STEREOSCOPIC MICROSCOPE

INSTRUCTION MANUAL

MODEL X

OLYMPUS

GREENOUGH BINOCULAR STEREOSCOPIC MICROSCOPE

The Greenough Binocular Stereoscopic Microscope is a multi-purpose instrument with many diverse applications, including: plant classification, entomology, anatomical examination of animals, geology, stamp and coin inspection, gemmology and in the electronic and precision instrument industries.

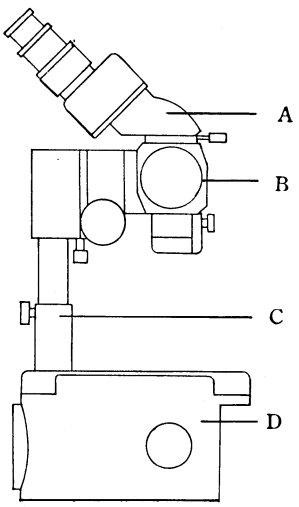
The new Olympus Model X microscope is highly versatile, and can be adapted for use in every field where binocular stereoscopic observation is required.

SPECIFICATIONS:

1. Five different magnifications attainable by magnification-selector drum.
2. Paired objectives and eyepieces.
3. Magnifications (variable): . . . . . 6.3× ~ 160×
4. Inclination of binocular head: . . . . . 45°
   Angle of visual axes: . . . . . 12°
5. Interpupillary distance adjustment: . . . . . 50–80mm(w/G10×)
   46–80mm(w/G20×)
6. Interchangeable objectives: . . . . . 1× or 2×
7. Long working distance: . . . . . 86mm & 45mm
8. Range of body movement (up & down) 83mm
   Rack & pinion (fine adjustment) 36mm
   Pillar (sliding movement of smaller diam tube) 47mm
9. Swinging movement of body (pivoted at pillar) . . . . . 100mm(80°)
10. Detachable sub-stage base with reflecting mirror
11. Stage plates (clear and black-and-white)
12. Widefield eyepieces
13. Interchangeable stands
14. Detachable binocular head
15. Epi-illuminator (attachable)

TABLE OF CONTENTS

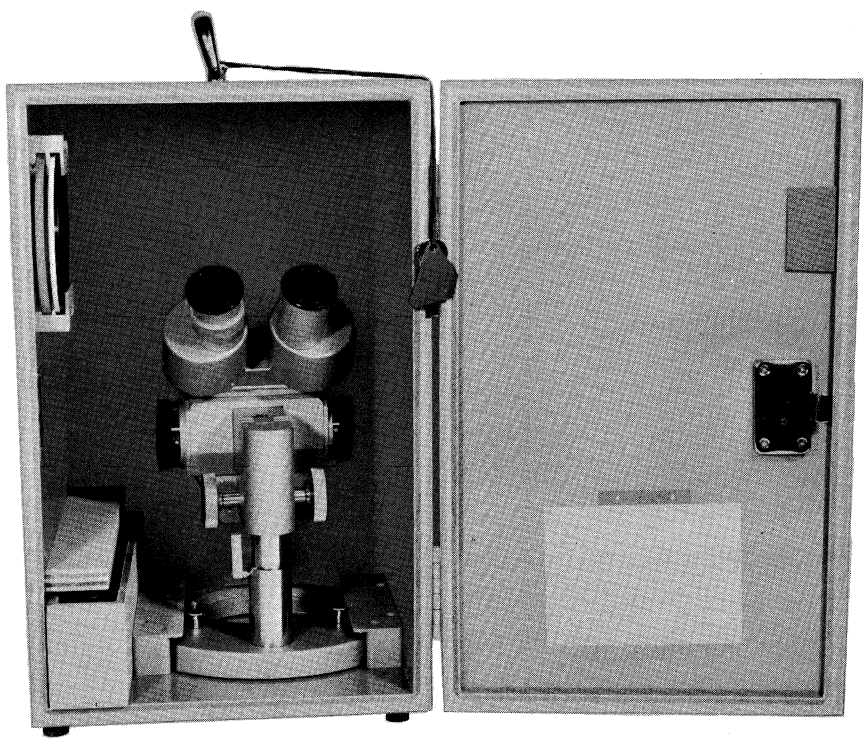
This instruction manual is composed of Parts A through D as follows:



HANDLING INSTRUCTIONS

The Model X consists of the following components:

1. Body
2. Inclined head
3. Stand
4. Eyepieces, 1 pair each of G10 × and G20 ×
5. Objectives, 1 pair of 1 × (2 × optional)
6. Stage plates, 1 each of clear and black-and-white plates
7. Stage clips
8. Instructions, Certificate of inspection
9. Desiccant
10. Eyepiece caps (large)
11. Eyeshields
12. Wooden carrying case

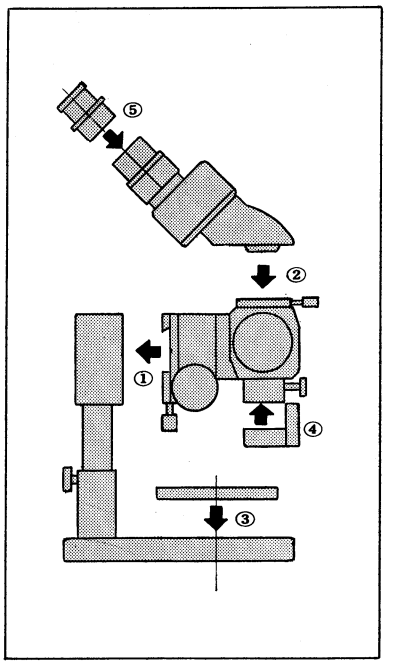


ASSEMBLY

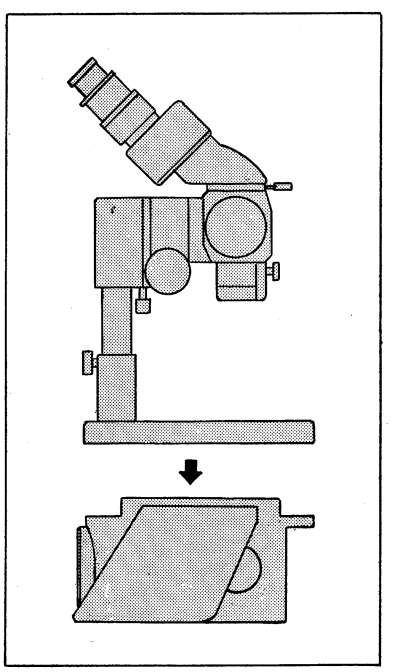
Assemble the instrument in the following order:

1. Place the body onto the yoke at the top of the pillar and clamp it with the screw provided.
2. Set the inclined head on the seat at the top of the body, and clamp it with the screw provided.
3. Place the stage plate of your choice in the receptacle on the stage and clamp it with the screw provided.
4. Attach an objective pair of your choice to the body and clamp it with the screw provided.
5. Insert a pair of eyepieces of your choice into the eyepiece tubes.

   The instrument is now ready for observation by natural light.

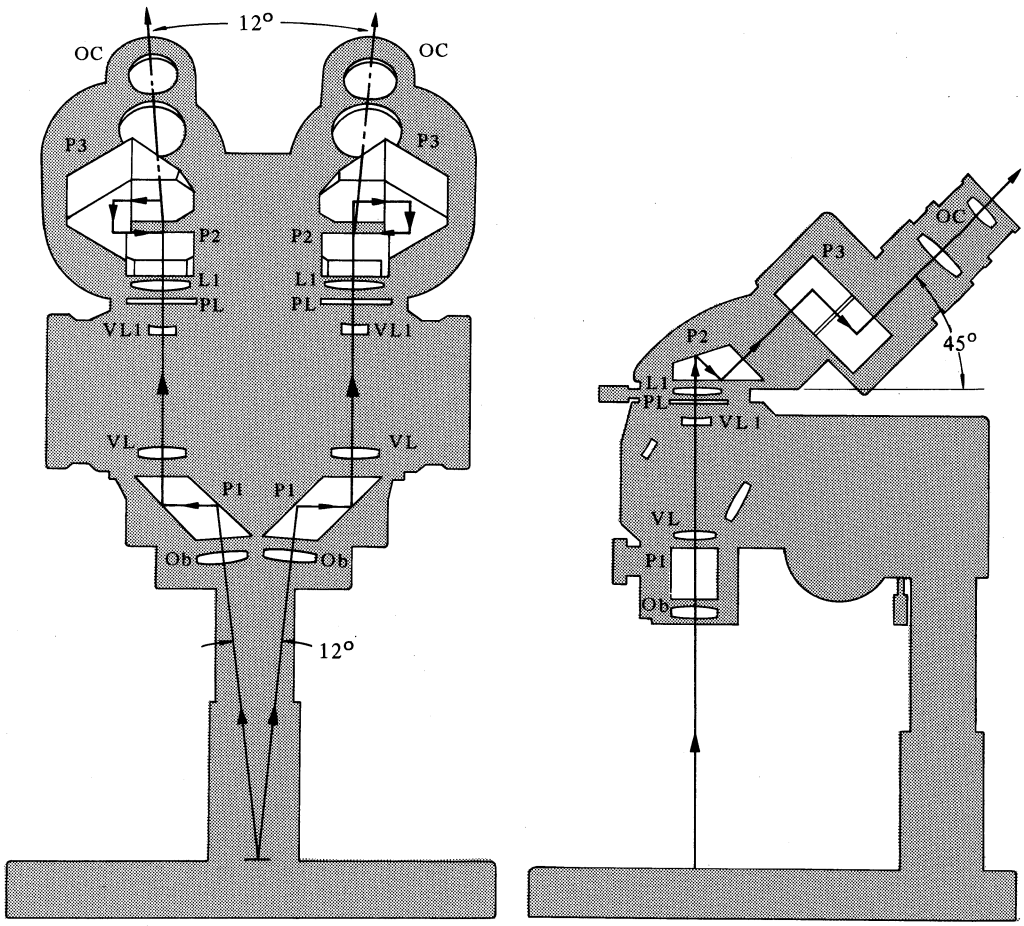


For trans-illuminated observation, the instrument as assembled above is placed on the illuminating stand. Natural or artificial light will be reflected to the specimen by the mirror. If necessary set the iris equipment on the sub-stage base. Now with attachment of armrests to the base, you are ready for prolonged observation under any conditions.



A. OPTICAL SYSTEM

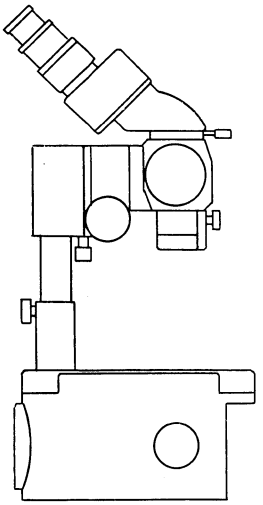
The optical system for Model X consists of paired objectives, magnification-varying tube lenses (hereinafter referred to as variables), and eyepieces, as shown below.



Light bundles from the specimen enter Prism P1 with an angle of visual axis of 12°, where they are turned parallel to each other, then proceed to the variable lens system (VL and VL1), the tube lens system (PL and L1) and to Prism P2. Then, still maintaining parallel position, they enter Porro-prisms at P3, at the last facet of which they again assume a 12° angle of visual axes, forming an image at the eyepiece exit pupil.

As described above, the variables are paired on parallel optical axes. Consequently five magnifications are attainable, i. e. two sets of normal and reverse positions plus a blank position. (See page 6.)

As to the trans-illumination system the sub-stage base contains a reflecting mirror and a 100V, 20W bulb. In addition, special accessories such as an iris diaphragm (for field adjustment) and an epi-illuminator are available.

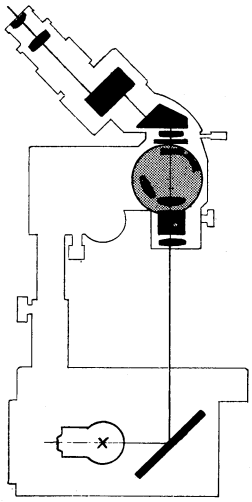


A–1 General Features

Following is a table of optical specifications. When using 1× objectives total magifications will be as indicated on the magnification-selector drum. When using the 2× objectives, numbers on the drum must be doubled. With the 2× objectives, do not use positions marked ☒ in the table.

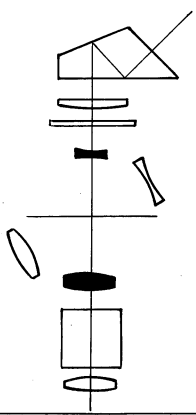
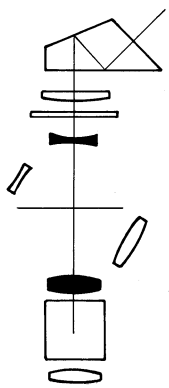
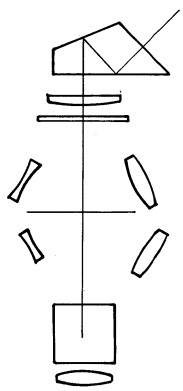
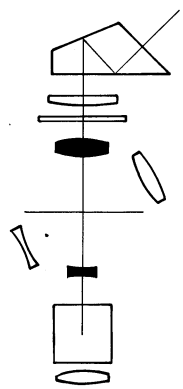
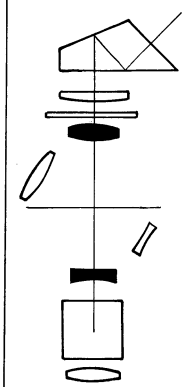
TABLE

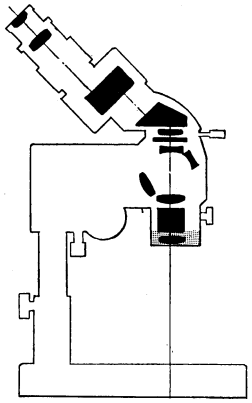
Drum Position	Objectives	Eyepieces	Total Magnification	Field Diameter mm	Working Distance mm
6.3	1× (f=100)	10×	6.3×	32	86
10			10 ×	20	
16			16 ×	12.5	
25			25 ×	8	
40			40 ×	5	
12.5		20×	12.5×	19.4	
20			20 ×	12.2	
31.5			31.5×	7.6	
50			50 ×	4.9	
80			80 ×	3.1	
☒ 6.3	2× (f=50)	10×	——	——	45
☒ 10			——	——	
16			31.5×	6.3	
25			50 ×	4	
40			80 ×	2.5	
☒ 12.5		20×	——	——	
20			40 ×	6.1	
31.5			63 ×	3.9	
50			100 ×	2.4	
80			160 ×	1.5	



A–2 Variable Lens System

This system is composed of two sets of Galilean telescopic lenses and a blank position. Since the axes of Galilean telescopic lenses are parallel to each other, five different variations can be obtained by their reversal plus the use of the blank position as illustrated A through E. When forming a telescopic system, variables in the reversed position give a reciprocal magnification, still within the normal focusing range.

	A	B	C	D	E
Lens Dis-posi-tions					
G10×	40×	25×	16×	6.3×	10×
G20×	80×	50×	31.5×	12.5×	20×



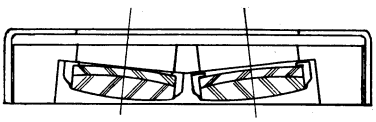
A–4 Objectives

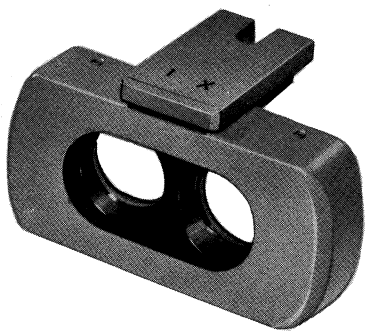
A pair of objectives designed for exclusive use in the Model X is mounted in an interchangeable housing. Available in two types.

	Focal Length	Working Distance	Numerical Aperture
1×	100mm	86mm	0.08
2×	50mm	45mm	0.08

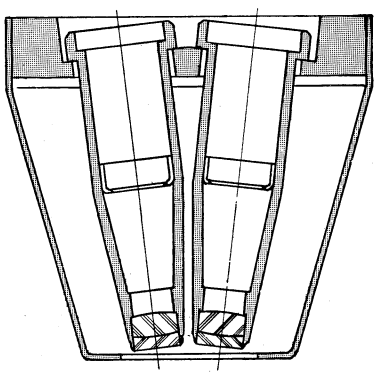
Using the high magnification objectives (2×) the edge of the field may be darkened at magnification-dial positions 6.3, 10, 12.5 and 20. This is caused by the fact that both 2× and 1× objectives are made to focus at the same point. If you want these magnifications, use the 1× objectives. The image will be brighter and of the desired magnifications.

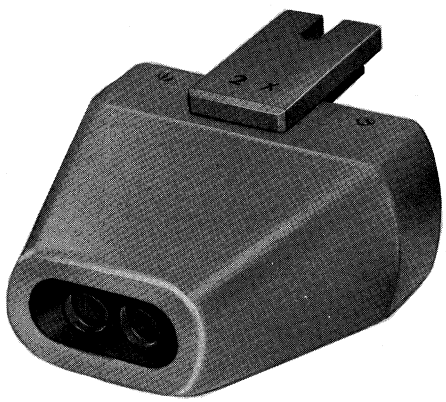
1× Objectives



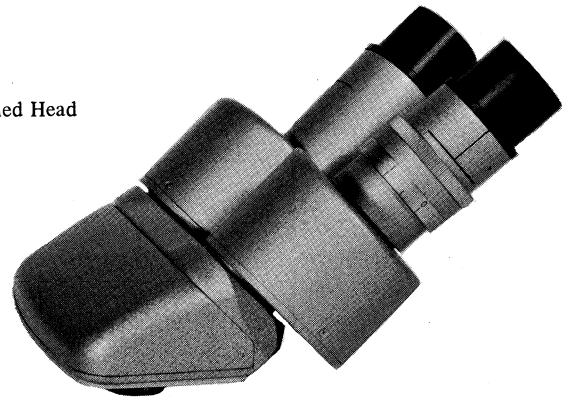


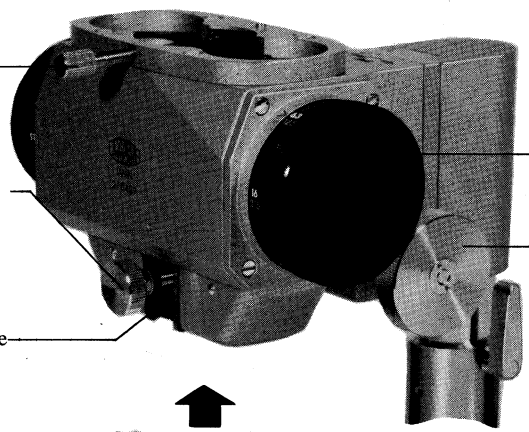
2× Objectives





7. Inclined Head





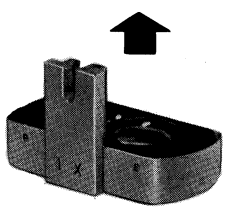
8. Head Clamping Screw

9. Body

10. Objective Clamping Screw

13. Focusing Knob

12. Objective Locating Groove



11. 1× Objectives

At the top of the body is the seat (17) for the inclined head (7), in which the head can be mouned and tightened with the head clampring screw (8).

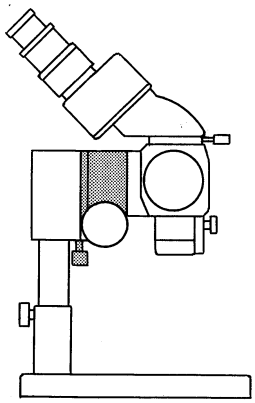
At the lower part of the body is a groove (12) into which the desired objective pair (11) is inserted and secured with the objective clamping screw (10). Prisms for variation of the angle of visual axes are located in the inclined head, inside the prism housing (22).

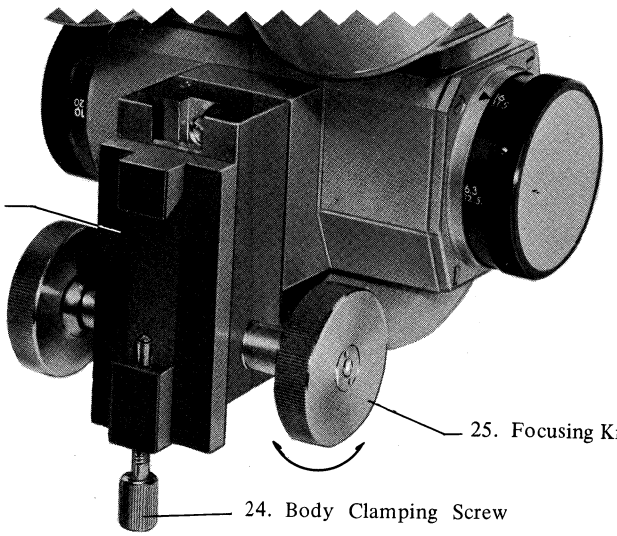
B–3 Focusing Mechanism

To focus on a given specimen, first loosen the pillar clamping lever (30) sliding the body on the spring-tension pillar until rough focus is attained. Fine adjustment is then made with the rack and pinion focusing knobs (25).

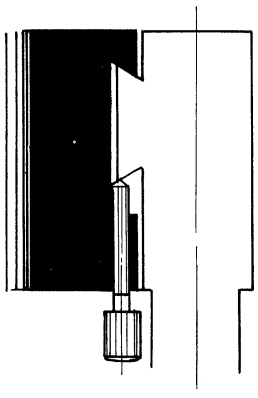
The focusing knobs provide a maximum range of vertical movement of 36mm.

Tension on the focusing knobs may be adjusted to the user's preference. Tension is adjusted by turning both focusing knobs securely and simultaneously clockwise to tighten, counter-clockwise to loosen. If set too loosely, the body may slip down by its own weight; reasonably firm tension will avoid this.

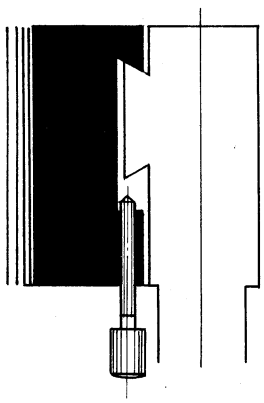




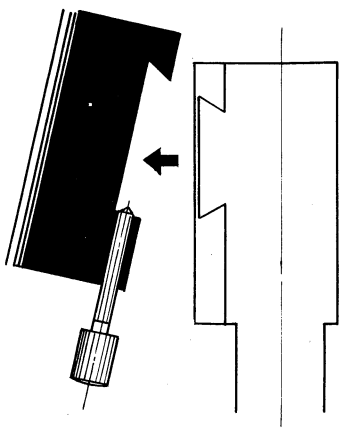
The entire binocular body can be freely attached to or detached from the stand with the body coupling plate (23) at the sliding section of the rack. To secure the body to the stand, tighten the body clamping screw (24).



Tighten the Screw Firmly.
(Attachment)



Loosen the Screw.
(Ready for Removal)



Tilt upwards.
(Removal)