

# PARABOLOID CONDENSER

Cat. No. 31-58-50  
31-58-51  
31-58-52

*Directions for Use*

## BAUSCH & LOMB

OPTICAL COMPANY



ROCHESTER 2, N. Y.

# Directions for Use

## *Fitting to the Microscope.*

The Bausch & Lomb Paraboloid Condenser is supplied for use with the simple substage, either in a centering mount, Figure 1, or with a factory adjusted lamp, Figure 2; it is also supplied on a dovetail slide for attaching to the complete centering substage, Figure 3.

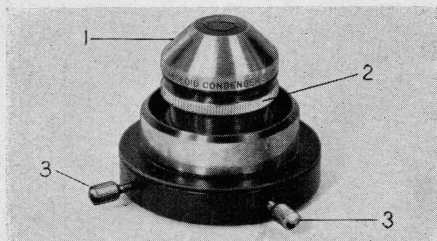


Figure 1  
31-58-50 Paraboloid Condenser  
with Centering Mount

The body of the condenser (1) is threaded and provided with a lock ring (2), so that its height in the mount may be adjusted, and the condenser may then be locked in place. The condenser, in the appropriate mount, should be put in place of the substage condenser of the microscope. Rack the substage up to its highest position and adjust the condenser vertically by screwing it up or down until the top of the condenser comes just even with the microscope stage, and tighten the lock ring (2).

## *Centering.*

Make sure that the dark field condenser is adjusted flush with the microscope stage when the substage is racked to its highest position. By means of the two centering screws (3), Figure 1, or by means of two centering screws of the centering substage, in the case of the mount illustrated in Figure 3, adjust the condenser until the top of the condenser is centered

in the opening of the stage. If the stage does not have a circular opening, lower an objective to within a few millimeters of the condenser and center the condenser to the objective. In the case of the 31-58-51 Paraboloid Condenser (Figure 2) which has a factory-centered system, such centering is not required.

Select a specimen slide having the correct thickness of 1.45mm to 1.6mm, and as free from scratches and physical defects as possible. It is best to measure and select a number of slides and use them for dark field work exclusively. Make sure that the slide is clean. Mount the material to be examined on it, and cover with a No. 2 cover glass.

*Caution:* Do not put a thick or highly concentrated suspension on the slide. In preparing the specimen be sure not to have too much solid material in the preparation. Best dark field results will be obtained from mounts which appear void to the naked eye.

Place a drop of immersion oil on the condenser and lower it slightly below the level of the microscope stage by racking the substage down. Place the slide on the stage and rack the condenser up until oil contact with the slide is made. Use a 10 $\times$ , 16mm objective and focus on the slide. Focus the condenser up and down by means of the substage rack and pinion until the smallest spot of light is seen in the field. If this spot is not in the center of the field, recenter the condenser by means of the centering screws. Refocus the condenser, making certain that the size of the illuminated field is smallest, at which position it will also be most intense.

The No. 31-58-51 Paraboloid Condenser, Figure 2, is supplied with a lamp which uses the 31-31-39 pre-focused, pre-centered bulb, so that no adjustments are needed on the lamp



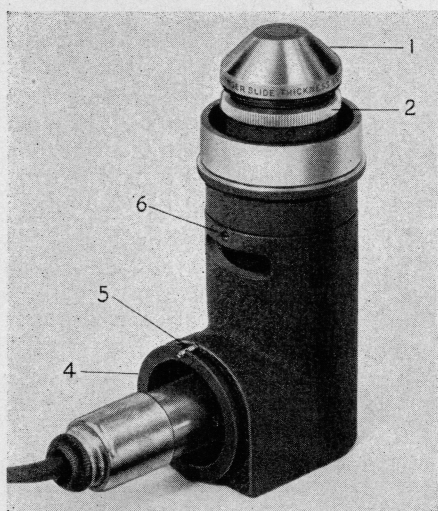


Figure 2  
31-58-51-51 Paraboloid Condenser  
with Pre-centered Lamp

as supplied. A 6 volt transformer or resistance should be used with this equipment. To replace a bulb, simply grasp the rim of the bulb mount (4) and pull it out. Remove the bulb from the bayonet socket and replace it with the new one. Push the bulb mount into the lamphouse and make sure that the slot in the rim engages with the pin (5) in the lamphouse. Be sure that the bulb mount is pushed in as far as it will go. (It should be noted that cost of bulb replacements may be minimized by returning burned-out unit in exchange for factory reconditioned unit with new bulb.)

In case it becomes necessary to clean the lenses, the small set screw (6) at the top of the housing may be loosened and the lens mount may be unscrewed from the housing. In replacing this mount it should be screwed down until a sharp image of the lamp filament can be thrown on a distant wall. Then the set screw (6) should be tightened again.

For critical dark field work where higher intensity and homogeneity are required, and for use with the 31-58-52 Paraboloid Condenser shown in Figure 3, the 6 volt 108 watt coil or rib-

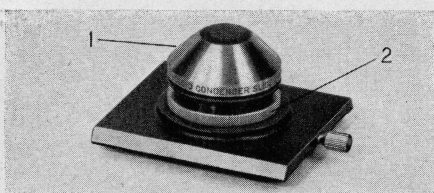


Figure 3  
31-58-52 Paraboloid Condenser on  
Dovetail Slide for use in  
centering substage

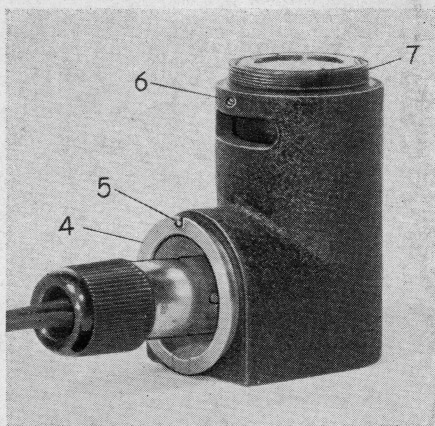
bon filament lamp or the carbon arc lamp may be used, each provided with a suitable condenser. Focus the image of the source on a distant wall and then direct it on the microscope mirror. Now adjust the mirror by rocking and turning it until a reflected image of the source is returned from the Paraboloid Condenser and the mirror to the condenser of the lamp. This condition can be detected by observing the front of the lamp; when it is obtained, light is entering the condenser parallel to its axis.

#### *Illumination.*

For routine use with the 31-58-50 Paraboloid Condenser, Figure 1, we recommend the 31-33-43 Dark Field



Figure 4  
31-33-43-61 Paraboloid Condenser  
with Dark Field Lamp



*Figure 5*  
*31-33-43-31 Dark Field Lamp*  
*for use with Paraboloid Condenser*

Lamp, Figure 5, with either a 6 volt transformer or resistance. This lamp is similar to the one illustrated in Figure 2, and makes use of the 31-31-39 pre-focused bulb. To replace the bulb follow the directions given for the 31-58-51-51 lamp (page 3).

To attach the lamp, Figure 5, to the condenser mount, Figure 1, screw the condenser mount directly on to the thread, 7, (Figure 5). The completed assembly is illustrated in Figure 4.

#### *Observation.*

Use either a 43 $\times$ , 45 $\times$ , or 97 $\times$  objective to observe the small objects in the specimen mount.

If the 97 $\times$  objective is used, the funnel stop which accompanies the Paraboloid Condenser must be used with it. Remove the objective from the microscope and screw the funnel stop into the back of the objective. The end having the small pinhole goes nearest the lenses in the objective.

Be sure the 97 $\times$  objective does not have old immersion oil on the tip. Clean it carefully. Place a drop of immersion oil on the tip of the objective, and screw it into the nose-piece of the microscope.

Rack the objective down until it is barely above the cover glass. Look through the microscope and rack the coarse adjustment up until some floating particles are observed in the field. Focus the objective sharply by means of the fine adjustment.

If brilliantly illuminated circles are observed, the cause may be air bubbles in the preparation, in the oil below the slide, or in the oil above the slide.

The most common errors, which should be avoided, are:

- (1) Condenser too low.
- (2) No funnel stop when using oil immersion objective.
- (3) Immersion oil too thick.

In an emergency, mineral oil or even water may be used between the condenser and the slide. Immersion oil, or a substitute having similar optical properties, should always be used between the cover glass and the oil immersion objective.

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