

# STEREOMICROSCOPES

CAT. NO. 31-26-10

## REFERENCE MANUAL



BAUSCH & LOMB

OPTICAL COMPANY

ROCHESTER 2, NEW YORK



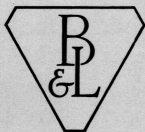
**Guarantee** ★ From raw materials to final inspection, Bausch & Lomb products are made under the rigid control of mechanical and optical experts. The formulae for the glass used in optical elements and the design and manufacture of both optical and mechanical parts contribute to one purpose—a product which will afford you the highest satisfaction.

If a product of our manufacture proves defective in material or workmanship, an appropriate adjustment will be made. This guarantee does not cover damage in transit, damage caused by carelessness, misuse or neglect, or unsatisfactory performance as a result of conditions beyond our control. —*Bausch & Lomb Optical Co.*



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REFERENCE MANUAL

BAUSCH & LOMB OPTICAL CO.  
ROCHESTER 2, N. Y.



# BAUSCH & LOMB STEREOMICROSCOPES

This Bausch & Lomb Stereomicroscope is a precision instrument designed to withstand hard usage. Because it is a precision instrument it deserves the same special care that would be given to a fine micrometer. With reasonable care, it will provide many long years of accurate, efficient service.

To protect the instrument against any damage during shipment, the optical elements are carefully wrapped. When a hardwood carrying case is purchased, eyepieces will be found in a rack inside the carrying case door. Objectives are at the bottom of the case between wooden blocks. Extra objectives, if any, are near the bottom of the case against the side walls. Sub-stage base models are secured to the case with a bolt extending through the bottom of the case. This bolt must be removed before the stereomicroscope can be taken out.

## **Procedure for Adjustment of the Stereomicroscope**

1. Place the object to be viewed on the stage.

2. Bring the objective of the desired magnification into the proper position above the object.

3. Elevate the stereomicroscope with the focusing knob (1, BKT-5) so that the nosepiece (2, BKT-5) is about 6 inches above the object.

4. Insert the desired eyepieces in the eyepiece tubes.

5. Make approximate illumination adjustments. See section, "Illumination" for further details.

6. Rotate one or both of the prism boxes (4, BKT-5) until the distance between the eyepieces seems to coincide with the spacing between the eyes.

7. Lower the stereomicroscope until the object is in focus for both eyes. (Make sure that the objectives, which are held in place by dovetail bearings, are properly seated home against the stop screw (3, BKT-5), otherwise the objectives will not be in correct alignment.)

8. Then close the left eye and focus the object for the right eye.

9. Close the right eye and focus for the left eye by rotating the eyepiece focusing collar (5, BKT-5). This raises and lowers the left eyepiece.

10. Make any necessary final adjustments on illumination and spacing of the prism boxes.

11. The stereomicroscope is now in adjustment and may be used with ease and comfort.

## **Illumination**

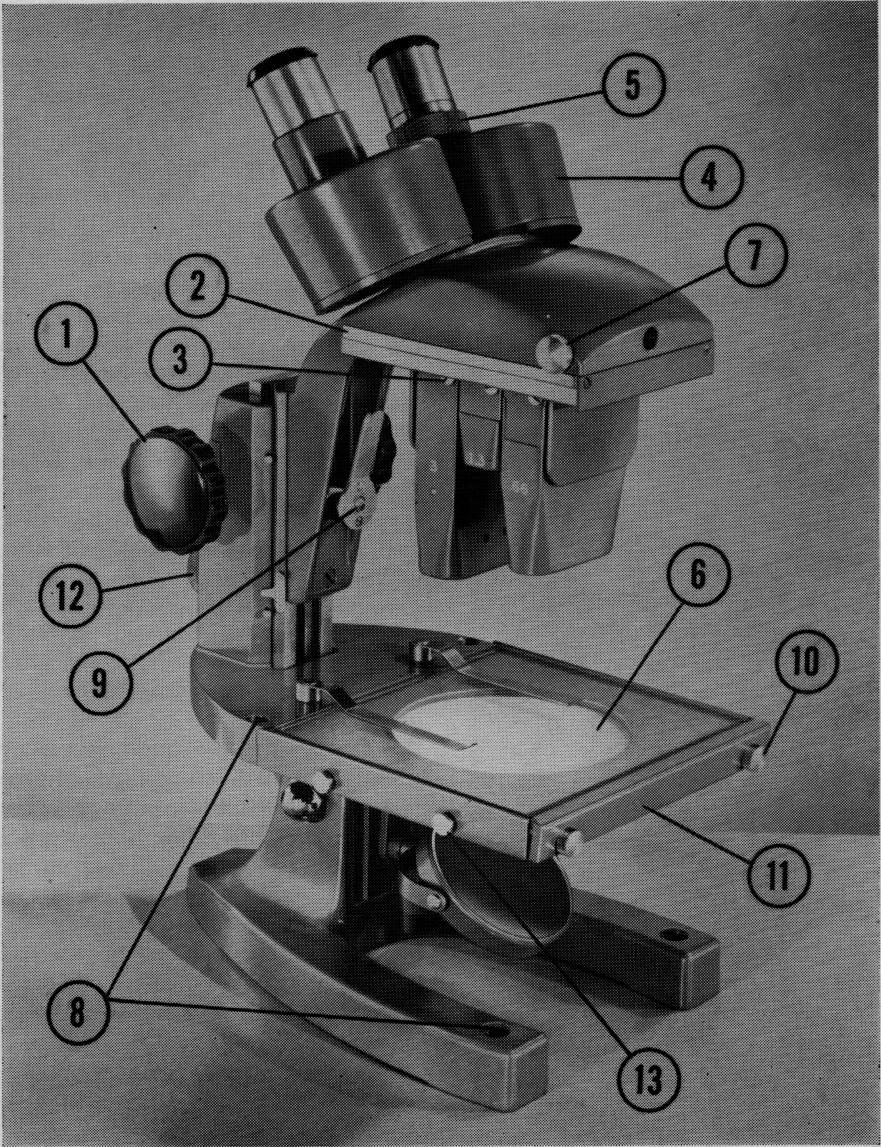
It is not possible to establish hard and fast rules to govern the illumination of the almost endless number of objects which may be examined profitably with a stereomicroscope. Some sug-



gestions, however, may be made as to the various methods of illumination. The BKT-5 Stereomicroscope will be considered here to illustrate illuminating techniques.

When examining a thin, transparent object, it is best to illuminate it with transmitted light, i.e., light which is passed through the object by means of the substage mirror. To illuminate

*BKT-5 Stereomicroscope*





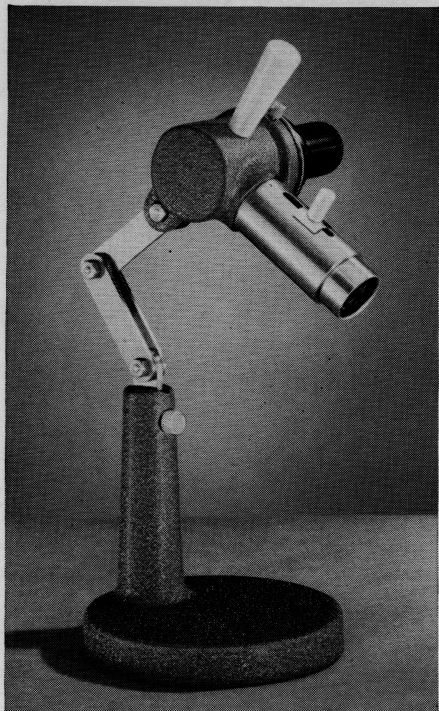
the object, remove the reversible contrast plate (6, BKT-5) from the stage by pulling the spring forward and the plate will drop down.

When examining an opaque object it is best to illuminate it with incident light, i.e., light which is reflected from the surface of the object. The shape of the object will determine the best angle from which to illuminate it.

While daylight may meet the illuminating requirements in some cases, it will be found that an illuminator designed especially for use with the wide field stereomicroscopes will be most helpful. Three illuminators are recommended:

1. Fluorescent Illuminator
2. Nicholas Illuminator
3. Reflector Illuminator

#### *Improved Nicholas Illuminator*



*Reflector Illuminator and Rheostat*

The first two of these illuminators are particularly useful with all models as they may be attached directly to the stand. A clamp screw (7, BKT-5) locks the illuminator in place when it is attached to a stereomicroscope. In this position the illuminator travels with the stereomicroscope, making it unnecessary to readjust the lamp when changing from one specimen to another. In addition to attaching the illuminator as shown in the illustration of the BKT-5 Stereomicroscope, it may also be inserted in either one of the holes marked 8 in the illustration.

The Reflector Illuminator is used as an external light source only.

#### **Changing the Objectives**

Bausch & Lomb Stereomicroscopes are supplied with three types of nose-pieces: single (fixed type); double (revolving type); and triple (sliding type).

In order to obtain a desired magnification, objectives may be interchanged or substituted. All of the new Bausch & Lomb objectives are par-focal, that is, any objective will automatically be in the same focus as the objective it is replacing.

When removing an objective, slide it until it is disengaged from the supporting dovetail. Insert the new objec-



tive and slide it until the stop screw (3, BKT-5) is in contact with the locating shoulder of the nosepiece.

### **Eyepieces**

All of the series W, T, and R Stereomicroscopes are supplied with Wide Field Eyepieces. These eyepieces provide an exceptionally large, flat field, and offer comfortable eye relief. Three powers are available, 10 $\times$ , 15 $\times$ , and 20 $\times$ . The series K Stereomicroscopes are sometimes supplied with 10 $\times$  Huygenian Eyepieces. All of the above eyepieces are parfocal.

### **Measuring With the Stereomicroscope**

The stereomicroscope may be used as a measuring instrument by placing a micrometer disc in one of the eyepieces. The following procedure may be used to insert the micrometer disc in the eyepiece:

1. Remove the field diaphragm *unit* by unscrewing it from the bottom of the eyepiece.
2. Place the micrometer disc on top of the field diaphragm, with the engraved scale facing down.
3. Place the snap ring over the disc in order to hold it in place.
4. Now replace the field diaphragm *unit* (containing the micrometer disc) by screwing it in until the scale engraved on the surface is in focus when viewed through the eyepieces.

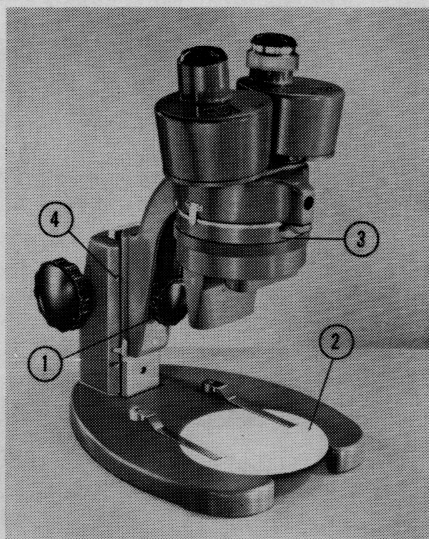
For accurate work the scale should be located in the vertical position. If it is used horizontally it will only be accurate at the center, since a horizontal object is inclined to the axis of both microscopes.

Before measurements can be made, a standard of measurement must be

determined for the stereomicroscope and the particular object. This is accomplished by determining the equivalent dimension of the scale on the micrometer disc with the known scale dimensions of a glass stage micrometer.

To determine the standard of measurement for the stereomicroscope, place a known scale on the stage so that it appears to run north-south in the field of view. Focus carefully so that the stage scale is seen sharply in focus at the same time as the eyepiece scale, and note the ratio of eyepiece scale divisions to stage scale intervals. If calibration for more than one objective is desired, repeat for the other objectives, jotting down the ratios in each case. This data can then be used to make measurements in the specimen plane. For example, if 1 mm on the stage scale was found to be equivalent to 20 divisions of an eyepiece scale, then each eyepiece scale division represents 1/20th millimeter on the specimen plane, etc. The regu-

*JK-2 Stereomicroscope*



lar stage micrometers, which are normally used in the calibration of microscopes, are too small for convenient use in the calibration of Stereomicroscopes when the lower powered objectives are used. In these instances, a second eyepiece micrometer disc may be used as a stage micrometer.

### Large Working Area

All Bausch & Lomb Stereomicroscopes are equipped with an extensible focusing mechanism which will permit the examination of large, thick objects. The method of operating this mechanism will depend on the type of microscope.

Certain models have a knob protruding from the front of the arm assembly as shown at (1, JK-2 Microscope). When this knob is unscrewed, the arm is separated from the dovetail focusing slide and it may be repositioned at a higher or lower level. There are three screw holes in the dovetail slide and the arm may be

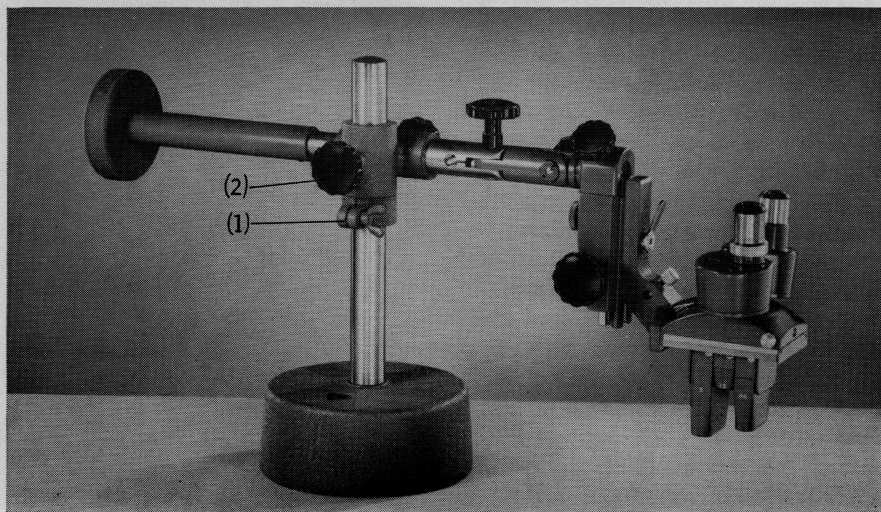
positioned at three corresponding heights.

On all other models a lever (9, BKT-5 Microscope) clamps the arm at the desired height. A clockwise rotation of this lever releases the friction clamp and the arm may be moved up or down as desired. When positioning the arm near the upper limit of its movement, be sure to leave sufficient bearing surface in the extension dovetail to insure a firm support.

### Extended Area Coverage

There are certain models of wide field microscopes which have been designed especially for the examination of large, extended areas. The SKW-5 Microscope is representative of this type (see illustration). Particular care should be taken when adjusting Models SK-2 and SKW-5 in a vertical direction to firmly clamp the collar support (1, SKW-5 Microscope) in addition to using the vertical clamp knob (2, SKW-5 Microscope).

*SKW-5 Stereomicroscope*





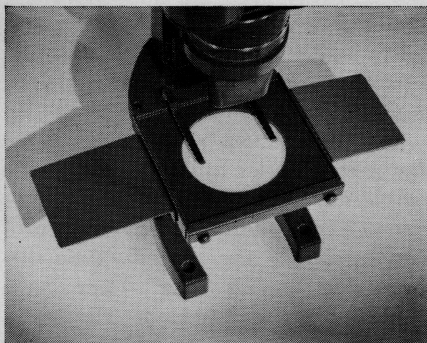
Occasionally one may wish to use a microscope of the BKT-5 or JK-2 type to examine the surface of an object too large or bulky to be placed on the microscope stage. In such cases the microscope may be placed directly on the object. With Models JK-1 and JK-2 it is only necessary to remove the contrast plate (2, JK-2 Microscope) and focus directly on the object. If the microscope has a glass stage plate, it may be removed by unscrewing the two screws (10, BKT-5 Microscope), removing the metal protection plate (11, BKT-5 Microscope), and sliding out the glass stage plate. The microscope can be removed from its base by unscrewing the knurled screw (12, BKT-5 Microscope) about two turns and lifting the microscope from its base.

### **Focusing Tension**

The tension of the focusing mechanism may be adjusted to suit the user's needs. On the back of the stereomicroscope's focusing mechanism there are two small countersunk screw heads located slightly above the centerline of the focusing knobs. By turning these screw heads slightly clockwise or counterclockwise the tension will be increased or decreased as desired.

### **Inclination Joint**

The BK, BKW and BKT models are equipped with a base which incorporates an inclination joint that permits the microscope to be tilted to suit the convenience of the observer. Before tilting the microscope, however, make sure the object being studied is secured to the stage.



*Hand Rests are supplied on all B&L Stereomicroscopes equipped with bases and glass stages.*

### **Hand Rests**

All Stereomicroscopes which are equipped with bases and glass stages are supplied with hand rests (see illustration). These hand rests fit over the two screw heads (13, BKT-5 Microscope) located on either side of the stage.

### **Care of the Stereomicroscope**

It is better to take precautionary measures against dirt than it is to allow dirt to accumulate and then clean it off. It should be an unbroken rule to keep either a pair of eyepieces or suitable plugs in the eyepiece tubes at all times and to keep the whole microscope covered when not in use. The dustproof seal which is fitted to the lower end of each eyepiece tube will prevent dust from sifting over the prism surfaces and down on to the backs of the objectives but it cannot prevent dust from collecting on the top prism face directly beneath an uncovered eyepiece tube. With proper care it should seldom be necessary to clean the prisms. Should dust accumulate on the prism surface below the eyepiece tube it is best removed with (1) a

gentle blast of air from a syringe, and (2) by gently picking up the remaining dust with a small camel's hair brush or moist cotton swab on a stick.

Extra objectives, when not in place on the microscope nosepiece, should be stored on their sides in a dust-free covered container. Under no circumstances should the objectives be disassembled for cleaning. They have been factory-adjusted for alignment

and parfocality, and any tampering with them will destroy this alignment. The best cleaning method is the same as that given above for cleaning the prisms. A cotton swab moistened with a cleaning fluid is not recommended on the objectives because the liquid may leave a film which will be extremely difficult to remove, particularly from the back surfaces of the objectives.

MAGNIFICATIONS AND REAL FIELDS				
Objective Magnification and Working Distance	PAIRED EYEPIECES			
	Wide Field			Huygenian
	10×	15×	20×	10×
0.66× 62.0 mm	6.6× 30.0 mm	10.0× 26.2 mm	13.2× 18.5 mm	6.6× 22.0 mm
1.0× 95.9 mm	10.0× 20.0 mm	15.0× 17.3 mm	20.0× 12.2 mm	10.0× 14.5 mm
1.33× 95.9 mm	13.3× 15.4 mm	20.0× 13.3 mm	26.6× 9.4 mm	13.3× 10.9 mm
2.0× 63.6 mm	20.0× 10.0 mm	30.0× 8.7 mm	40.0× 6.1 mm	20.0× 7.2 mm
3.0× 51.7 mm	30.0× 6.7 mm	45.0× 5.8 mm	60.0× 4.1 mm	30.0× 4.8 mm
4.0× 39.0 mm	40.0× 5.0 mm	60.0× 4.3 mm	80.0× 3.1 mm	40.0× 3.6 mm
6.0× 23.9 mm	60.0× 3.3 mm	90.0× 2.9 mm	120.0× 2.0 mm	60.0× 2.4 mm
7.5× 19.2 mm	75.0× 2.7 mm	112.0× 2.3 mm	150.0× 1.6 mm	75.0× 1.9 mm

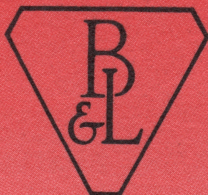


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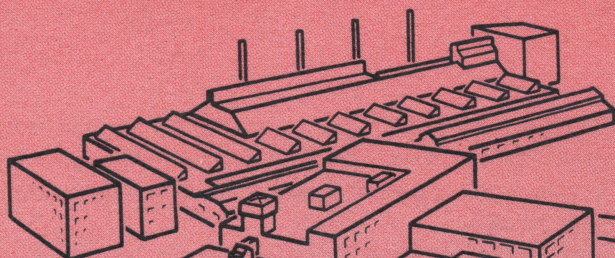
If shipment shows evidence of rough handling, have the agent note on the receipt "Received in bad order"; or if "concealed damage" is revealed after unpacking, call the representative of the transportation company within 48 hours and have him make out a "Bad order" report. Unless this procedure is followed, you lose all right to recovery from the carrier. —Bausch & Lomb Optical Co.

*Illustrations shown herein are of Bausch & Lomb products current at the time of this printing. However, due to our constant efforts to improve and refine, we reserve the right to supply products that may differ slightly from those shown in accompanying illustrations.*

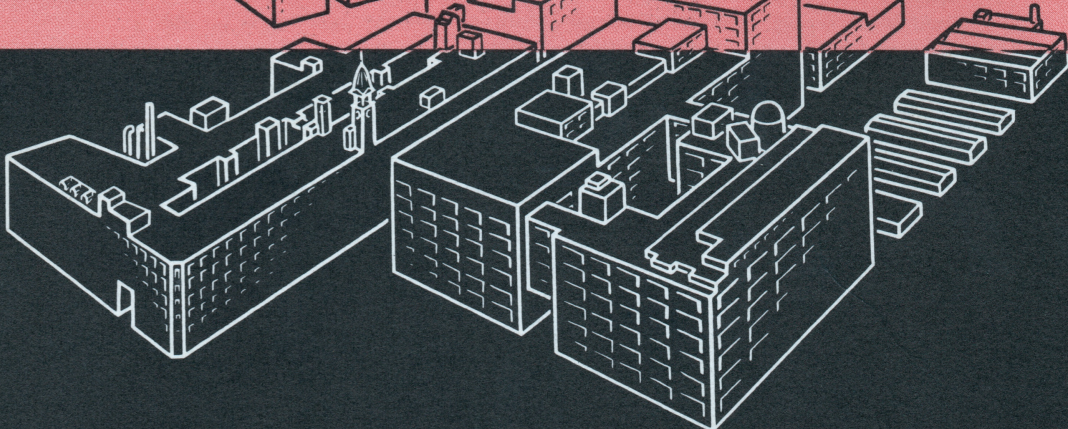




Sketched below are the main offices and works of the Bausch & Lomb Optical Co., at Rochester, New York. There are other Bausch & Lomb plants in Rochester, N. Y.; Midland, Ontario, Canada; and Rio de Janeiro, Brazil. Sales offices are in many of the larger cities.



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