sent for adaptation.

Astro 30 No.	Description	To be quoted when ordering: Codeword	Identification No
147	**Cross Webs,** being spider's webs stretched over a plate, fitted to eyepiece	*Aschiel*	51 50 10
148	**Cross Lines,** etched on glass and fitted into eyepiece. Thickness of lines according to specification or to suit stated purpose	*Aschino*	51 50 15
149	**Eyepiece Micrometer,** being a ruled glass plate, upon which 5 mm. are divided into tenths of a millimetre. The price includes the mount and adaptation to the eyepiece	*Aschiosa*	51 50 20
150	**Eyepiece Cross Line Micrometer,** being a small glass plate with ruled reticule of 5 mm. square divided into squares of 0.5 mm. side. The mount and adaptation to the eyepiece are included in the price. . .	*Aschiza*	51 50 25
151	**Circular Micrometer,** being a small glass plate having three concentric circles ruled upon it. The diameters of these circles according to requirements and to correspond with the field of view of the eyepiece employed. The mount and adaptation to the eyepiece are included in the price	*Aschkar*	51 50 30
152	**Ring Micrometer,** consisting of a steel ring cemented to a glass plate. The inner and outer diameters of the ring (according to requirement) are made to correspond to the eyepiece employed. The mount and adaptation to the eyepiece are included in the price	*Aschkarman*	51 50 35
152a	**Cross Bar Micrometer,** Figs. 86a and 86c, consisting of two steel bars at right angles to each other within the field stop and so arranged that they may be rotated about the position axis and clamped at position angles of 0°, 45° and 135°. Orthoscopic eyepieces of 25 to 5 mm. (1 to $\frac{3}{16}$ in.) focus, which should be used, are not included in the price of the micrometer . . . . In case	*Aseguraba*	51 50 36
152b	**Position Circle,** Figs. 86a to c and 87, divided into degrees, fitted with index for reading fractional degrees, with clamp and collar for rotation about the position axis. Screw with inside thread to fit Nos. 106, 152a and 247 . . . . . In case	*Asegurado*	51 50 38
153	**Eyepiece Screw Micrometer,** Fig. 87, consisting of a micrometer screw with movable filar plate (cross lines and double lines); rotation counter within the field of view; stationary filar plate; (orthoscopic) eyepiece in special mount for the accomodation of the micrometer; focal length 12.5, 10, 9 or 7 mm. ($\frac{1}{2}$, $\frac{13}{32}$, $\frac{11}{32}$ or $\frac{9}{32}$ in.), according to requirement. The micrometer slides into an eyepiece sleeve and has a clamping collar for rotation in terms of position angles. Tube shortening: 30 mm. ($1\frac{3}{16}$ in.). In case	*Aschkolk*	51 50 41

For particulars of dimensions and weights see page 133 — **Price List at end of catalogue**

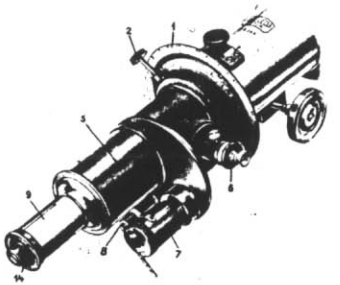


9006

Fig. 86a

Key to Figs. 86a—c and 87

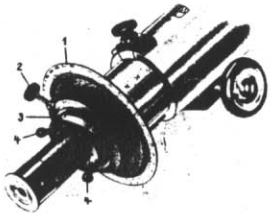
1 Position circle No. 152b
2 Clamp to rotation about position axis
3 Cross-bar micrometer No. 152a
4 Revolving collar with spring catch for rotation into position angles
5 Abbe dark-ground illuminating attachment No. 106
6 Electric lamp with conducting wires
7 Regulating resistance drum
8 Plug connector
9 Eyepiece sliding sleeve No. 247
10 Eyepiece screw micrometer No. 153
11 Graduated drum (100 divisions) with index; screw pitch 0.5 mm.
12 Micrometer eyepiece with dark-ground stop
13 Clamp for the eyepiece screw micrometer
14 Sliding eyepiece with dark-ground stop in cap
15 Ordinary eyepiece cap



9005

Fig. 86b

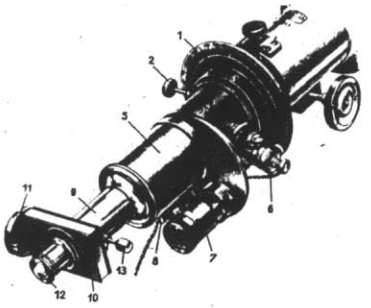
Position Circle No. 152b
with dark-ground illuminating attachment No. 106 and eyepiece with micrometer No. 148—152



9001

Fig. 86c

Position Circle No. 152b
with cross-bar micrometer No. 152a



9003

Fig. 87

Position Circle No. 152b
with dark-ground illuminating attachment No. 106 and eyepiece screw micrometer No. 153