

SPHERICAL
ILLUMINATOR

DIRECTIONS FOR USE



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.*

FLC

SPHERICAL ILLUMINATOR

Cat. No. 31-33-75

Cat. No. 31 33-76

Cat. No. 31-33-77

Cat. No. 31-33-78

Directions for Use

BAUSCH & LOMB

OPTICAL COMPANY



ROCHESTER 2, N. Y.

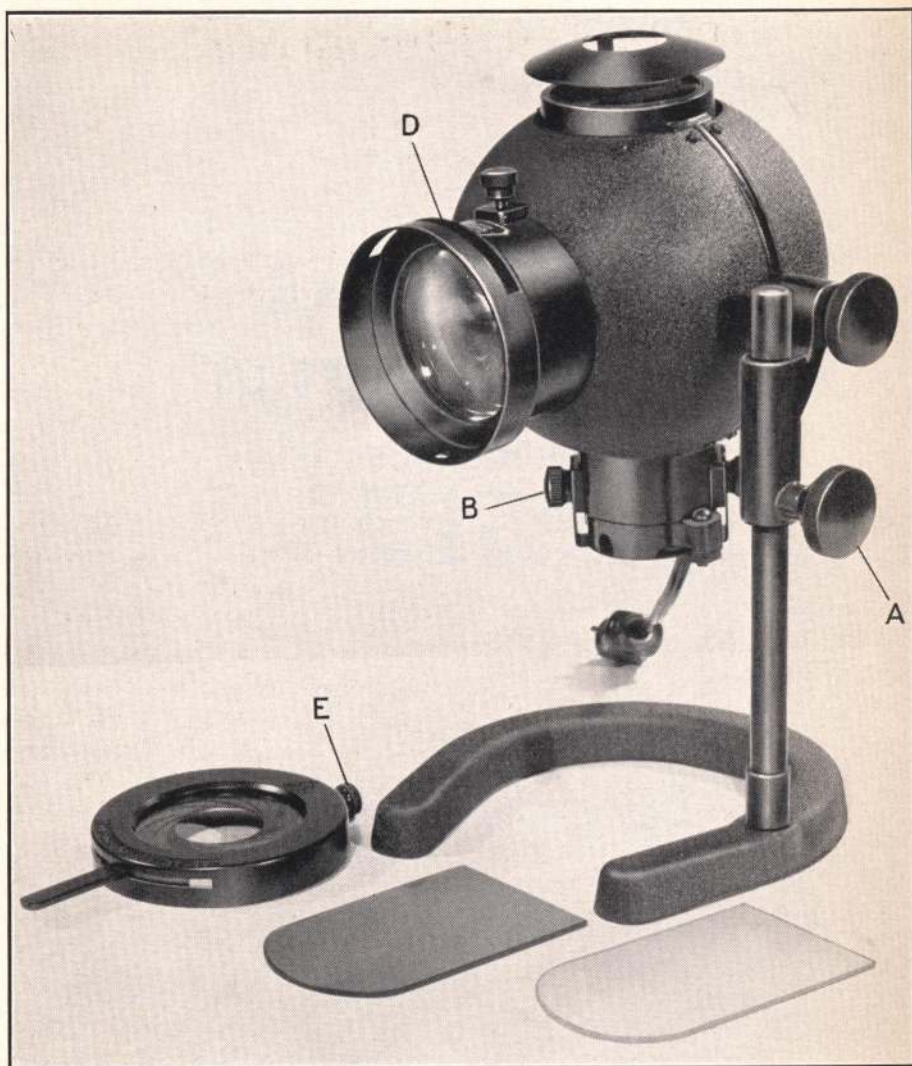


Figure 1

*The 31-33-75 Spherical Illuminator with Filters
and 31-34-33 Iris Diaphragm Removed*

A *Clamp Screw*
B *Thumb Screw*

D *Filter Slot*
E *Clamp Screw*

Spherical Illuminator

Directions for Use

The Spherical Microscope Illuminator is packed for shipment complete in one box. The lamphousing is removed from its support to avoid possible damage in shipment. The lamp will be included in the same box but wrapped separately. The filters, if ordered, will also be wrapped separately but packed in with the illuminator and lamp.

To attach the lamphousing to the support rod, turn out the clamp screw (A), Fig. 1, and slide the bracket of the lamphousing down over the support rod. Fig. 1 shows the illuminator properly assembled.

The lamp socket is held in the lamphousing by the two thumb screws (B), Figs. 1 and 2. To put in the lamp tilt the illuminator up as shown in Fig. 2, turn out the thumb screws (B) and pull out on the base of the lamp socket. Fig. 2 shows the socket removed and the lamp placed in the socket. Note that the base of the lamp is fitted with two flanges, one of which is wider than the other. Turn the lamp as it is placed in the socket until the flanges are over the slots of corresponding width in the socket. Press down on the lamp and turn it a quarter turn to the right to lock the lamp in place. (Reverse the motion to remove a lamp from the socket.)

Insert the lamp through the open-

ing in the bottom of housing and slip the two metal strips (C), Fig. 2, attached to the socket into the grooves of the lamp socket holder. Note that one of the metal strips is wider than the other and the slots into which they fit are of corresponding size. The socket can be inserted in only one position, so that the lamp filament will always be held in correct position with respect to the condenser lens. The 115 volt 100 and 200 watt lamps may be operated from either A.C. or D.C. lines.

In the 31-33-75 and -77 illuminators, the condenser consists of two plano convex lens elements. The condenser of the 31-33-76 and -78 illuminators is a single aspheric lens. In each illuminator the condenser is focused in the same manner; i.e., by sliding the condenser lens tube in and out. This is best accomplished by grasping the rim of the filter mount with one hand and moving the tube in or out as desired, while steadying the illuminator at the base with the other hand.

The spherical illuminators are usually supplied with two filters—one plain, ground glass filter (Cat. No. 31-34-52) and one clear, blue glass filter (Cat. No. 31-34-51). Either of these may be used alone, but for most work the two are used together to give a source of diffused light with the desirable bluish tint.

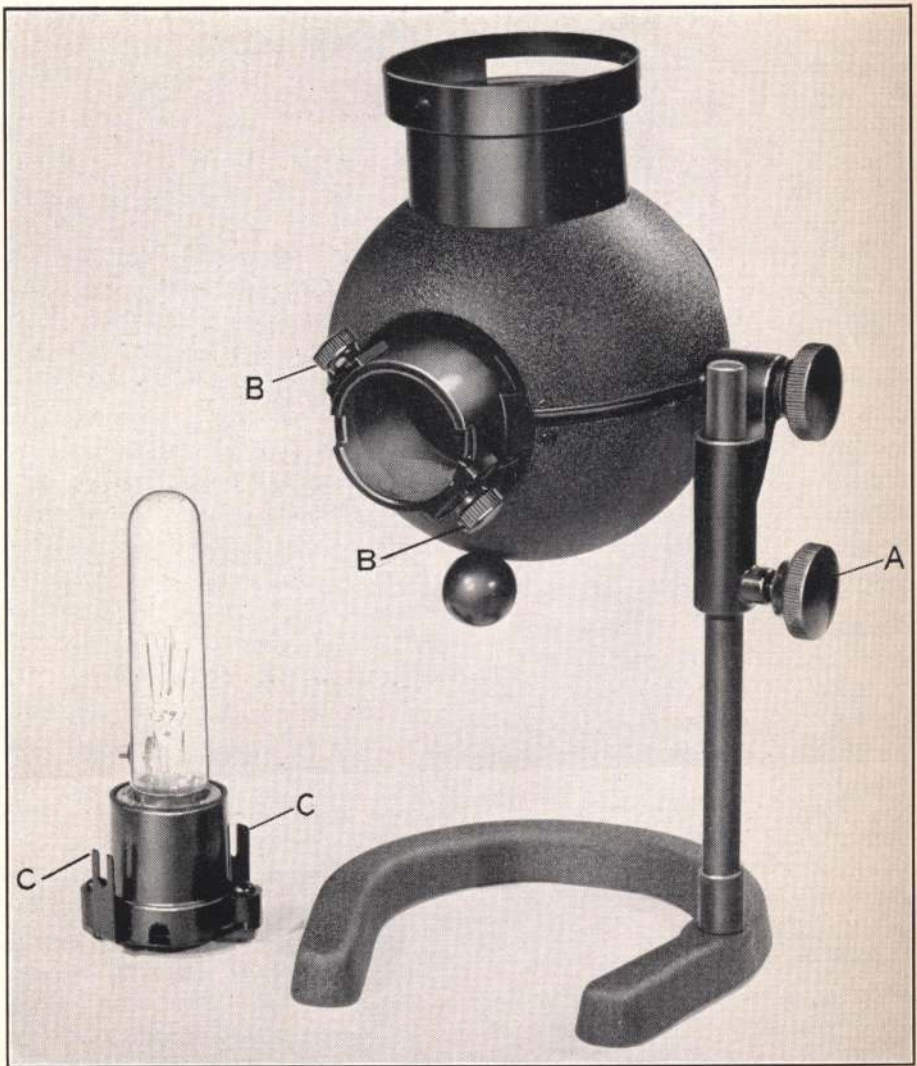


Figure 2

*The Spherical Illuminator with Socket and Lamp Removed,
and Tilted Upright*

A *Clamp Screw*

B *Thumb Screws*

C *Metal Strips*

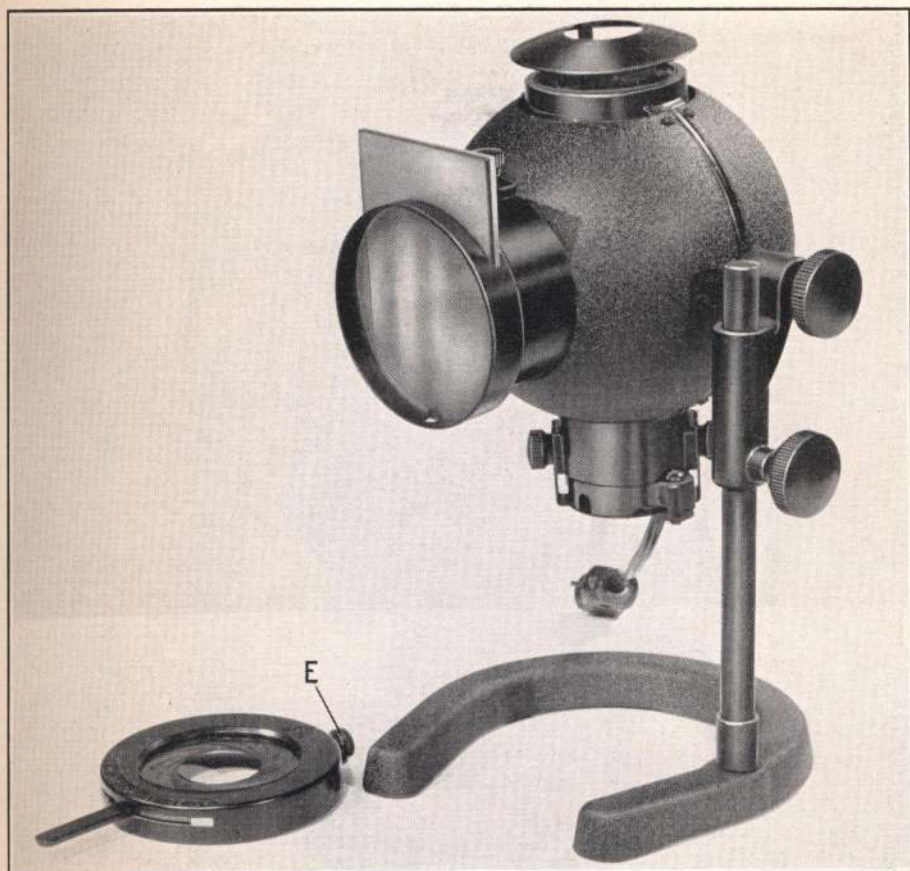


Figure 3

The Spherical Illuminator with Filters in Position

E *Clamp Screw*

In place of these two filters the Corning Daylite Blue filter (Cat. 31-34-50) may have been ordered. This one filter acts as a diffusing glass and at the same time provides a close substitute for daylight.

The filters are to be inserted square end uppermost in the slot (D) provided at the front of the condenser lens tube. (See Fig. 1). Fig. 3 shows the filters in place in the illuminator.

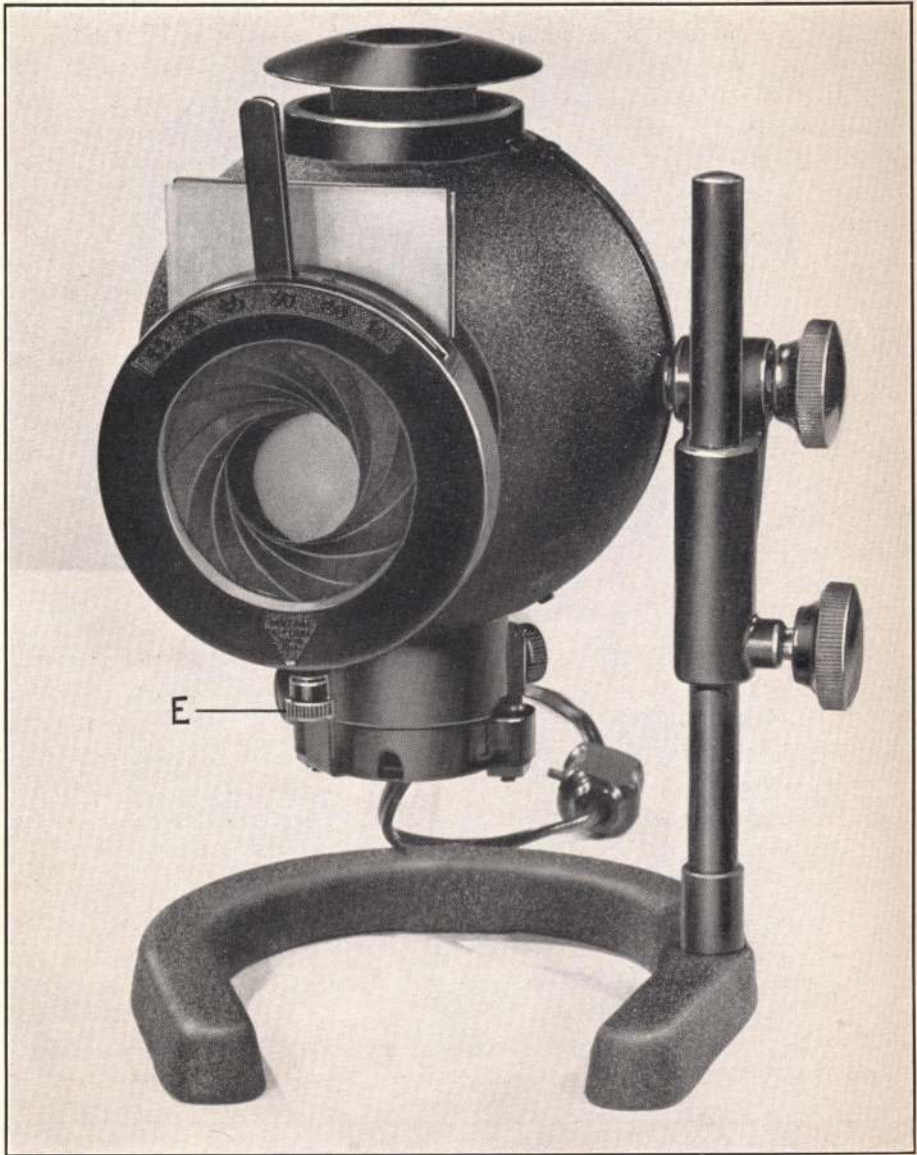


Figure 4

*The 31-33-75 Spherical Illuminator with Filters
and 31-34-33 Iris Diaphragm in Position*

E Clamp Screw

To use the illuminator with its filters for the microscopic examination of specimens by transmitted light, turn the illuminator on and without the filter focus the condenser lens to image the lamp filament about 12 inches away from the front of the lens tube. Set the illuminator about 12 inches away from the microscope mirror and tilt the illuminator and adjust it for height to direct the filament image onto the plano side of the mirror. Now insert the filters and focus the microscope on a specimen slide. Now focus the substage condenser and tilt the mirror if necessary until the tip of a pencil or similar

object held at the center of the illuminator filter is imaged in the field of view. Rack the substage condenser up or down slightly to destroy the image of the ground surface of the filter, if this is found objectionable.

The same procedure is carried out for setting up the illuminator for critical work without the diffusing filter. In this case, however, the distance from illuminator to microscope should be adjusted until the image of the lamp filament is sufficiently magnified, when focused on the microscope mirror, to completely fill the opening of the substage condenser or its iris diaphragm.

3 I-34-33 Iris Diaphragm

Fig. 1 illustrates the 31-34-33 iris diaphragm which may be attached to the Spherical Illuminator. To attach the diaphragm turn out the screw (E) and slip the diaphragm on over the flange at the front of the condenser lens tube of the illuminator. Tighten the screw (E) to hold the diaphragm in place. Fig. 4 shows the diaphragm in position on the illuminator. The scale on the iris reads directly in millimeters the opening of the iris at any particular setting of the handle. When the iris diaphragm is attached to the illuminator, the microscope substage con-

denser is usually focused to image the diaphragm in the field of view. The diaphragm at the illuminator is then opened until it just clears the field of the eyepiece. This prevents internal reflections which often cause a haze over the field of view. The iris may also be reduced to decrease the field about a particular point of interest.

When the illuminator is used for illuminating opaque objects from above the stage or in photographic work, the iris diaphragm acts as an illumination control.

3 I-34-29 Water Cell Holder

The water cell holder, Figure 5, is designed to stand on the work table between the illuminator and microscope. The holder may be adjusted for height and tilt by loosening the

thumb screw "A".

Place the water cell holder 6 or 8 inches from the base of the microscope and adjust it for height and tilt until the light beam from the

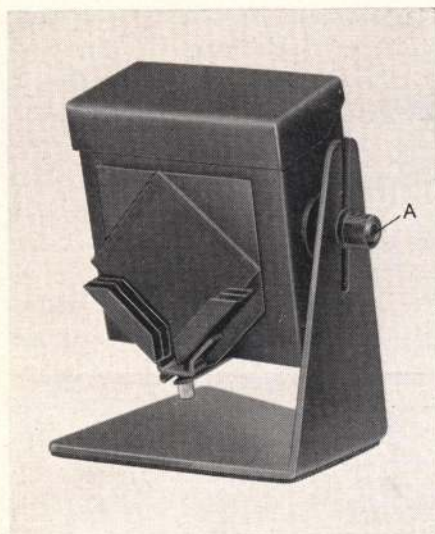


Figure 5

*The 31-34-29 Water Cell Holder
and 31-34-25 Filter Holder*

microscope lamp passes through the circular windows of the holder. Place

the holder squarely across the light beam.

The fused glass cell may be cleaned or filled with any solution that will not attack glass. For most work, where a tungsten filament lamp is the light source, distilled water will be found satisfactory as a heat absorbing medium. If greater heat absorption is desired, an acidulated solution of 2% copper sulfate in distilled water is recommended. Evaporation of the liquid in the cell may be reduced appreciably by floating a layer of clear mineral oil about $\frac{3}{16}$ inch thick on the surface of the liquid.

The use of ordinary tap water in the cell is not recommended, since the dissolved minerals in the water deposit on the glass, forming a scum which is difficult to remove.

Accessories and Replacement Parts for Spherical Microscope Illuminators

Catalog Number	Specifications
31-34-25	Filter Holder
31-34-29	Water Cell Holder
31-34-33	Iris Diaphragm
31-34-50	Corning Daylite Filter, Ground on one side
31-34-51	Blue Glass Filter, Clear
31-34-52	Ground Glass Filter
41-41-62	100-watt lamp, clear, medium, prefocus base, 115 volt A.C. or D.C.
41-41-63	200-watt lamp, clear, medium, prefocus base, 115 volt A.C. or D.C.
42-42-36	6v, 18 amp. ribbon filament lamp
42-46-97	Transformer

RESPONSIBILITY FOR DELIVERY. Every shipment of Bausch & Lomb products is in perfect condition when it leaves the factory. The transportation company, when it accepts the shipment, becomes the consignee's agent and is responsible for safe delivery:

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.



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 and Wellsville, N. Y.; Midland, Ontario, Canada; and Rio de Janeiro, Brazil. Sales offices are in many of the larger cities.

D1-594, 1, VIII-50

LITHO IN U. S. A.

