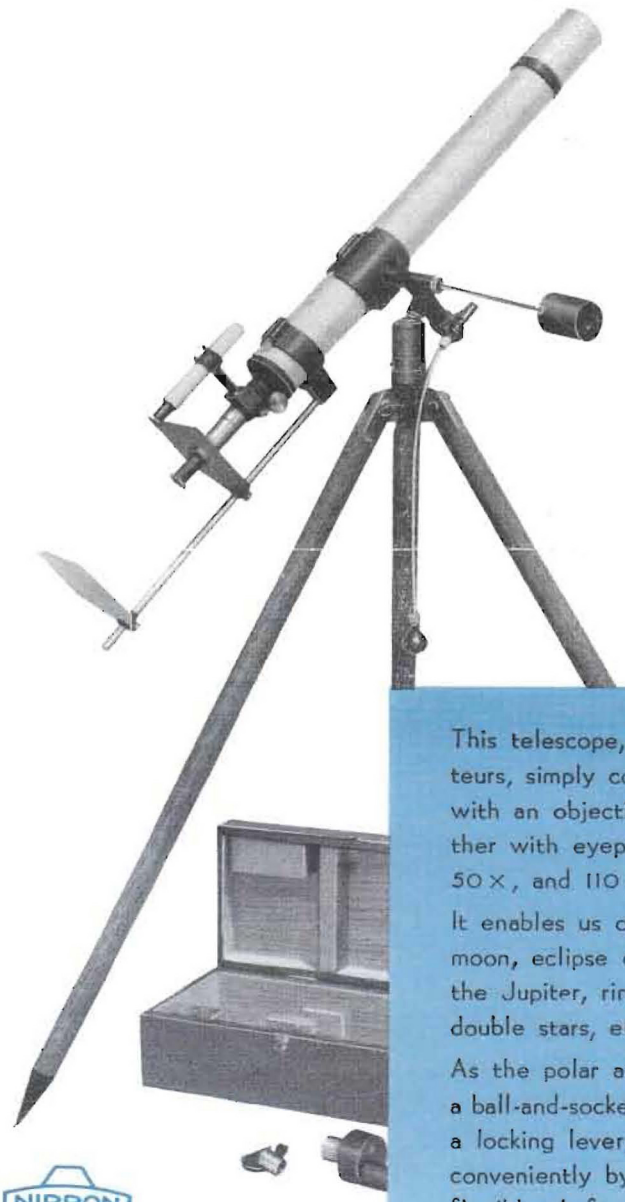
2-½ TELESCOPE

Equatorial Mount



This telescope, designed for school use and for amateurs, simply constructed yet effective, is equipped with an objective of 2 ½ inch aperture, used together with eyepieces giving magnification of 40×, 50×, and 110× diameters.

It enables us observation of sun spots. details of the moon, eclipse of the Venus, stripes and satellites of the Jupiter, rings of the Saturn, star clusters, nebular, double stars, etc.

As the polar axis on the tripod head can be tilted by a ball-and-socket device which is firmly positioned with a locking lever, the diurnal motion can be pursued conveniently by rotation of the polar axis driven by flexible shaft with hand.

NIPPON KOGAKU TOKYO

NIPPON KOGAKU K.K.

01 MORIMAE-CHO, SHINAGAWA, TOKYO

Catalog No. TeC Printed in Japan 2805/2

2 1/2 inch Astronomical Telescope

Objective: Diameter . . . . . 2 1/2 inches Focal length. 980mm
The lowest magnitude of star visible through this telescope 11.0

Eye-pieces:

Type	Focal length	Magnification	Diemeter of exit pupil	Relative brightness	Field of view Real	Field of view Apparent
Huygenian	25mm	40×	1.7mm	2.8	1°9'	43°
"	18 mm	55×	1.2mm	1.4	50'	43°
Orthoscopic	9 mm	110×	0.6mm	0.4	23'	40°
Terrestrial	40mm	25×	2.7mm	7.2	1°32'	36°

Tripod with monunt: Equatorial type with a fine motion devise driven by hand.
Zenith Prism with Zenith Finder
Sun Glass
Sun Projector
Wooden Cabinet
The standard outfit is supplied with all the above items free of charge.

The following items if required will be supplied by order:

1) **7mm Eye-piece,** giving the telescope the magnification of 140×

Type	Focal length	Magnification	Diameter of exit pupil	Relative brightness	Field of view Real	Field of view Apparent
Orthoscopic	7mm	140×	0.5mm	0.2	18'	40°

2) **Finder Telescope,** having a large field which enables one to locate a celestial object without difficulty.

Diameter of objective	Magnification	Exit pupil	Field of view Real	Field of view Apparent
18mm	6×	3mm	5°	30°

3) **Photographic Attachment,** consisting of connecting ring and focusing tube.
The attachment will be made in two types, one for a Nikon or Contax camera and the other for a Leica or Leica type camera. Therefore please state which camera you are using.

Weight and Measurement:

Item	Length	Weight
Telescope	1.095 m	3.060 kg.
Tripod with mount	1.400 m	12.100 kg.
Sun projector	600mm	0.715 kg.
Finder telescope	150mm	0.425 kg.

TOKYO

HOW TO USE

2 ½ INCH ASTRONOMICAL TELESCOPE

NIPPON KOGAKU K. K.

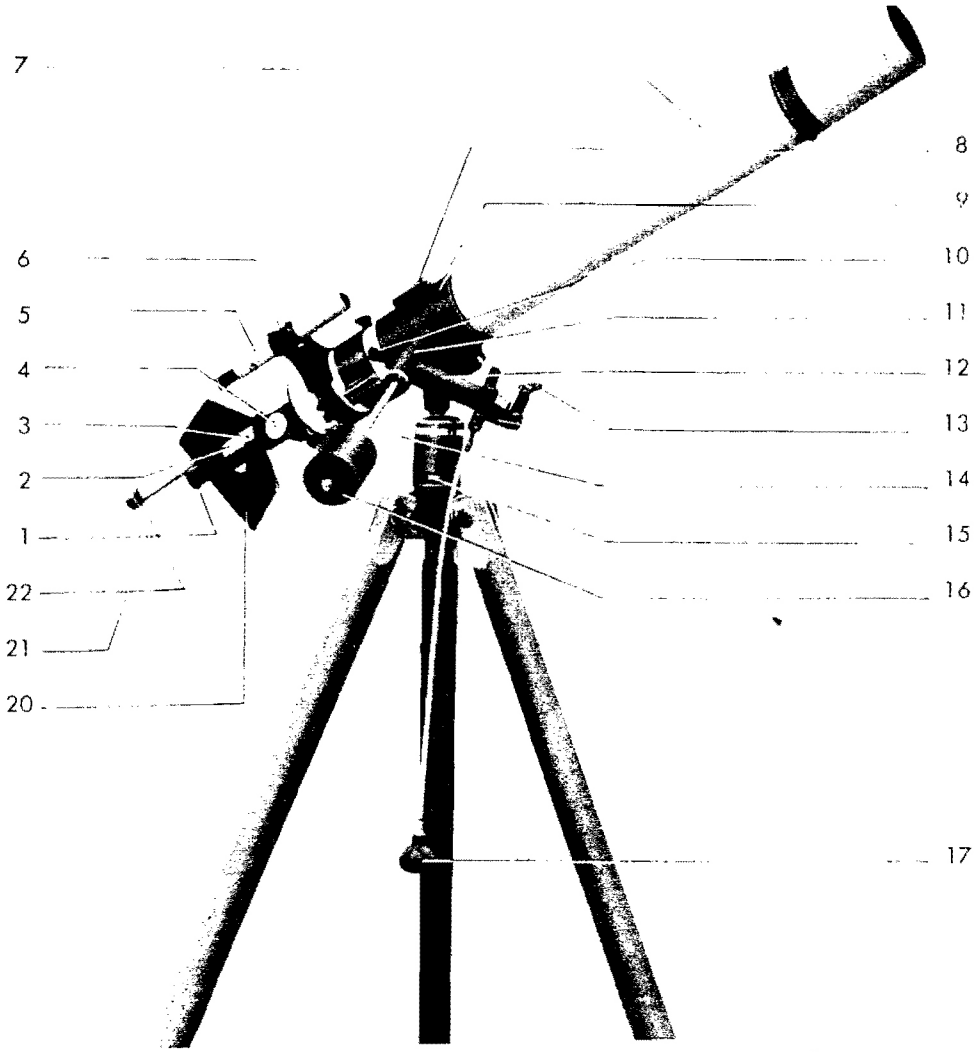


Fig. 1

Parts of 2 ½ Telescope

1 Ocular tube
2 Extension tube
3 Ocular sleeve
4 Focusing knob
5 Finder telescope
6 Finder telescope holder
7 Telescope
8 Telescope clamp
9 Telescope holder
10 Declination axis clamp
11 Declination axis
12 Polar axis
13 Polar axis clamp
14 Counterbalance shaft
15 Trigger
16 Counterbalance
17 Polar axis slow motion control
20 Shade
21 White screen plate
22 Connecting rod

Objective: Diameter ··· ··· ··· ··· 2 ½ inches, Focal length ··· ··· ··· 980mm

The lowest magnitude of star visible through this telescope ··· ··· ··· 11.0

Eye-pieces:

Type	Focal length	Magnification	Diameter of exit pupil	Relative brightness	Field of view	
					Real	Apparent
Huygenian	25mm	40 ×	1.7mm	2.8	1° 9′	43°
"	18mm	55 ×	1.2mm	1.4	50′	43°
Orthoscopic	9mm	110 ×	0.6mm	0.4	23′	40°
Terrestrial	40mm	25 ×	2.7mm	7.2	1° 32′	36°

Tripod with mount: Equatorial type with a fine motion device driven by hand.

Zenith prism with zenith finder

Sun glass

Sun projector

Wooden cabinet

The standard outfit is supplied with all the above items free of charge.

The following items if required will be supplied by order:

1) **7mm Eye-piece**, givng the telescope the magnification of 140 × .

Type	Focal length	Magnification	Diameter of exit pupil	Relative brightness	Field of view	
					Real	Apparent
Orthoscopic	7mm	140 ×	0.5mm	0.2	18′	40°

2) **Finder Telescope**, having a large field which enables one to locate a celestial object without difficulty.

Diameter of objective	Magnification	Exit pupil	Field of view	
			Real	Apparent
18mm	6 ×	3mm	5°	30°

3) **Photographic Attachment**, consisting of fastening piece and focusing tube. The attachment will be made in two types, one for a Nikon or Contax camera and the other for a Leica or Leica type camera.

To make the polar axis parallel to the rotating axis of the earth ★

1. Push the trigger (Fig. 2-15) of the tripod-head to the left, which release the polar axis (12) on the ball joint.

2. Bring the polar axis (12) on the meridian plane, with the declination axis (11) in the north (in the northern hemisphere).

3. Set the polar axis (12) at an inclination to the horizont equal to the angle expressed by the degree of the latitude of the observing place, with the declination axis (11) always higher.
   Fasten the trigger (15) of the tripod head by pushing it to the right.

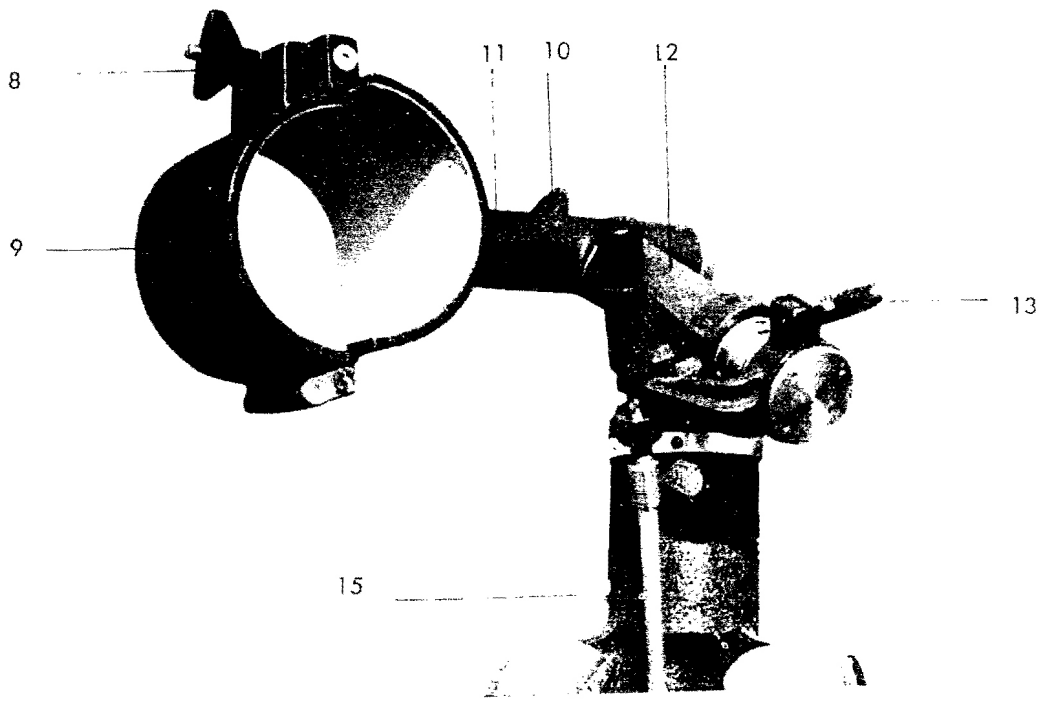


Fig. 2

★ In this case it is recommended to use a compass, a map and a clinometer.

To mount the telescope and counterbalance

1. Release clamp screw (Fig. 2-13) at an end of the polar axis and bring the declination axis (11) approximately to the horizontal position and fasten by the screw (13).

2. Fasten the screw (10) at the other end of the polar axis, and fix the telescope holder (9) at the horizontal position.

3. Open the holder (9) and place the telescope in a balanced position and fasten the screw (8).

   It is advisable to hold the telescope by hand and counteract its weight until the counterbalance (Fig. 1-16) comes into play.

4. Screw in the counterbalance shaft (14) at the end of the declination axis (11).

5. Tighten the weight by screw at such a point on the shaft as will counterpose the telescope.

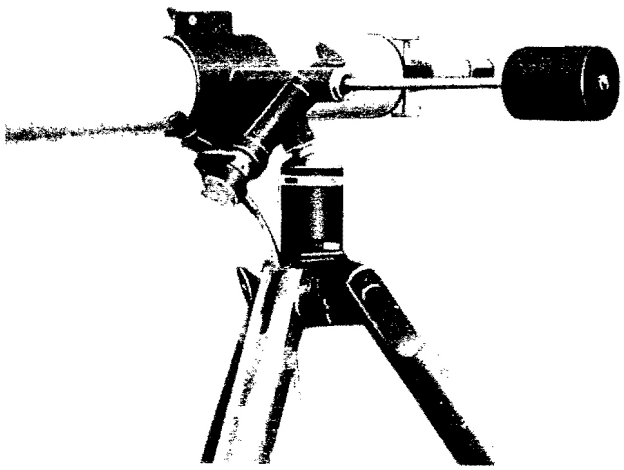


Fig. 3

To adjust tightness of the rotation of the polar axis

For this purpose tighten or loosen the nut with a small dent at the end of the polar axis, by using a rod found in the carrying cabinet.

Observation

Take off the dew cap from the objective and fit an eye-piece into the ocular tube (Fig. 1-1). The focusing is made by turning the focusing knob (4).

Celestial Observation

With the setting described on page 3 a star at any position can be caught by the rotation of the telescope round the declination axis after releasing the screw (Fig. 1-10) and round the polar axis after releasing the screw (13).

Flexible shaft

The diurnal motion of the star from rising to setting can be persued by rotating the telescope round the polar axis only, which is performed precisely by twisting flexible shaft (17) with the screw (13) fastened.

When the fine motion by this flexible shaft comes to a limit, loosen the screw (13) and twist the shaft inversely as far as it goes, in order again to operate the shaft from the beginning. The maximum range of the polar axis rotation by means of the flexible shaft is ± 7.5°, i.e. about 1 hour of the diurnal motion.

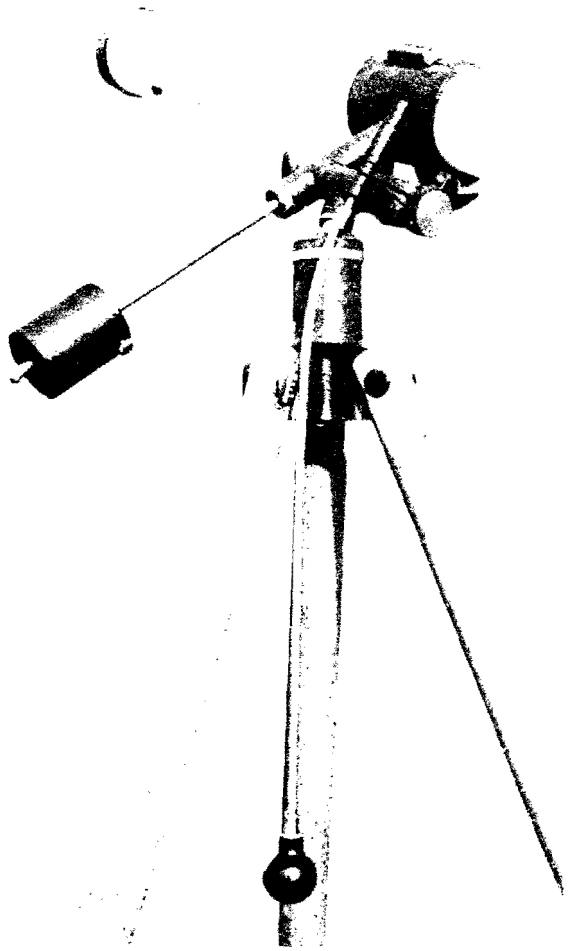


Fig. 4

Solar Observation

Sun glass

Do not forget to use a sun glass, when aiming at the sun, no matter for how short a time. The sun glass is placed in place of the eye-piece cap which screws off.

Sun projector

This consists of the screen (Fig. 1-21), the shade (20) and the rod (22), all of which are found screwed on the inside of the carrying case. The focusing is made by adjusting the eye-piece and the position of the screen plate on the rod.

In this case, it will become necessary to readjust the balancing of the telescope by changing the point at which the telescope is supported and the position of the counterbalance on the declination axis.

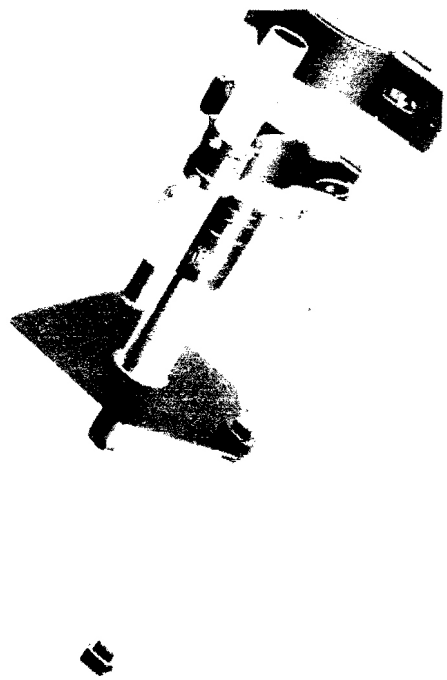


Fig. 5

Zenith Observation

The observation of zenith district may be conveniently made by use of zenith prism combined with zenith finder.

Zenith prism

To attach the zenith prism, remove the ocular tube (Fig. 1-1) from the extension tube (2) and put the zenith prism in its place, which has an opening for an eye-piece.

Zenith finder

The zenith finder is to be placed on the eye-piece end of the zenith prism, in alignment with the sights on the telescope.

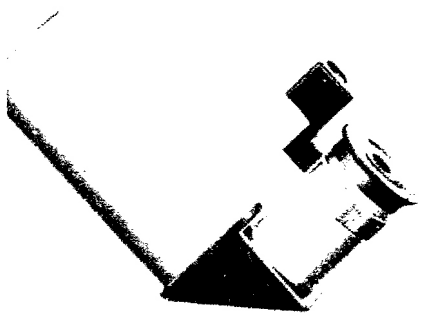


Fig. 6

Land Observation

The telescope set up for celestial observation may be used for surveying terrestrial objects also. But for the purpose of land observation only, all the details required for celestial observation may be dispensed with, and the telescope may readily be used, with the polor axis advisably in horizontal position, because land objects in most cases fall in view field of a telescope in such a position. In this case remove the counterbalance from the declination axis.

Terrestrial eye-piece

For the land observation a terrestrial eye-piece with Porro prism for erecting image is to be used.

Remove extension tube (Fig. 2) with ocular tube (1), and thrust in the terrestrial eye-piece.

To counteract an increased weight of the telescope, caused by use of terrestrial eye-piece, readjust the balance by sliding the telescope in the holder until it balances itself.

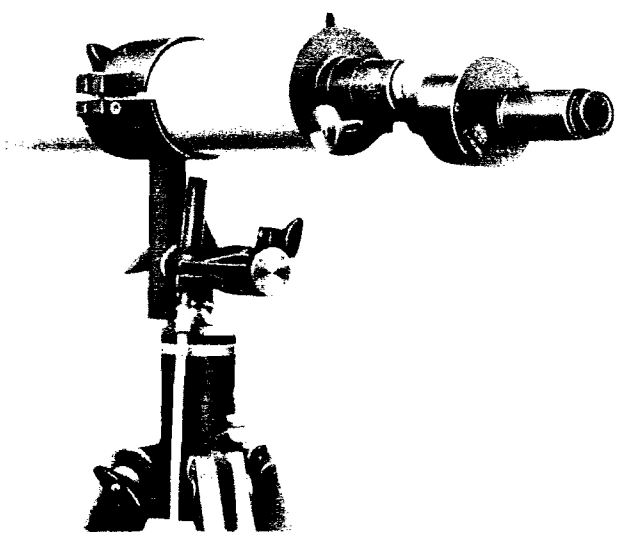


Fig. 7

Finder Telescope

1. To mount the finder telescope (Fig. 1-5) on the main telescope open finder telescope holder (6) and fasten the finder telescope by means of fastening screw.

2. Parallelism of the finder to the main telescope will be obtained by adjusting the three screws (see Fig. 8) on the finder holder until you get an image of a remote object on the cross lines of the finder, while at the same time the same distant object is caught at the center of the view field of the main telescope.

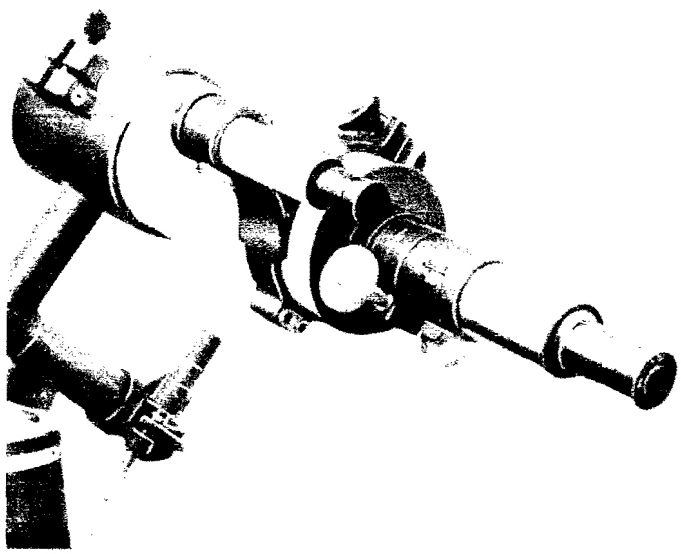


Fig. 8

Photographying

How to use photographic attachment for Nikon or Leica type camera

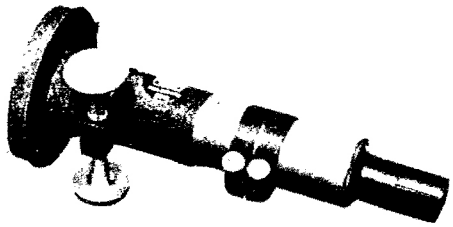


Fig. 9

1. In order to prevent the possibility of extension tube (Fig. 1-2) being pulled out of ocular sleeve (3) by the weight of the camera, place a fastening piece (Fig. 9) over the sleeve and the tube and secure it by screws.

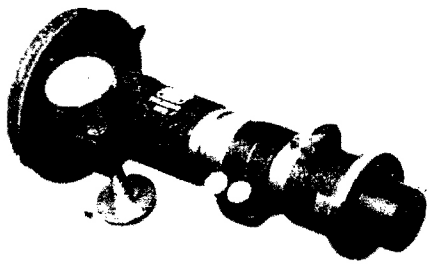


Fig. 10

2. Then remove ocular tube (Fig. 1-1) and in its place push focusing tube (Fig. 10) in over the extension tube as far as it goes. Look through the magnifying glass provided at the end of the focusing tube and obtain a sharp image on the ground glass by turning the focusing knob.

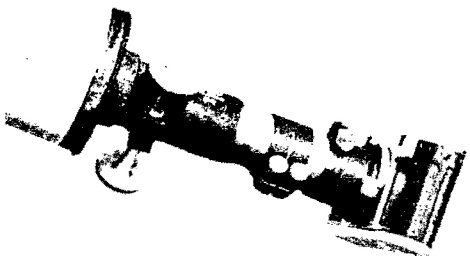


Fig. 11

3. When, thus, all is set for correct focusing, change the focusing tube for camera holder which should be pushed over the extension tube the same way as the focusing tube and clamped. The end of the camera holder is then coupled to a Nikon camera body bayonet fashion (Fig. 11) or to Leica by screwing.

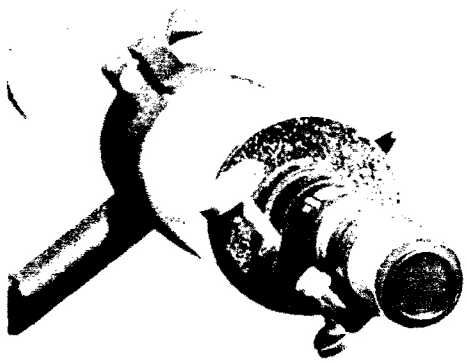


Fig. 12

4. Color filter can be screwed inside the end of the extension tube before focusing tube or camera holder is thrust over it (Fig. 12).

Caution in Handling

1. Do not stain the lenses. For cleaning, use feathers or soft hair brush. If insufficient, wet slightly soft washed muslin or gauze with good alcohol and pass it carefully on the lenses. If more alcohol than necessary is used, the cementing layer might be injured.

2. The objective lens of the telescope must be protected with dew cap, when not in use. Dew on the lens may be removed by natural evaporation in a dry room or with soft gauze.

3. Dismantling of objective lens should be made with proper tools by an expert hand, and therefore must not be attempted unless absolutely necessary. Contact the maker or his agent for necessary services.

4. Apply a small quantity of good lubricant occasionally at the sliding parts of telescope, the rotating joints of declination axis and tripod head.

Weight and Measurement :

Item	Length	Weight
Telescope	101cm	3.1 kg.
Tripod with mount	140cm	12.1 kg.
Sun projector	60cm	0.7 kg.
Finder telescope	15cm	0.4 kg.

NIPPON KOGAKU TOKYO

PRODUCTS IN REGULAR PRODUCTION:

NIKON, 35mm Camera
NIKKOR, Interchangeable Lens
CINE-NIKKOR, Lens for 8mm Cine Camera
PRO-NIKKOR, 35mm Projector Lens
APO-NIKKOR, Photo-Engraving Lens
NOVAR & MIKRON, Binoculars
Astronomical Telescope
Microscope & Accessories
Transit & Level
SHADOWGRAPH, Cantour Projector
DIOPTOMETER, Vertex Focometer
POINTAL, Ophthalmic Lens
Raw Optical Glass

Send for literature on lines that interest you !

NIPPON KOGAKU K. K.

SHINAGAWA, TOKYO. Cable Address: NIKKO TOKYO

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