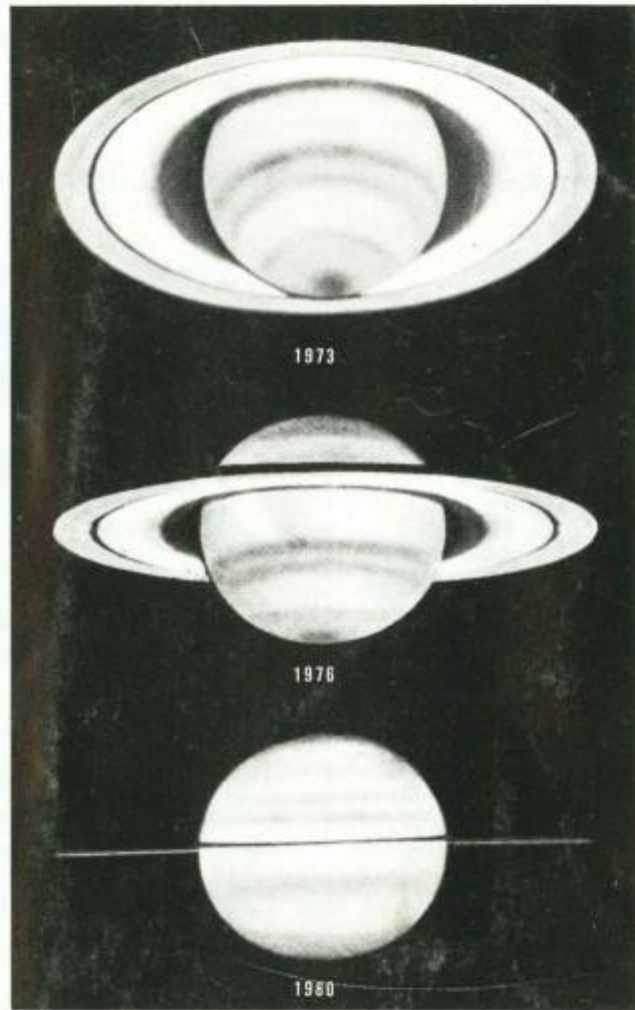


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TOKYO

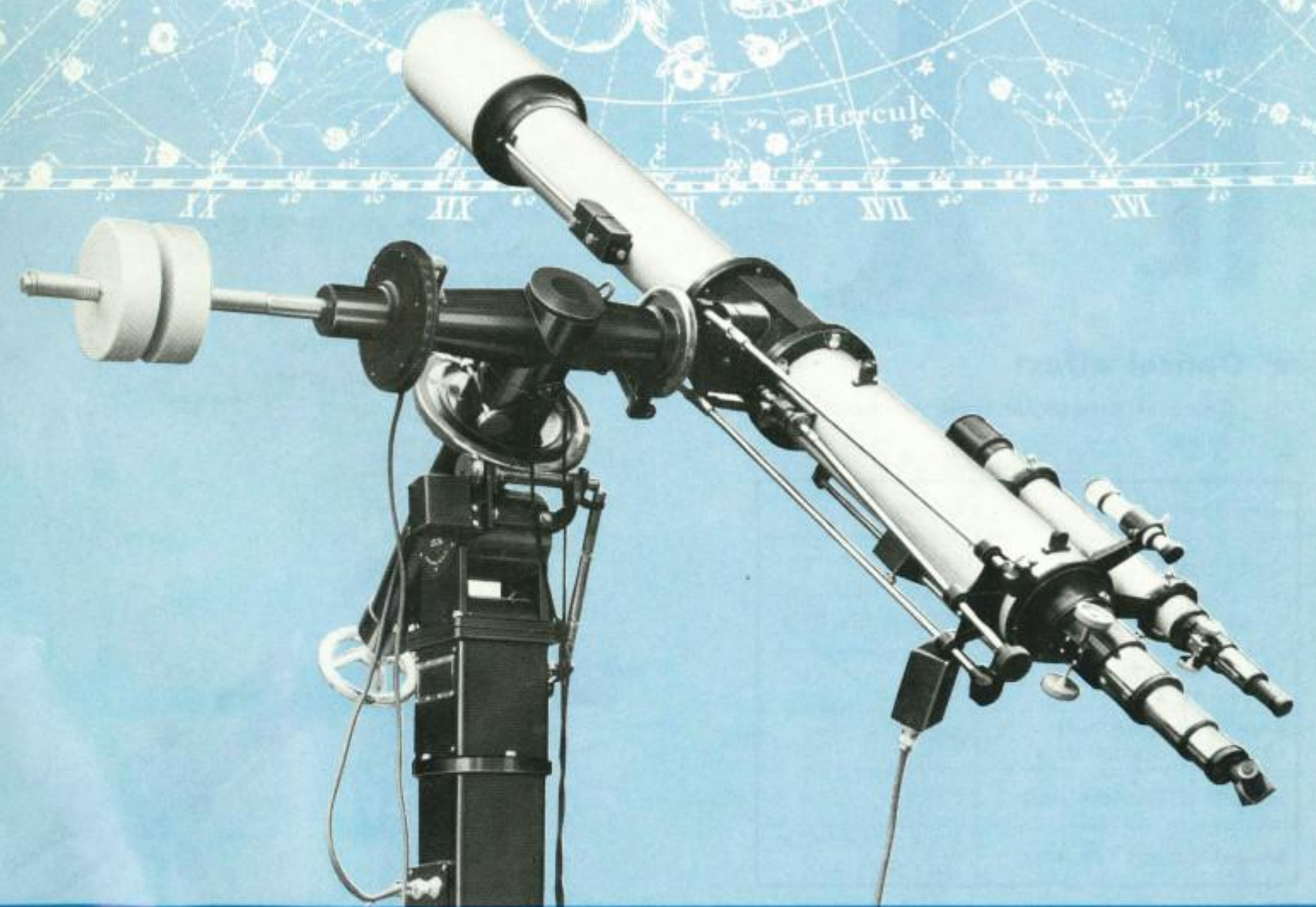


Printed in Japan

ROYAL  
TOKYO

*Astronomical and Terrestrial*

# TELESCOPES



**ASTRO OPTICAL IND. CO., LTD.**

TOKYO, JAPAN

# 150mm Equatorial Refractor

## R-151

A higher grade telescope for the use in schools, universities, observatories and public institutions.

It is the most suitable instrument for semi-professional astronomers.

The manipulation of the tube can be made automatically by an electrical device as well as by hand at the foot of the eye-end. The equatorial mounting rests on a heavy iron support which guarantees stability and assures minute observation.

### ★ Driving clock

Electric clock drive with synchronous motor for rate regulation, capable of setting the speed to the diurnal motion.

### ★ Accessories

- 6 Eye-pieces
  - Orthoscopic ..... Or 4mm
  - " ..... Or 6mm
  - " ..... Or 9mm
  - Kellner ..... K 12mm
  - " ..... K 25mm
  - " ..... K 50mm

- 1 Star finder 6×30mm 4°
- 1 Guide telescope D=60mm f=700mm (35x with cross-haired eyepiece)
- 3 Sun glasses
- 2 Moon glasses
- 2 Star diagonal prisms
- 1 Sun diagonal prism
- 1 Sun projection screen



### ★ Optical effect

Objective (Fraunhofer type, Achromat, Hard coated)

Lens aperture	155mm
Clear aperture	150mm
Focal length	2250mm (F=15.0)
Light collecting power for naked eye	460×
Resolving power with respect to double stars	0.8"
Faintest discernible stars	12.7m
Magnifications for Astro.	563×, 375×, 250×, 188×, 90×, 45×

### ★ Mounting

Equatorial mount with hour and declination circles and slow motions on iron pillar stand.

# 108mm Equatorial Refractor

## R-101

A fine telescope of advanced design for the purpose of the use of amateur astronomers or higher school students in its dome.

The instrument is equipped with a precise sidereal drive by the electric motor driving apparatus.

### ★ Accessories

- 6 Eye-pieces
  - Orthoscopic ..... Or 4mm 400×
  - " ..... Or 6mm 267×
  - " ..... Or 9mm 178×
  - Kellner ..... K 12mm 133×
  - " ..... K 25mm 64×
  - Huygens ..... K 50mm 32×

- 2 Finder telescope 6×30mm 4°
- " 25×50mm 1°
- 2 Sun glasses
- 1 Moon glass
- 1 Star diagonal prism
- 1 Off axis stop & dust cap

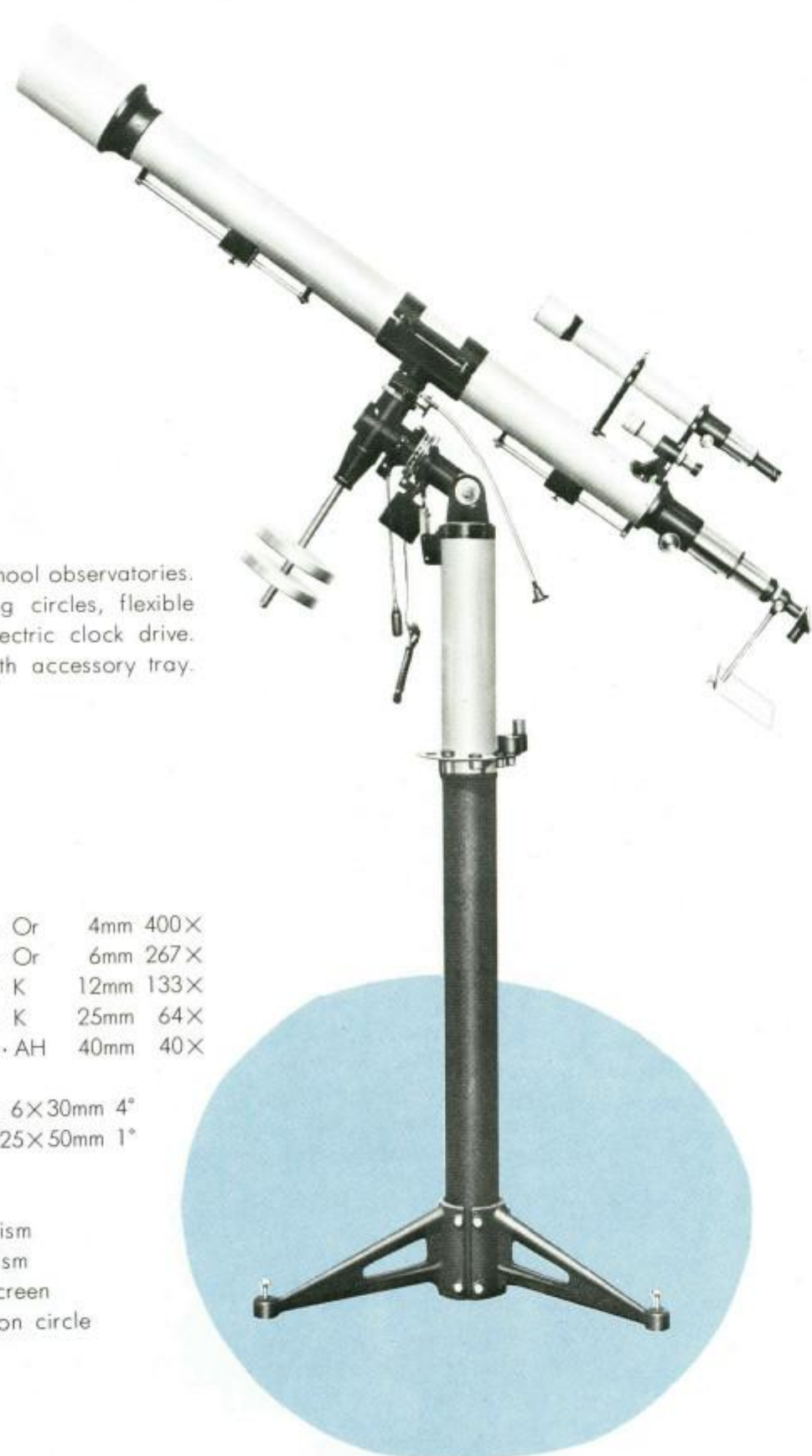


Model	Mounting	Optical effect					
		Objective (Fraunhofer type, Achromat, Hard coated)					
		Lens aperture	Clear aperture	Focal length	Light collecting power for naked eye	Resolving power with respect to double stars	Faintest discernible star
R101	Equatorial on iron pillar stand	112mm	108mm	1600mm (F14.8)	238×	1.0"	12.0m

# 108mm Equatorial Refractor

## R-102

An excellent telescope for home and school observatories. Complete equatorial mount with 3 setting circles, flexible slow motion controls and synchronous electric clock drive. Extra-rigid, heavy duty pedestal base with accessory tray. These are its outstanding features.



### ★ Accessories

- 5 Eye-pieces
  - Orthoscopic ..... Or 4mm 400×
  - " ..... Or 6mm 267×
  - Kellner ..... K 12mm 133×
  - " ..... K 25mm 64×
  - Achromat Huygens... AH 40mm 40×
- 2 Finder telescopes 6×30mm 4°
- " 25×50mm 1°
- 2 Sun glasses
- 1 Moon glass
- 1 Star diagonal prism
- 1 Sun diagonal prism
- 1 Sun projection screen
- 1 Hour & declination circle

Model	Mounting	Optical effect					
		Objective (Fraunhofer type, Achromat, Hard coated)					
		Lens aperture	Clear aperture	Focal length	Light collecting power for naked eye	Resolving power with respect to double stars	Faintest discernible star
R102	Equatorial on metal pedestal base	112mm	108mm	1600mm (F=14.8)	238×	1.0"	12.0m

# 80mm Equatorial Refractor



## R-83

The most excellent telescope for the use of comet seekers. Semi-apochromatic objective lens (D: 80mm, f: 600mm, in triple components) brings its genius into full play.

Built-in Polar telescope, setting circles, capable of setting the instrument speedy and correctly.

### ★ Accessories

- 2 Eyepieces (Or 12.5mm, Or 5mm)
- 1 Finder telescope 6×30mm 4°
- 1 Polar telescope 5×25mm 5°
- 1 Hour & declination circle
- 1 Wooden carrying case

Model	Mounting	Optical effect					
		Objective (Fraunhofer type, Achromat, Hard coated)					
		Lens aperture	Clear aperture	Focal length	Light collecting power for naked eye	Resolving power with respect to double stars	Faintest discernible star
R-82	Equatorial on field tripod	83mm	80mm	1200mm (F=15.0)	131×	1.4"	11.3m



## R-82

A fine telescope of advanced design for the purpose of the use of amateur astronomers and school students.

The equatorial mount is equipped with setting circles, flexible slow motion controls and synchronous electric clock drive which enables the user to obtain scientific observation and to take astro photography.

### ★ Accessories

- 3 Eye-pieces
  - Orthoscopic ..... Or 6mm 200×
  - " ..... Or 12.5mm 96×
  - Kellner ..... K 25mm 48×
- 1 Finder telescope 6×30mm 4°
- 1 Sun glass
- 1 Moon glass
- 1 Star diagonal prism
- 1 Sun diagonal prism
- 1 Sun projection screen
- 1 Hour & declination circle

# 76mm Equatorial Refractor



**R-76**

A high class telescope for amateur astronomers and school students for all-round purposes. The instrument has an unusually high light collecting power which displays a very bright image.



**R-77**

A high class telescope of superior quality of amateur astronomers and school students for all-round observations. Scientific observation obtainable, according to Hour and Declination circles being provided.

Model	Mounting & Tripod	Optical effect						Accessories												
		Objective (Fraunhofer type, Achromat, Hard coated)			Magnifications			Finder telescope	Eye-piece	Sun glass	Moon glass	Star diagonal prism	Sun projection screen	Erecting prism	Hour & decl. circle	Barlow lens (2X)				
		Lens aperture	Clear aperture	Focal length	Light collecting power for naked eye	Resolving power with respect to double stars	Faintest discernible star										Astro.	Terr.		
R76	Equatorial & Alt-azimuth on field tripod	mm 79	mm 76	mm 910	X 118	" 1.6	" 11.2	182X, 75X, 36X	same as astro.	mm 6X30	3	1	1	1	1	1	1	1	1	1
R77	"	"	"	1200	"	"	"	240X, 100X, 48X (with Barlow lens 480X, 200X, 96X)	"	6X30	3	1	1	1	1	1	1	1	1	1

# 60mm Equatorial Refractor



**R-61D**

A slick stream-lined instrument which is patented for its trim design, new mechanism and highly convenient mounting. Its high magnifying power provides extremely sharp images and the flexible shaft enables observation from any position.



**605**

A patented Astro type astronomical telescope for beginners, primary school and middle school students. It is light and easy to manipulate, and has a high magnifying power. The convenient mount enables one to easily trace a comet, and it is popular for observation of distant landscapes and objects at sea or in the mountains.

Model	Mounting	Optical effect						Accessories											
		Objective (Fraunhofer type, Achromat, Hard coated)			Magnifications			Eye-piece	Finder telescope	Sun glass	Star diagonal prism	Erecting prism	Sun projection screen	Barlow lens (2X)					
		Lens aperture	Clear aperture	Focal length	Light collecting power for naked eye	Resolving power with respect to double stars	Faintest discernible star								for Astro.	for Terr.			
R61D	Equatorial & Alt-azimuth with slow motions on field tripod	mm 62.5	mm 60	mm 1200	X 73	" 1.9	" 10.7	200X, 96X, 48X	same as astro.	3	6X30mm4"	1	1	1	1	1	1	1	1
605	"	"	"	910	"	"	"	152X, 73X, 46X (with Barlow lens 304X, 146X, 92X)	"	3	"	1	1	1	1	1	1	1	1

# 60mm, 50mm Refractor

# 60mm & 76mm Equatorial Refractor



**R-68**

A simple astronomical and terrestrial telescope for beginners with yoke type alt-azimuth mounting on field tripod. It is light and easy to manipulate and has high magnifying power.



**R-51**

Smallest and effective astronomical telescope for amateur astronomers or school use with equatorial and alt-azimuth mount on field tripod.

Model	Mounting	Optical effect						Accessories								
		Objective (Fraunhofer type, Achromat, Hard coated)			Magnifications			Eye-piece	Finder telescope	Sun glass	Star diagonal prism	Erecting prism	Sun projection screen	Barlow lens (2X)		
		Lens aperture	Clear aperture	Focal length	Light collecting power for naked eye	Resolving power with respect to double stars	Faintest discernible star								for Astro.	for Terr.
R68	Alt-azimuth on field tripod	mm 62.5	mm 60	mm 1000	X 73	" 1.9	m 10.7	167X, 50X	same as astro.	2	5X25mm5"	1	1	-	-	1
R51	Equatorial & Alt-azimuth on field tripod	52	50	750	51	2.3	10.3	125X, 83X, 40X	"	3	"	1	1	-	1	-



**EM-6 ("Photo Mount")**

The most convenient equatorial mount for celestial photography with the camera attached as it follows the diurnal movement of the celestial bodies. This mount enables the user to make both an observation and photography at the same time which will meet the demand of astronomers.

Being built-in Polar Telescope (5X25mm 5"), setting up can be made easily and correctly. By fixing the guiding telescope and camera on the universal plate of the mount, the user can take easily celestial photography.

Following accessories are available at additional cost:

1. Universal telescope band (50mm-80mm)
2. Guiding telescope:  
D: 50mm f: 500mm  
D: 60mm f: 910mm
3. Eyepiece K12mm with cross hair
4. Pulse motor (Crystal Oscillator system)  
(DC 12V, and also electric power can be supplied from car battery)



**R-60 (D:60mm, F.L.:1000mm)**

A fine telescope of advanced design for amateur astronomers and astro photographers.

The equatorial mount is equipped with polar telescope, setting circles, flexible slow motion controls which enables the user to obtain scientific observation and to take astro photography.

Additional accessories are available at extra cost.



**R-70 (D:76mm, F.L.:910mm)**

An excellent telescope for amateur astronomers and school students which is very convenient for celestial photography and scientific observation.

Built-in polar telescope which enables the user to set up the telescope easily and accurately.

# Newtonian Equatorial Reflector

## LN-12E

The most magnificent reflector for universities, observatories and professional astronomers.

The manipulation of the tube can be made automatically by an electrical device as well as by hand. Equatorial mount with setting circles, slow motion controls and electric drive enables the user to trace precisely the celestial objects.

### ☆ Main mirror:

Pyrex, Parabolic surface, Aluminized & Siliconized.

### ☆ Mounting:

Equatorial mount with hour and declination circles and slow motion on heavy iron pillar stand.

### ★ Driving clock

Electric clock drive capable of setting the speed to the diurnal motion.

### ★ Accessories

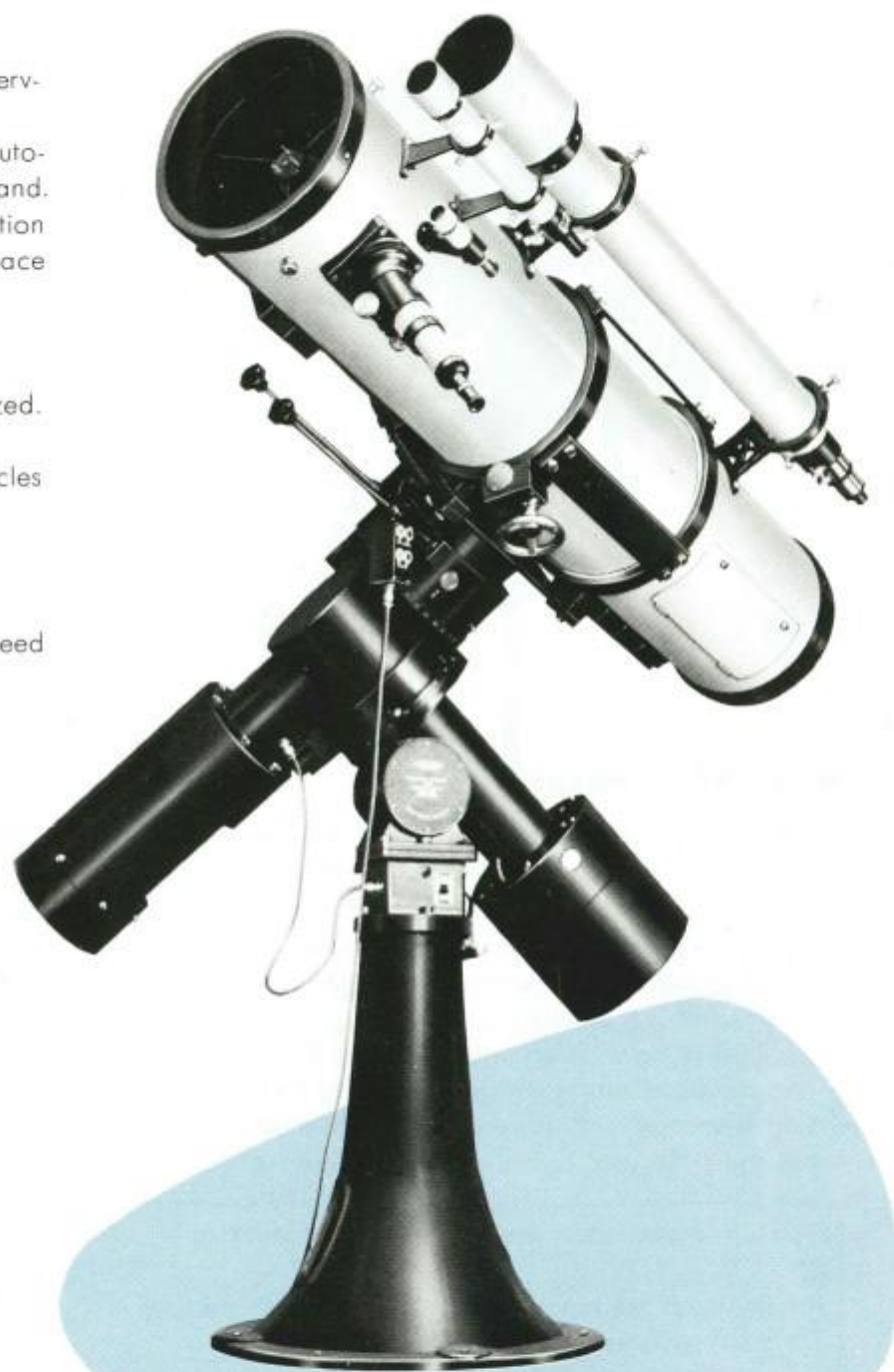
7 Eye-pieces

Orthoscopic	..... Or	4mm	563X
"	..... Or	6mm	375X
"	..... Or	9mm	250X
"	..... Or	12.5mm	180X
"	..... Or	18mm	125X
"	..... Or	25mm	90X
Kellner	..... K	50mm	45X

2 Finder telescopes 6X30mm 4"  
" 25X50mm 1"

1 Guide telescope D=80mm f=1200mm

- 3 Sun glasses
- 2 Moon glasses
- 2 Star diagonal prisms
- 1 Sun diagonal prism



Model	Mounting	Optical effect				
		Objective				
		Mirror aperture	Focal length	Light collecting power for naked eye	Resolving power with respect to double stars	Faintest discernible star
LN12E	Equatorial on pillar stand	300mm	2250mm (F=7.5)	1837X	0.39"	14.2m

# Newtonian Equatorial Reflector

## LN-10E

Magnificent reflector, high magnifications and bright images are obtainable. The satellites of Uranus "Oberon" and Owl nebulae (M97) in Ursa Major can be seen.

### ☆ Main mirror:

Parabolic surface, Aluminized & Siliconized

### ☆ Mounting:

Equatorial mount with hour and declination circles and slow motion on iron pillar stand.

### ☆ Driving clock:

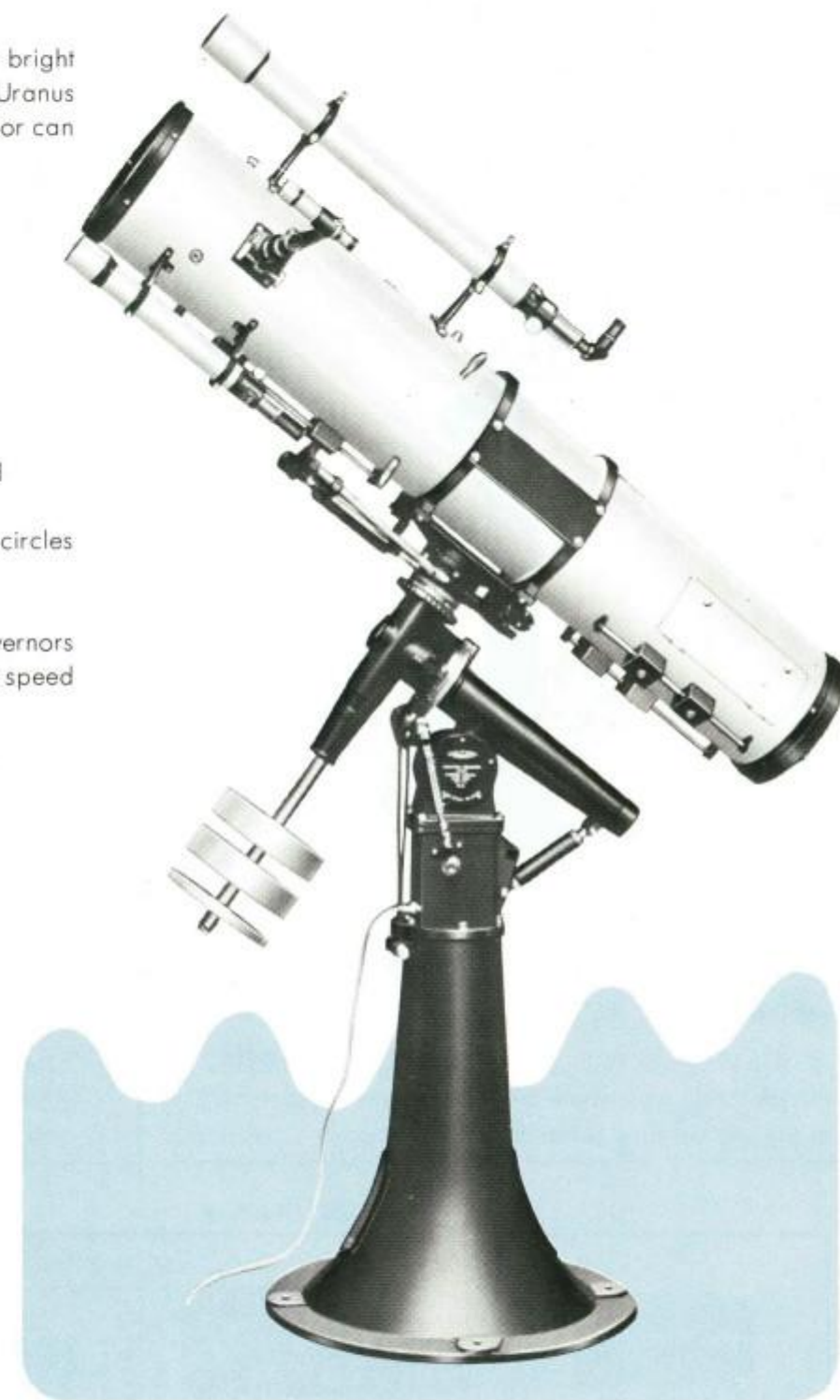
Electric clock with motor or gravity governors for rate regulation, capable of setting the speed to the diurnal motion.

### ★ Accessories

6 Eye-pieces			
Orthoscopic	..... Or	4mm	450X
"	..... Or	6mm	300X
"	..... Or	9mm	200X
Kellner	..... K	12mm	150X
"	..... K	25mm	72X
"	..... K	50mm	36X

2 Finder telescope 6X30mm 4"  
" 25X50mm 1"

- 2 Sun glass
- 1 Moon glass
- 2 Star diagonal prism
- 1 Sun diagonal prism
- 1 Sun projection screen
- 1 Hour & declination circle



Model	Mounting	Optical effect				
		Objective				
		Mirror aperture	Focal length	Light collecting power for naked eye	Resolving power with respect to double stars	Faintest discernible star
LN-8E	Equatorial on pillar stand	200mm	1600mm (F=8.0)	817X	0.6"	13.3m
LN10E	"	250mm	1800mm (F=7.2)	1276X	0.5"	13.8m

# Newtonian Equatorial Reflector



**LN-6E**

A higher grade reflector with driving clock for semi-professional astronomers. High magnifications and bright images are obtainable.



**LN-4E**

A high class astronomical reflector with equatorial mount for amateur astronomers and school students.



**LN-4T**

An excellent reflector with equatorial mount on rigid wooden tripod for amateur astronomers and school students.

Model	Mounting	Optical effect					Accessories					
		Objective			Magnification		Eye-piece	Finder telescope	Sun glass	Moon glass	Off axis stop & dust cap	
		Mirror aperture	Focal length	Light collecting power for naked eye	Resolving power with respect to double stars	Faintest discernible star						Astro.
LN-4E	Equatorial on pedestal stand	mm 100	mm 1000	X 204	" 1.2	m 11.8	167X, 80X, 40X	3	6X30mm4°	1	1	1
LN-4T	Equatorial with slow motions on rigid wooden tripod	100	1000	204	1.2	11.8	167X, 80X, 50X	3	6X30mm4°	1	1	1
LN-6E	Equatorial on pedestal stand	150	1300	460	0.8	12.7	325X, 217X, 108X, 52X	4	12X40mm2°	2	1	1

# Accessories & Parts

## ★ EYE-PIECE



It is necessary to change the range of magnification and or field of view according to the objects. And it is suggested that you use the H or HM type of eye-pieces for the Refractor, and the Orthoscopic or the Kellner for the Reflector.

Orthoscopic: This consists of a field lens of three components and a simple

plano convex eye lens. It is by far the best eye-piece particularly for high magnification.

Kellner: This has a plano convex field lens and an achromatic eye lens. It is very popular for low and medium powers.

## ★ STAR DIAGONAL PRISM



A prism eye-piece which enables you to observe celestial objects in an easy and comfortable position. The horizontal position of the object is inverted, but the vertical position is seen correctly, and, therefore, substitutes the erecting prism.

## ★ SUN PRISM



When observing the sun only through a sun glass, there is the possibility the sun glass will crack from the heat of the sun. The sun prism absorbs 95 % of the sun's heat and enables you to observe the sun for a lengthy period of time.

## ★ ERECTING PRISM



With an astronomical telescope, the object is seen inverted which makes it inconvenient to see. The purpose of the erecting prism is to normalize the position of the object seen through the telescope. There are two sizes, large and small, and the use of these prism lenses provides a broader prospective than the ordinary eye-piece.

## ★ BARLOW LENS



A color-corrected, capsular lens which is inserted between the main tube and the eye-piece and which optically lengthens the depth of focus and increases the magnification exactly twice or thrice that of the normal magnification of the telescope lens. It is convenient when you do not have many varieties of eye-pieces. And it can be used for photographing the sun.

When it is used individually, has the quality of Galillei type telescope.

## ★ STAR FINDER



Astronomical telescope must be needed of the star finder telescope of which the low power and wide field. Can be fitted to the main tube and provided with adjustable graticule lined up with the optical axis of the main telescope. Small model with pillar and adjusting screws suitable of under 50mm diameter of the objective, and large model suitable for the larger diameter above 60mm of it.

## ★ OBJECTIVE LENS



Fraunhofer type, Achromat, Hard-Coated Objective lens with mount:  
The resolving power of the objective lens exceeds the Dawes limit criterion necessary to secure a point image. The objective mount is equipped with a special device which permits "squaring on" and centering the objective lens.

## ★ MAIN MIRROR



Parabolic surface, Aluminized & Siliconized:

Diameter	Thickness	Focal length
105mm	14mm	1000mm
155mm	22mm	1300mm
203mm	26mm	1600mm
260mm	40mm	1800mm

## ★ DIAGONAL ELLIPTICAL MIRROR



From 22mm for 3" Reflector to 53mm for 10" Reflector

## ★ MOUNTING CELL for REFLECTORS



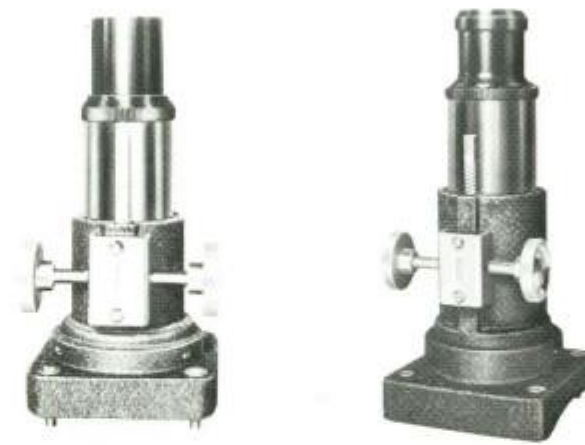
Cast aluminium cell with aligning screws and locking bolts.

## ★ DIAGONAL MIRROR HOLDER



Designed for absolute rigidity, fit tube diameters of 3 1/4" to 10".  
Made of brass, finished in dull black.

## ★ RACK & PINION EYE-PIECE MOUNTS



Rack & Pinion mechanism with variable tension for smooth focusing.

## ★ ELECTRIC CLOCK DRIVE

Electric Clock Drive with synchronous motor for automatically tracking stars.



★ PULSE MOTOR (Crystal Oscillator system)  
DC 12V, and also electric power can be supplied from car battery)



## ★ CAMERA ADAPTER



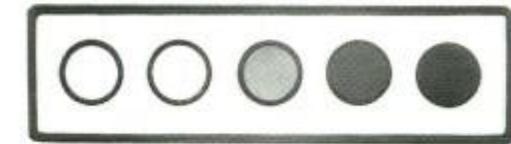
Camera adapter for 35mm single lens camera to be fitted to our telescopes.

## ★ CHANGE RING to FIT



Nikon, Minolta, Canon, Konica, Asahi-Pentax (screw), Asahi-Pentax K, Olympus OM series 35mm SLR cameras.

## ★ PHOTO FILTER



Astro photo filters are of solid glass, precision ground and polished from the finest optical glass, and the following five make one set.

- Skylight : for Moon, Venus and Jupiter (color films)
- Neutral density : for Sun, Solar eclipse and Sunspot (color films)
- Yellow : for Moon and Venus (black & white films)
- Green : for Sun near the horizon (black & white films)
- Red : for Sun and Mars (black & white films)

## ★ CAMERA MOUNT for REFRACTORS



Available for 50mm, 63mm, 70mm, 76mm and 90mm telescope tube.

## ★ CAMERA MOUNT for REFLECTORS



Available for any caliber reflectors, large or small.