

B A U S C H & L O M B

**Microscope
Illuminators**

A WORD ABOUT ILLUMINATION



Many factors contribute to the quality of image viewed through the microscope. One of the most important of these is proper illumination. To derive full benefit from whatever degree of quality and precision is provided in the optical and mechanical components of any microscope, it is essential that *adequate lighting of the proper type* be provided. Since ordinary daylight is too inconstant to be relied upon, some form of artificial illumination is usually required.

What is "adequate" and "proper" in one application may not be suited at all to another. The complexity and particular makeup of the specimen to be viewed, and the fineness of detail one wishes to observe should be determining criteria in selecting a microscope illuminator. Cost and ease of operation are also to be taken into account.

In the more elementary student applications of microscopy, and in routine work in the hospitals, a simple low cost illuminator will proba-

bly perform with utmost satisfaction. Research work requiring critical microscopy, photomicrography, and micro-projection require a much more advanced type of illuminator, if best results are to be obtained.

The demands of microscopy have steadily become more complex and exacting. The development of greatly improved microscopes to meet these demands has been paralleled by similar improvements in illuminators. Those available from Bausch & Lomb will lend greater efficiency and convenience to any task in microscopy, photomicrography or micro-projection.

An extensive line of these illuminators is pictured and described in this catalog. One will be found to provide the best possible solution to your lighting problem.

There are, of course, other B&L Illuminators available for use in metallography and in the more specialized applications in the laboratory. Bausch & Lomb will be happy to help you solve any lighting problem with the greatest speed and efficiency, whatever it may be.

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PROFESSIONAL TYPE ILLUMINATORS

MODEL PL-25

MODEL PG-26

MODEL PR-27

PROFESSIONAL

QUALITY • APPEARANCE • PERFORMANCE

You are assured greater effectiveness in all microscope applications, both visual and photomicrographic, with bright field, dark field, and phase contrast illumination, using this series of illuminators.

The profusion and quality of the light they provide helps considerably in the attainment of images that are bright and clear, with every detail vividly apparent. This means speed and precision in interpreting specimens of every description.

SIMPLE, CONVENIENT CONTROL

The light from any one of these illuminators is quickly and accurately directed onto the microscope mirror. A readily accessible knob actuates a smooth working cam mechanism to tilt the illuminator through an angle of approximately 25 degrees. The action is firm and positive without the slightest indication of "jerkiness" or backlash. The mechanism, while easily operated, remains as set unless purposely changed. The illuminator will not tilt past the set position due to jarring or its own weight.

DESIGNED FOR OPERATOR COMFORT

All illuminator surfaces and control knobs remain comfortable to the touch even after having been in constant use for several hours. The operator need never be concerned about burns or difficulty in manipulating control knobs.

Ventilation openings are baffled to prevent stray light from reaching the operator's eyes or surrounding table area.

ONE-STEP BULB REPLACEMENT

The upper half of the bulb housing is quickly released simply by a few turns of a knob. This upper half lifts off in one piece to permit convenient access to the bulb for speedy removal and replacement. The new bulb goes back into position perfectly centered—there is no need for frustrating and time-consuming "screwdriver tactics" in an attempt to recenter the bulb.

MINIMUM MAINTENANCE REQUIRED

Extremely sturdy, aluminum die-castings prevent damage to condensers, lamp, lamp socket and other vulnerable parts. Closely fitted body halves protect against dust sifting onto lamp and internal optical components, eliminating the need for frequent cleaning. Pivot shaft and operating mechanisms always work easily and smoothly because they are entirely enclosed, sheltered against the accumulation of dust, grease, and other foreign material.

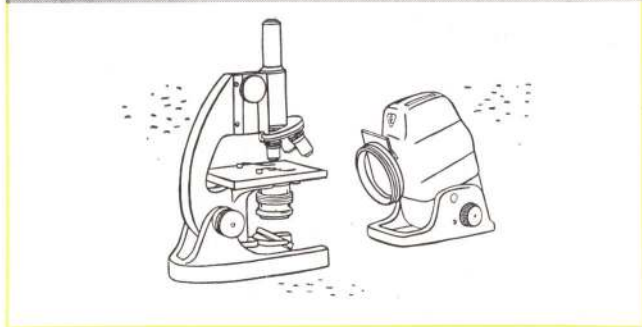
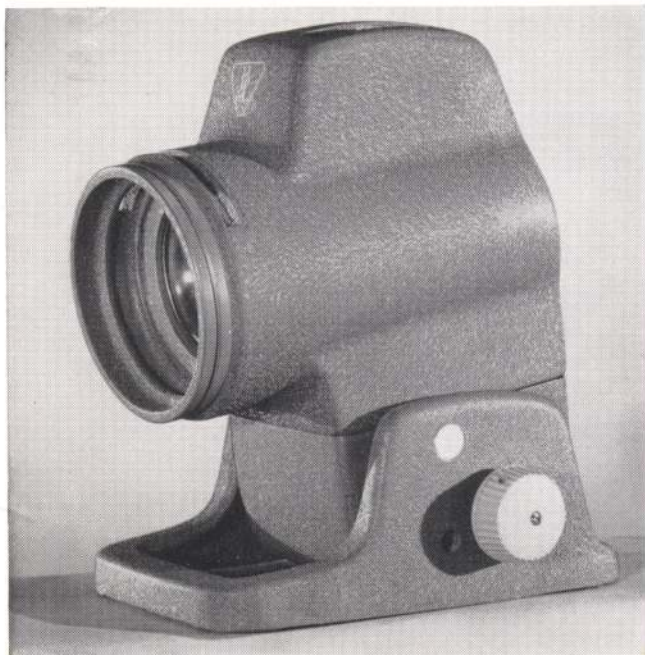
SMART, PRACTICAL DESIGN

The smooth, graceful contours of these illuminators reflect the efficiency built into them. Free of "hard-to-reach" crevices and exposed gears, they can be kept clean with a minimum of effort. Handsome and durable gray crackle finish reduces reflections from overhead lights and makes these illuminators a proud addition to any lab.

The bases are designed to provide a high degree of stability, to protect against tipping, and occupy a minimum of space.

**EACH MODEL HAS SPECIAL FEATURES FITTING
IT TO YOUR PARTICULAR APPLICATION**

MODEL PL-25



The extremely low cost and professional quality, appearance and performance of this model make it an incomparable value. General in purpose, it provides prolonged, dependable, daily service in all visual observation applications. The large aperture condenser and effective size of the light source make it possible to achieve full field illumination with even the lower power objectives.

Employing a universally available, 60-watt, daylight, inside frosted, household type lamp this model cannot be matched in economy of operation by any other professional type illuminator. The use of a large light source eliminates the need for focusing or centering the illuminator, as is required with concentrated sources. Use of 50- or 75-watt lamps is optional for less or more illumination.

A slot is provided at the very front of the lamp housing to permit quick and easy introduction of ground glass or colored filters whenever the particular application requires their use.

MODEL PG-26

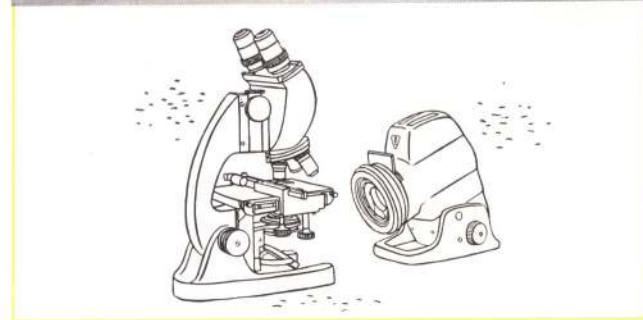
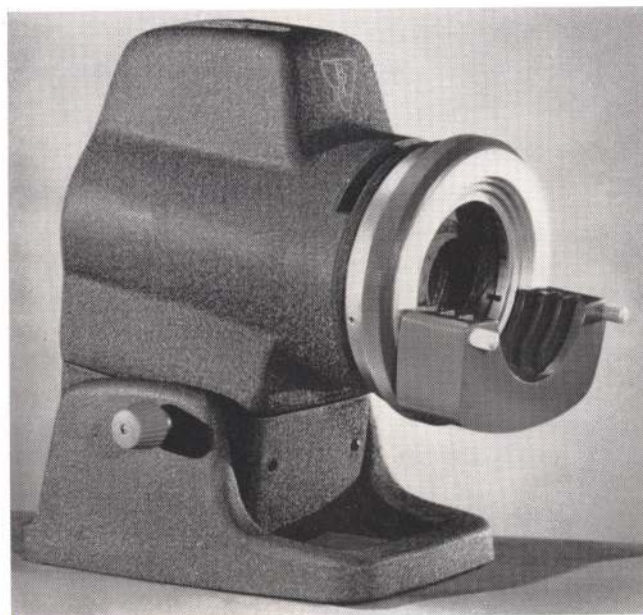
A high intensity light source makes the Model PG-26 entirely suitable for photomicrography, either black and white or color (with filters), as well as for all types of visual observation.

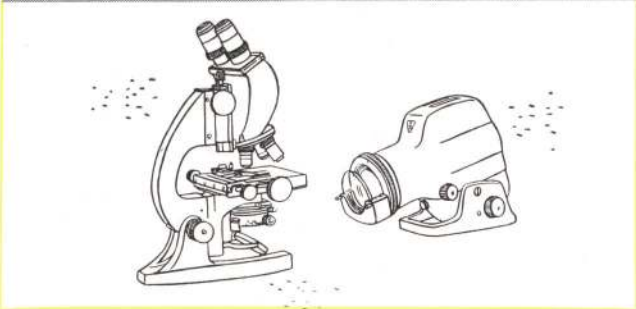
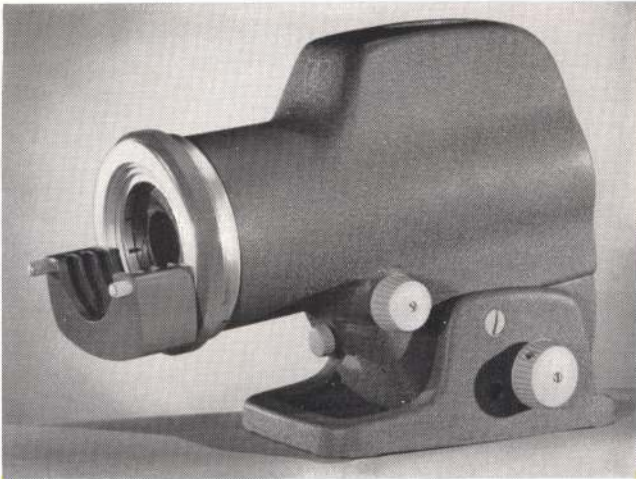
To insure obtaining the best possible image for more critical microscopy, this illuminator permits Koehler illumination to be established with complete ease.

To provide quick focusing with a minimum of effort, the lamp socket can be moved forward or back by a smoothly-meshing rack and pinion mechanism. Actuated by a knob conveniently positioned in the illuminator base, it permits imaging the lamp filament through a range from infinity down to approximately 6 inches in front of the illuminator.

The light source is a 100-w., 120-v., clear lamp with a concentrated filament, which has a four times longer life than other concentrated filament type lamps. Replacements are readily available at a low cost.

Adding to its versatility, this illuminator can be supplied with an iris diaphragm, filter holder, neutral filters and heat absorbing glass.



MODEL PR-27

The most advanced instrument of its type ever available, this new Research Illuminator will provide valuable assistance in simplifying the most complex problems of illumination in microscopy and photomicrography.

Here, for the first time, is an illuminator that completely eliminates the troublesome task of refocusing the light when changing from high to low power objectives, or vice versa. There is no need to relocate the illuminator, no need for "trial and error" focusing. With the microscope substage condenser in its uppermost position, you get full field illumination with high or low power objectives merely by rotating the critical focus selector knob a quarter turn. Turning this knob flips a lever, moving the variable focus condenser lens easily into one of the two pre-set positions.

In its forward position, the variable focus condenser lens provides a large, evenly illuminated aperture to completely fill the field of low power objectives. A turn of the selector knob moves the condenser into the second position, closer to the source. This results in the source being imaged in the microscope substage condenser at higher magnification, while the illuminated aperture of the lens is smaller, conforming to the smaller field requirements with high powers. This condenser is parabolic to provide correction for spherical aberration.

It also permits quick and easy establishment of true Koehler illumination. A knob at the rear of the illuminator base provides a means for speedy adjustment to compensate for differences between individual lamps, or filament shift.

The lamp used in this illuminator is a 6-v., 18-amp. ribbon filament type, which has been established as the most practical source for critical microscopy and photomicrography.

ACCESSORIES

IRIS DIAPHRAGM—The iris diaphragm provides a simple, convenient means of controlling the amount of light reaching the objective, or it may also be used as a field aperture diaphragm. It is quickly secured in position with three setscrews without distorting diaphragm assembly.

The action of the diaphragm is smooth and bind-free at all times. A knurled ring can be grasped at any point on its periphery to adjust the diaphragm opening through a range of 3mm to 60mm. The ring remains comfortable to the touch throughout extended operation of the illuminator.



FILTER HOLDER—Quickly attached to the iris diaphragm with two thumbscrews and accommodating three 3-inch square or round filters. Grooves are wedge shaped to prevent filter tipping, even though its thickness varies from 3 to 5.5mm.



FILTER ADAPTER—For those occasions when you will want to use a two inch square filter, such as an Interference or Wratten filter, this 2" x 2" filter adapter is offered. It fits into the groove of the filter holder and holds the square filter firmly, in the central aperture of the iris diaphragm.



FILTERS—Daylight Filter—A quality of illumination closely approximating light from a clear sky is furnished by this filter, assuring the visual observation of stains in their true colors.

Heat Absorbing Filter—Eliminating the need for a water cell and the preparation of coolant solutions, this highly efficient glass filter is ideal for use with Wratten filters, and when examining specimens hypersensitive to heat.

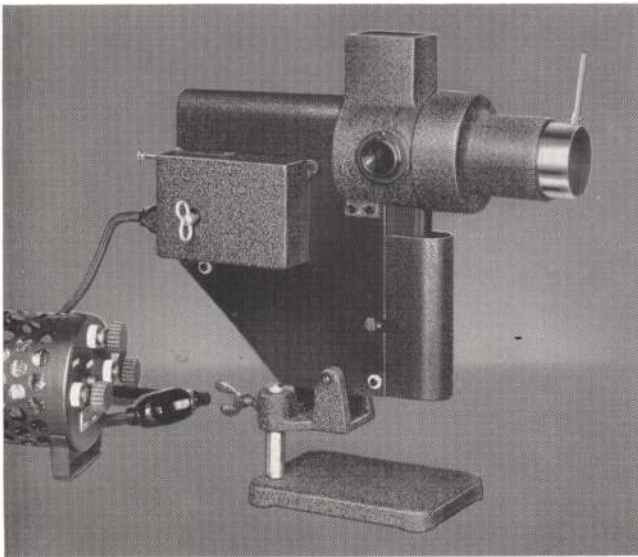
Neutral Density Filters—A completely new set of three inconel coated glass filters is available which provides extremely flat spectrophotometric curves throughout the range of 400 to 700 millimicrons. Densities of .7, 1.0, and 1.3 give transmission of 20%, 10%, and 5%, respectively, and any combination of the three will give additional reduction of illumination.

SPECIFICATIONS

(Professional Illuminators)

| Catalog No. | Description |
|-------------|--|
| 31-33-25-01 | Model PL-25, Professional Illuminator, 60-w., 120-v., daylight lamp. |
| 31-33-26-11 | Model PG-26, Professional Illuminator, 100-w., 120-v., concentrated filament lamp, blue and ground glass filters. |
| 31-33-26-12 | Model PG-26, Professional Illuminator, 100-w., 120-v., concentrated filament lamp, blue and ground glass filters and iris diaphragm. |
| 31-33-26-13 | Model PG-26, Professional Illuminator, 100-w., 120-v., concentrated filament lamp, blue and ground glass filters, 3 neutral filters, iris diaphragm and filter holder. |
| 31-33-27-21 | Model PR-27, Professional Illuminator, 108-w., 6-v., ribbon filament lamp, adjustable transformer, 3 neutral and 1 daylight filters, iris diaphragm and filter holder. |
| 31-31-34 | Lamp, 100-w., 120-v., concentrated filament, S.C. bayonet base (mfrs. no. 100 G16-1/2 SC) for PG models. |
| 33-33-12 | Lamp, 60-w., 120-v., inside frosted, daylight med. screw base (mfrs. no. 60A/D-120 IF) for PL model. |
| 42-42-36 | Lamp, 108-w., 6-v., ribbon filament, med. prefocus base (mfrs. no. 18A/T10/2P-6) for PR model. |
| 31-34-57 | Iris diaphragm. |
| 31-34-56 | Filter holder, for 31-34-57 iris diaphragm. |
| 31-34-58 | Daylight filter, polished both sides, 3" dia. |
| 31-34-66 | Neutral filter, 0.7 density, 20% transmission, 3" dia. |
| 31-34-67 | Neutral filter, 1.0 density, 10% transmission, 3" dia. |
| 31-34-68 | Neutral filter, 1.3 density, 5% transmission, 3" dia. |
| 31-34-69 | Box for 5 filters, 3" dia., cardboard. |
| 31-34-66-01 | Set of 3 neutral filters and daylight filter, in box. |
| 31-34-60 | Heat absorbing filter, 3" dia. |
| 42-46-97 | Transformer, 115-v., 60-cycle, AC, for Model PR-27. |
| 31-34-50 | Daylight Filter, ground one side, for PL-25 and PG-26. |
| 31-34-51 | Blue glass filter, polished both sides, for PL-25 and PG-26. |
| 31-34-52 | Ground glass filter for PL-25 and PG-26. |
| 31-34-76 | Adapter to hold 2" square filter in 31-34-56 filter holder. |

MECHANICAL FEED ARC ILLUMINATOR



The Bausch & Lomb Mechanical Feed Arc Illuminator is an all-purpose, high intensity light source. Its support can be adjusted to any elevation and tilted to any angle. The focusing sliding tube carries a condenser, which may be either spherical or aspheric, as desired.

Hinged shields enclose the carbons, and a clockwork feeding mechanism assures that the carbons will burn evenly to completion, with one setting.

Operating on 115-v., AC or DC, the illuminator requires a resistance.

SPECIFICATIONS

| Catalog No. | Description |
|-------------|---|
| 31-33-81-02 | Mechanical Feed Arc Illuminator, fitted with aspheric condenser, without resistance. |
| 31-33-81-03 | Mechanical Feed Arc Illuminator, same as 31-33-81-02 above, except with spherical condenser. Without resistance. |
| 31-33-81-64 | Mechanical Feed Arc Illuminator, fitted with aspheric condenser, with water cell holder and filter holder including fused Pyrex water cell. Without resistance. |
| 31-33-81-65 | Mechanical Feed Arc Illuminator, same as 31-33-81-64 above, except with spherical condenser. Without resistance. |

All of these illuminators require a resistance. Selection should be made according to the current available. Connecting cords are supplied with the resistance.

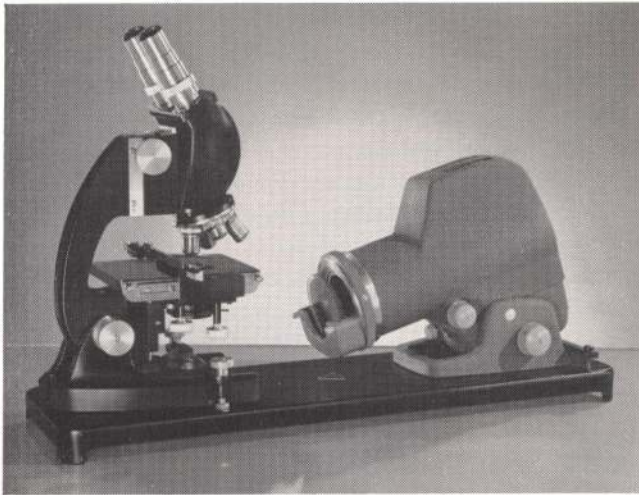
RESISTANCES

| | |
|----------|--|
| 42-46-52 | Resistance, fixed form, 4.5 amp., for use with any of above on 115-v., DC. With cords. |
| 42-46-53 | Resistance, fixed form, 4.5 amp., for use with any of the above on 230-v., DC. With cords. |
| 42-46-57 | Resistance, fixed form, 8-amp., for use with any of above on 115-v., AC. With cords. |

ACCESSORIES AND REPLACEMENT PARTS

| | |
|-------------|---|
| 31-34-24 | Water Cell Holder for 31-33-81 Illuminator. |
| 31-34-24-25 | Water Cell Holder and filter holder with fused Pyrex water cell. |
| 31-34-38-01 | Four neutral filters, inconel coated glass, and one daylight filter, 50mm square, polished on both sides. |
| 31-34-34 | Ground glass diffuser, 50mm square. |
| 42-47-28 | Water Cell, Pyrex glass. |
| 41-42-72-73 | 25 pairs carbons—cored (8mm horizontal, 5.6mm vertical) 6" long for DC. |
| 41-42-64 | Carbons—cored 6.4mm dia., 6" long for AC. |

ALL-METAL BASEBOARD



Permanent, accurate alignment of microscope and illuminator is achieved with the B&L All-Metal Baseboard. This means that they are always ready for immediate use. There is no time lost in checking and resetting the illuminator and mirror—the entire assembly can be handled as a unit.

The Baseboard is supplied for use with B&L Professional Type Illuminators, or the customer's own illuminator and microscope. The B&L Illuminators, Model PG-26 and PR-27 are pictured and described on Pages 4 and 5.

SPECIFICATIONS

| <i>Catalog No.</i> | <i>Description</i> |
|--------------------|--|
| 31-50-54 | Baseboard only, for Microscope and Microscope Illuminator. |

FLUORESCENT ILLUMINATOR



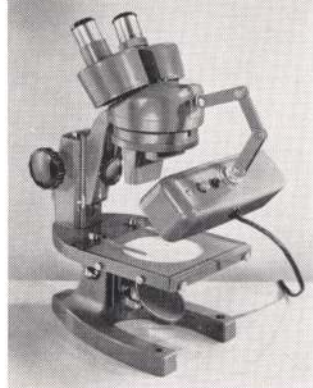
An exceptional value, the Fluorescent Illuminator floods the specimen or object with cool, diffused light. It is best suited for observation of surface details with low power objectives. When attached to the stereomicroscope, it automatically provides ideal illumination without adjustment, no matter how specimen thickness varies.

The light is supplied by two 4-w. daylight tubes which will last through many hours of normal operation.

The arm is fashioned of three sets of double links with friction-spring pressure control, so that it will stay in position despite vibration or jarring. When used separately from the stereomicroscope, a thumbscrew secures the arm assembly to the base, permitting rotation and setting at any position in the 360° travel. The cast base is heavy enough to provide ample support.

Above—The Fluorescent Illuminator as an independent light source.

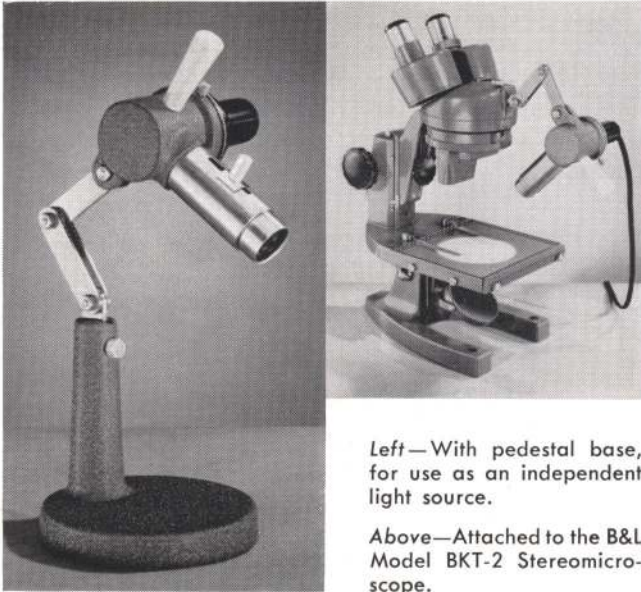
Right—In position on the B&L Model BKT-2 Stereomicroscope.



SPECIFICATIONS

| <i>Catalog No.</i> | <i>Description</i> |
|--------------------|--|
| 31-33-55 | Fluorescent Illuminator with two 4-w. daylight tubes in lock type sockets, two-button manual starting switch, wire and plug, for 115-v., AC. |
| 31-31-03 | Fluorescent tubes for replacement, 4-w. daylight. |

NICHOLAS ILLUMINATOR



Left—With pedestal base, for use as an independent light source.

Above—Attached to the B&L Model BKT-2 Stereomicroscope.

Providing a most intense “spotlight” effect, this illuminator is recommended for stereomicroscope examinations of both surface and internal details with highest power objectives, as well as low and medium power. It is essential for lighting small or deep apertures such as crevices, cracks, holes, etc.

It can be used as an independent light source, or attached to the stereomicroscope.

A highly corrected, easily adjustable condenser system efficiently concentrates brilliant intense light on a small area, or evenly distributes it over large fields of view. A built-in daylight filter eliminates filament color.

The arm provides adequate support for the lamp and condenser assembly, minimizing vibration and consequent inconstant focus.

The Nicholas Illuminator must be used with either a resistance (AC or DC) or a transformer (AC). These will be found listed below.

SPECIFICATIONS

| Catalog No. | Description |
|-------------|--|
| 31-33-51-01 | Nicholas Illuminator with 6.5-v., 2.75-amp. lamp, focusable condenser and blue glass filter. On hinged arm, pedestal base, without transformer, or resistance. |
| 31-33-52-01 | Same as above but without pedestal base. |
| 31-36-45 | Transformer, adjustable secondary, 3 to 6.5-v., for 115-v., 60-cycle. |
| 31-36-47 | Transformer, fixed secondary, 6.5-v., for 115-v., 60-cycle. |
| 31-36-44 | Resistance for 115-v. AC-DC. |
| 31-31-79 | Lamp for Nicholas Illuminator, 6.5-v., 2.75-amp. |
| 42-65-50 | Right Angle Prism, Balcoted, attaches to Nicholas Illuminator to give near vertical illumination. |

REFLECTOR ILLUMINATOR



Providing enough light for the larger fields of view obtained with low and medium power stereomicroscope objectives, this illuminator is recommended for examination of both surface and internal details.

This illuminator is available with two different light sources. One includes a high intensity 6.5-v. lamp, operating from either a transformer (AC) or resistance (AC or

DC). A variable transformer is available permitting a further and more precise light intensity control.

Where slightly less light intensity is satisfactory, the second form of illumination is suggested. This has a 15-w. 115-v., AC or DC frosted lamp for use without a transformer or resistance. Initial cost is lower and lamp replacement less frequent.

SPECIFICATIONS

| Catalog No. | Description |
|-------------|--|
| 31-33-11-01 | Reflector Illuminator with elliptical reflector, focusable lamp housing, hinged arm, circular base, 6.5-v., 25.5-c.p. without transformer or resistance. |
| 31-33-21-01 | Same as above except with 15-w., 115-v., AC or DC lamp. No transformer or resistance required. |
| 31-36-45 | Transformer, adjustable secondary, 3 to 6.5-v., for 115-v., 60-cycle. |
| 31-36-47 | Transformer, fixed secondary, 6.5-v., for 115-v., 60-cycle. |
| 31-36-44 | Resistance, 115-v., AC or DC for 31-33-11-01. |
| 31-31-16 | Replacement lamp, 6-v., 2.75-amp., frosted for 31-33-11-01. |
| 31-31-67 | Replacement lamp, 15-w., 115-v., outside white, for 31-33-21-01. |

ATTACHABLE DARK FIELD ILLUMINATOR

The Attachable Dark Field Illuminator is designed for use with the Bausch & Lomb Paraboloid Condenser. The illuminator screws into the adjustable centering mount of the condenser, forming an integral part of the centering unit.

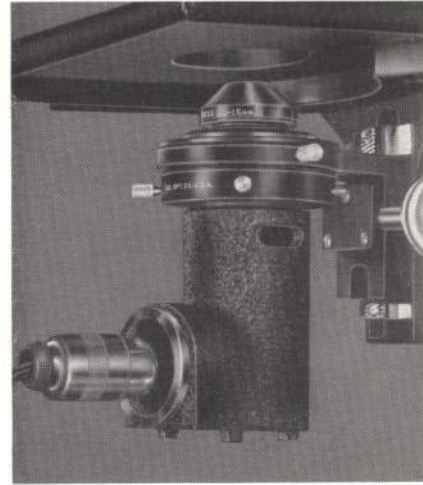
The light source is a precentered, low-voltage lamp. A corrected, achromatic condensing lens produces a beam of uniform intensity.

When the illuminator is attached to the condenser, there is a space between the bottom of the lamphouse and the table top, permitting free movement of the substage focusing mount to compensate for varying thicknesses of specimen slides. Immersion oil can be cleaned from the condenser lens without removing the unit.

Either dry or oil immersion objectives can be used, providing the numerical aperture of the objective is not greater than 0.95.

SPECIFICATIONS

| Catalog No. | Description |
|-------------|--|
| 31-33-43-31 | Dark Field Illuminator, for use with Paraboloid Condenser, 6.5-v., 2.75-amp. lamp, dark field slide, in case. Without transformer or resistance. |
| 31-33-43-61 | Dark Field Illuminator No. 31-33-43-31 above, and Paraboloid Condenser, in case. Without transformer or resistance. |



ACCESSORIES AND REPLACEMENT PARTS

| | |
|----------|---|
| 31-36-45 | Transformer, adjustable secondary, 3 to 6.5-v., for 115-v., 60-cycle. |
| 31-36-47 | Transformer, fixed secondary, 6.5-v., for 115-v., 60-cycle. |
| 31-36-44 | Resistance for 6.5-v., 2.75-amp. lamp, 115-v., DC or AC. The above transformers and resistance are also suitable for use with the Nicholas Illuminator. |
| 31-31-39 | Lamp, 6.5-v., 2.75-amp. clear, in special adapter, pre-focused, precentered, and preoriented for use in illuminating units No. 31-33-43-31 and No. 31-33-43-61. |

MICRO-LITE ILLUMINATOR

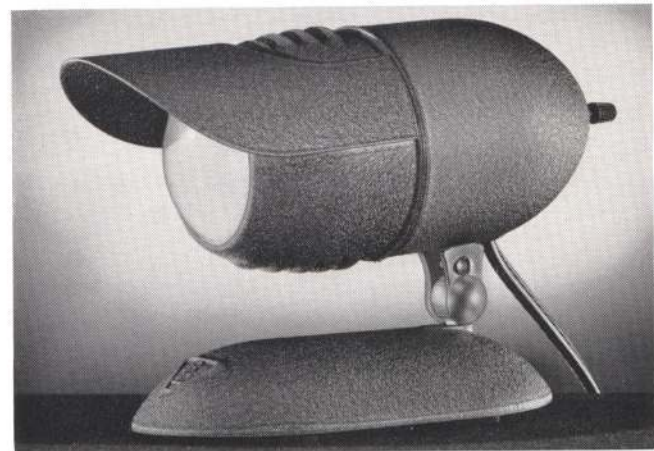
The Micro-Lite provides abundant light for transparent specimen work in a compact, light-weight illuminator, at an attractively low price.

Louvers on top and bottom permit flow of air around the lamp and prevent overheating of the lamphouse. The ball and socket joint, pressure controlled, permits directing the light in any direction.

The light source is an ordinary 60-watt lamp, obtainable practically anywhere. Condensing lens is the bull's-eye type with one surface ground to provide evenly diffused illumination. A blue filter behind the condenser produces light of about daylight quality, and an anti-glare shield above the lens completely protects the user's eyes from stray light.

A built-in "on-and-off" switch is provided complete with 6½ ft. of Underwriter's approved cord. The Micro-Lite is designed to be used in any 115-120-v. light circuit. The heavy base prevents tipping and has four felt-padded feet to protect table tops.

The finish is the popular Bausch & Lomb gray crackle, always attractive and easy to clean.



SPECIFICATIONS

| Catalog No. | Description |
|-------------|---|
| 31-33-01-01 | Micro-Lite, with 60-w., 120-v. lamp. |
| 71-71-13 | Lamp, 60-w., 120-v., inside frosted, med. screw base (mfrs. no. 60A-120). |

OPTI-LUME ILLUMINATOR

FOR BINOCULAR MICROSCOPES

This model provides the additional light required by all types of binocular microscope applications, from low power to oil immersion. It will, in fact, provide more than three times as much light as others in its price field.

Primarily designed for binocular microscope work, it is also ideal for use with monocular microscopes when examining thick, heavily stained specimens.

The field of view for any objective is completely and uniformly illuminated when the Opti-lume is attached to either an Abbe or Variable Focus Condenser. To fill the field of low power objectives when the Opti-lume is used separate from the microscope, it is essential that the microscope be fitted with the Variable Focus Condenser.

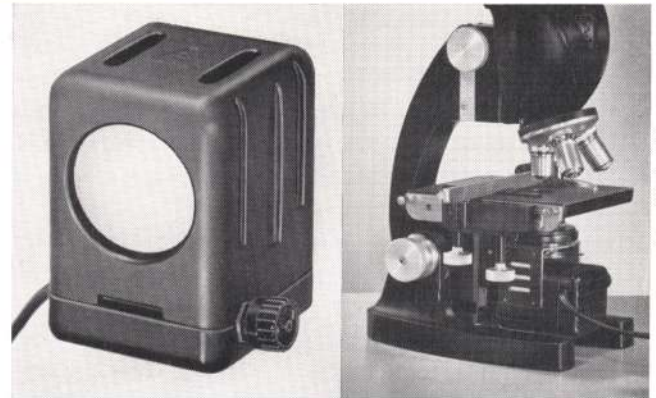
Easily and quickly attached to the microscope by means of a U-shaped bracket with a tongue and groove fitting into two sides of the lamphouse, the Opti-lume focuses with the substage condenser and tilts with the microscope.

Travel of the substage condenser is not limited in any way by attachment of the Opti-lume. The illuminator assembly is feather-light, eliminating all danger of increased wear on rack and pinion substages.

Sturdy, compact, and inexpensive, this Opti-lume has a simply designed phenolic lamphouse with ventilating louvers. When used on the microscope, a light shield around the lamp, and space between the illuminator and stage prevent heat damage to specimens. The lamp is 115-v., 15-w., clear medium screw base type, available wherever commercial lamps are sold. A convenient, built-in "on-and-off" switch is provided.

FOR MONOCULAR MICROSCOPES

The standard Opti-lume for monocular microscopes is designed to provide adequate illumination for routine examinations with low and medium power objectives. It features the same desirable advantages listed for the binocular



microscope Opti-lume with the exception of the spherical condenser and aluminized reflector, and with frosted blue glass instead of white.

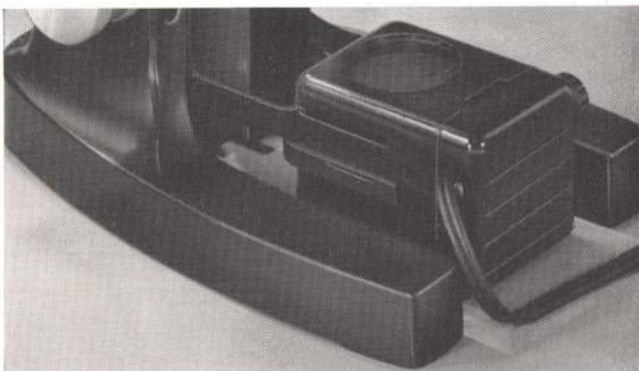
**Both the binocular microscope Opti-lume and the standard Opti-lume can be used separate from the microscope, with a mirror.*

SPECIFICATIONS

| Catalog No. | Description |
|-------------|---|
| 31-33-93 | Opti-lume Illuminator for Binocular Microscopes with 115-v., 15-w., lamp, switch, cord, plug, white ground glass filter, clear condenser, and clip-on metal reflector for use as a separate light source. |
| 31-33-93-47 | Opti-lume Illuminator for Binocular Microscopes, same as above, but with bracket and adapter for use as a built-on illuminator. |
| | Opti-lume Illuminator for Monocular Microscopes with 115-v., 15-w. lamp, switch, cord and plug for use as a separate light source, and the following optional equipment: |
| 31-33-90 | Blue ground glass filter. |
| 31-33-92 | Daylight ground glass filter. |
| | Opti-lume Illuminator for Monocular Microscopes, same as above, but with bracket and adapter for use as a built-on illuminator, and the following optional equipment: |
| 31-33-90-47 | Blue ground glass filter. |
| 31-33-92-47 | Daylight ground glass filter. |
| 31-33-90-48 | Opti-lume, for Models ST, STA, STAA and STAM Standard Teaching Microscopes, with blue glass filter, mounting bracket, built-in switch and 15-w., 115-v. lamp. |

REPLACEMENT PARTS

| | |
|----------|--|
| 31-34-19 | Daylight ground glass filter, 44mm square. |
| 31-34-21 | Blue ground glass filter, 44mm square. |
| 31-34-47 | Bracket and adapter. |
| 31-34-48 | Bracket only for mounting Opti-lume on ST, STA, STAA, and STAM Standard Teaching Microscopes. |
| 31-34-72 | Bracket only for mounting Opti-lume on Model STAV Standard Teaching Microscope. |
| 31-34-77 | Clip-on metal reflector. |
| 31-34-79 | Clear condenser. |
| 31-58-20 | H-Bracket for attaching Opti-lume to microscopes with D, M or S substage or Dynoptic Polarizing Microscopes. |
| 31-31-15 | Lamp, clear, 115-v., 15-w. (mfrs. no. 15S11/102-115). |



PANFOCAL ILLUMINATOR

VISUAL EXAMINATIONS WITH GREATEST CONVENIENCE

The attainment of perfectly balanced illumination of objective and condenser with the B&L Panfocal Illuminator is as easy as flipping a light switch. A convenience and simplicity of operation, difficult to excel, are provided by this Illuminator, when the microscope is to be used only for visual work with transmitted light at various magnifications.

The unit is a completely self-contained illuminator-condenser which fits into the full ring mount of any B&L laboratory microscope rack and pinion substage. It makes three types of illumination instantly available—bright field, dark field, and polarized light and when desired, a red, green, blue, or daylight filter.

OBJECTIVE AND CONDENSER N.A. QUICKLY, EASILY MATCHED

Matching the N.A. of the condenser to that of the objective is rapidly accomplished without effort. The scale on the Panfocal Illuminator is set to read the same as the objective N.A. The knurled ring graduated from .10 to 1.40 controls the N.A. setting and at the same time moves the lenses and aperture diaphragm in precise synchronization. The proper relationship between the seven lens elements of the condenser and the aperture diaphragm is always maintained. The aperture diaphragm is centered on the optical axis of the lens system and the plane of the aperture is perpendicular to that axis.

MANY OTHER FEATURES

Assuring Dependability, Versatility, Efficiency

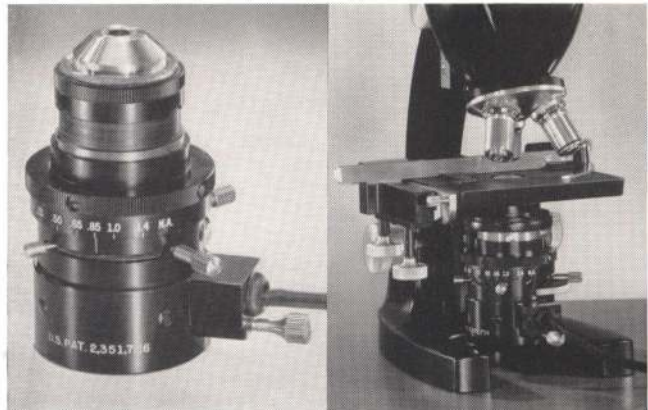
The source is a GE No. 55 miniature bayonet base, automobile type lamp which is easily and quickly centered by shifting the lamp until the back aperture of the objective is evenly filled with light.

By simply rotating a knurled ring above the source, the operator can immediately bring into use a red, green, blue, or daylight filter, a polaroid polarizer, or a special dark field illuminator unit. The latter performs best with objectives up to 0.70 N.A.

To prevent uneven illumination of the specimen, diffused light from the finely frosted filters is employed.

Field Diaphragm

The field iris diaphragm is controlled by a convenient lever and is centerable by two thumbscrews. This diaphragm is located in the lens system at a plane where it will be imaged at unit magnification in the specimen plane,



when the movable lenses are in their uppermost position. Because the field diaphragm is projected at nearly 1/1 magnification it remains imaged in approximately the same plane, regardless of the N.A. setting.

Eyepiece and body tube analyzers are available for use with the polarizer. A metal shield guards the filters against dirt and damage from above.

The illuminator is held firmly in the substage mount and is balanced in its vertical axis to eliminate all possibility of "wobble."

A recessed groove in the conical mount holding the stationary top lens prevents excess oil (in immersion work) from seeping down into the internal optical elements.

Field of View

With the B&L Panfocal Illuminator a field of view of 5.65mm diameter in the plane of the specimen can be illuminated for low power searching operations with the 32mm, 0.10 N.A. objective and any eyepiece, or with the 28mm objective and an eyepiece of 7.5× magnification or higher.

The illuminator is supplied in a blue leatherette covered case, complete with one extra lamp. An adjustable 3.5 to 8.5-volt transformer for use with 115-v., AC is included.

SPECIFICATIONS

| Catalog No. | Description |
|-------------|---|
| 31-33-57-02 | Panfocal Illuminator, including 2 lamps and adjustable transformer for use with 115-v., 60-cycle AC, in case. |

ACCESSORIES AND REPLACEMENT PARTS

| | |
|----------|---|
| 71-72-42 | Adjustable Transformer, 115-v., 60-cycle AC, 3.5-v. to 8.5-v. |
| 31-36-47 | Transformer, fixed secondary, 6.5-v., for 115-v., 60-cycle. |
| 31-57-11 | Polaroid Cap Analyzer for monocular microscopes. |
| 31-57-37 | Polaroid Body Tube Analyzer for binocular microscopes. |
| 31-31-95 | Replacement Lamp, 6-8-v., 0.41 amps., 2-c.p. |

TERMS AND PROCEDURE

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When ordering, be sure to give catalog number and name of item.

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To avoid a delay, a purchaser with whom Bausch & Lomb has not previously transacted business should accompany his first order with commercial references or remittance in cash.

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Bausch & Lomb reserves the right to make changes in instrument design in accordance with scientific progress, and to supply apparatus resultingly different from that described or illustrated in its literature.

BAUSCH & LOMB OPTICAL CO.

Rochester 2, New York, U. S. A.

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BAUSCH & LOMB

MICROSCOPE ILLUMINATORS

PRICE LIST FOR CATALOG D-119

October 15, 1958

PROFESSIONAL TYPE ILLUMINATORS

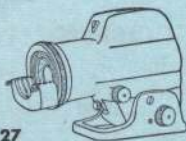
PL-25



PG-26

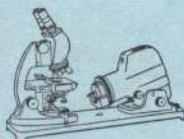


PR-27



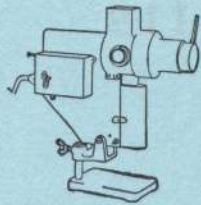
| Description | Catalog No. | Price |
|--|-------------|----------|
| Model PL-25, Professional Illuminator, 60-w., 120-v., daylight lamp..... | 31-33-25-01 | \$ 36.00 |
| Model PG-26, Professional Illuminator, 100-w., 120-v., concentrated filament lamp, blue and ground glass filters..... | 31-33-26-11 | 55.00 |
| Model PG-26, Professional Illuminator, 100-w., 120-v., concentrated filament lamp, blue and ground glass filters and iris diaphragm..... | 31-33-26-12 | 67.00 |
| Model PG-26, Professional Illuminator, 100-w., 120-v., concentrated filament lamp, blue and ground glass filters, 3 neutral filters, iris diaphragm and filter holder..... | 31-33-26-13 | 88.00 |
| Model PR-27, Professional Illuminator, 108-w., 6-v., ribbon filament lamp, adjustable transformer, 3 neutral and 1 daylight filters, iris diaphragm and filter holder..... | 31-33-27-21 | 139.00 |
| Lamp, 100-w., 120-v., concentrated filament, S.C. bayonet base (mfrs. no. 100 G16-½ 29SC) for PG models..... | 31-31-34 | 1.80 |
| Lamp, 60-w., 120-v., inside frosted, daylight med. screw base (mfrs. no. 60A/D-120 IF) for PL model..... | 33-33-12 | .35 |
| Lamp, 108-w., 6-v., ribbon filament, med. prefocus base (mfrs. no. 18A/T-10/2P-6) for PR model..... | 42-42-36 | 8.20 |
| Iris diaphragm for use on PL, PG and PR Illuminators..... | 31-34-57 | 12.00 |
| Filter holder, for 31-34-57 iris diaphragm..... | 31-34-56 | 3.00 |
| Daylight Filter, polished both sides, 3" diameter..... | 31-34-58 | 6.00 |
| Neutral filter, 0.7 density, 20% transmission, 3" diameter..... | 31-34-66 | 6.00 |
| Neutral filter, 1.0 density, 10% transmission, 3" diameter..... | 31-34-67 | 6.00 |
| Neutral filter, 1.3 density, 5% transmission, 3" diameter..... | 31-34-68 | 6.00 |
| Box for 5 filters, 3" diameter, cardboard..... | 31-34-69 | 1.00 |
| Set of 3 neutral filters and daylight filter, in box..... | 31-34-66-01 | 24.00 |
| Heat absorbing filter, 3" diameter..... | 31-34-60 | 9.50 |
| Daylight Filter, ground one side, for PL-25 and PG-26..... | 31-34-50 | 6.00 |
| Blue glass filter, polished both sides, for PL-25 and PG-26..... | 31-34-51 | 1.50 |
| Ground glass filter for PL-25 and PG-26..... | 31-34-52 | 1.50 |
| Transformer, 115-v., 60-cycle, AC, for Model PR-27..... | 42-46-97 | 28.00 |
| Adapter to hold 2" square filter in 31-34-56 filter holder..... | 31-34-76 | 1.50 |

BASEBOARD



| Description | Catalog No. | Price |
|--|-------------|----------|
| Baseboard only, for microscope and microscope illuminator..... | 31-50-54 | \$ 20.00 |

MECHANICAL FEED ARC ILLUMINATOR



| Description | Catalog No. | Price |
|--|-------------|----------|
| Mechanical Feed Arc Illuminator, fitted with aspheric condenser, without resistance | 31-33-81-02 | \$134.00 |
| Mechanical Feed Arc Illuminator, same as 31-33-81-02 above, except with spherical condenser, without resistance | 31-33-81-03 | 126.00 |
| Mechanical Feed Arc Illuminator, fitted with aspheric condenser, with water cell holder and filter holder including fused Pyrex water cell, without resistance | 31-33-81-64 | 161.00 |
| Mechanical Feed Arc Illuminator, same as 31-33-81-64 above, except with spherical condenser, without resistance | 31-33-81-65 | 153.00 |

All of these illuminators require a resistance. Selection should be made according to the current available. Connecting cords are supplied with resistance.

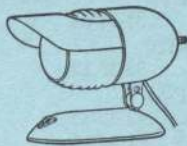
RESISTANCES

| | | |
|---|----------|----------|
| Resistance, fixed form, 4.5 amp., for use with any of the above on 115-v., D.C., with cords | 42-46-52 | \$ 26.00 |
| Resistance, fixed form, 4.5 amp., for use with any of the above on 230-v., D.C., with cords | 42-46-53 | 29.00 |
| Resistance, fixed form, 8-amp., for use with any of above on 115-v., A.C., with cords | 42-46-57 | 29.00 |

ACCESSORIES AND REPLACEMENT PARTS

| | | |
|---|-------------|---------|
| Water Cell Holder for 31-33-81 Illuminator | 31-34-24 | \$ 6.50 |
| Water Cell Holder and filter holder with fused Pyrex water cell | 31-34-24-25 | 27.00 |
| Four neutral filters, inconel coated glass, and one daylight filter, 50mm square, polished on both sides, in case | 31-34-38-01 | 27.00 |
| Ground glass filter for use with 31-34-38-01, 2" x 2" | 31-34-34 | .70 |
| Water Cell, fused Pyrex glass | 42-47-28 | 18.50 |
| 25 pairs carbons—cored (8mm horizontal, 5.6mm vertical) 6" long for D.C. | 41-42-72-73 | 6.40 |
| Carbons—cored 6.4mm diameter, 6" long for A.C. | 41-42-64 | .14 |

MICRO-LITE ILLUMINATOR



| Description | Catalog No. | Price |
|--|-------------|----------|
| Micro-Lite, with 60-w., 120-v. lamp | 31-33-01-01 | \$ 11.00 |
| Lamp, 60-w., 120-v., inside frosted, med. screw base (mfr's No. 60A-120) | 71-71-13 | .21 |

OPTI-LUME ILLUMINATORS



| Description | Catalog No. | Price |
|---|-------------|----------|
| Opti-lume Illuminator for binocular microscopes with 115-v., 15-w. lamp, switch, cord, plug, white ground glass filter, clear condenser, and clip-on metal reflector for use as a separate light source | 31-33-93 | \$ 10.50 |
| Opti-lume Illuminator for binocular microscopes, same as above, but with bracket and adapter for use as a built-on illuminator | 31-33-93-47 | 13.00 |
| Opti-lume Illuminator for monocular microscopes with 115-v., 15-w. lamp, switch, cord and plug for use as a separate light source, and the following optional equipment: | | |
| Blue ground glass filter | 31-33-90 | 6.00 |
| Daylight ground glass filter | 31-33-92 | 7.00 |
| Opti-lume Illuminator for monocular microscopes, same as above, but with bracket and adapter for use as a built-on illuminator, and the following optional equipment: | | |
| Blue ground glass filter | 31-33-90-47 | 8.50 |
| Daylight ground glass filter | 31-33-92-47 | 9.50 |
| Opti-lume for Models ST, STA, STAA and STAM Standard Teaching Microscopes, with blue glass filter, mounting bracket, built-in switch and 15-w., 115-v. lamp | 31-33-90-48 | 7.50 |

OPTI-LUME ILLUMINATORS (Cont'd)

| REPLACEMENT PARTS | | Catalog No. | Price |
|---|----------|-------------|-------|
| Daylight ground glass filter, 44mm square..... | 31-34-19 | \$ | 1.50 |
| Blue ground glass filter, 44mm square..... | 31-34-21 | | .50 |
| Bracket and adapter for mounting Opti-lume on Dynoptic Microscopes..... | 31-34-47 | | 2.50 |
| Bracket only for mounting Opti-lume on ST, STA, STAA and STAM Standard Teaching Microscopes..... | 31-34-48 | | 1.50 |
| Bracket only for mounting Opti-lume on STAV Standard Teaching Microscope..... | 31-34-72 | | 2.00 |
| Clip-on metal reflector..... | 31-34-77 | | 3.50 |
| Clear Condenser..... | 31-34-79 | | 1.00 |
| H-Bracket for attaching Opti-lume to Microscopes with D, M, or S substage or Dynoptic Polarizing Microscopes..... | 31-58-20 | | 2.50 |
| Lamp, clear, 115-v., 15-w. (mfr's no. 15S11/102-115)..... | 31-31-15 | | .27 |

NICHOLAS ILLUMINATOR



| Description | Catalog No. | Price |
|---|-------------|----------|
| Nicholas Illuminator with 6.5-v., 25.5-c.p. lamp, focusable condenser and blue glass filter. On hinged arm, pedestal base, without transformer or resistance..... | 31-33-51-01 | \$ 49.00 |
| Same as above but without pedestal base..... | 31-33-52-01 | 44.00 |
| Transformer, adjustable for 115-v., A.C..... | 31-36-45 | 19.00 |
| Transformer, fixed for 115-v., A.C..... | 31-36-47 | 17.00 |
| Resistance for 115-v., A.C.—D.C..... | 31-36-44 | 14.00 |
| Lamp for Nicholas Illuminator, 6.5-v., 2.75-amp..... | 31-31-79 | 1.15 |
| Right Angle Prism, Balcoted, attaches to Nicholas Illuminator to give near vertical illumination..... | 42-65-50 | 24.50 |

REFLECTOR ILLUMINATOR



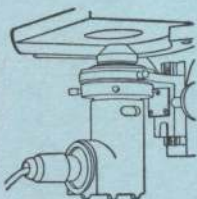
| Description | Catalog No. | Price |
|--|-------------|----------|
| Reflector Illuminator with elliptical reflector, focusable bulb housing, hinged arm, circular base, 6.5-v., 2.75-amp. lamp, without transformer or resistance..... | 31-33-11-01 | \$ 29.00 |
| Same as above except with 15-w., 115-v., A.C. or D.C. lamp. No transformer or resistance required..... | 31-33-21-01 | 29.00 |
| Adjustable transformer, 115-v., A.C. for 31-33-11-01..... | 31-36-45 | 19.00 |
| Fixed transformer, 115-v., A.C. for 31-33-11-01..... | 31-36-47 | 17.00 |
| Resistance, 115-v., A.C. or D.C. for 31-33-11-01..... | 31-36-44 | 14.00 |
| Replacement lamp, 6.5-v., 2.75-amp., frosted for 31-33-11-01..... | 31-31-16 | 1.23 |
| Replacement lamp, 15-w., 115-v., outside white, for 31-33-21-01..... | 31-31-67 | .72 |

FLUORESCENT ILLUMINATOR



| Description | Catalog No. | Price |
|--|-------------|----------|
| Fluorescent Illuminator with two 4-w., daylight tubes in lock type sockets, two-button manual starting switch, wire and plug, for 115-v., A.C..... | 31-33-55 | \$ 22.00 |
| Fluorescent tubes for replacement, 4-w., daylight..... | 31-31-03 | 1.35 |

DARK FIELD ILLUMINATOR



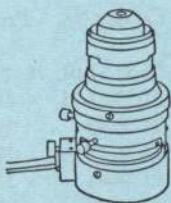
| Description | Catalog No. | Price |
|--|-------------|----------|
| Dark Field Illuminator, for use with Paraboloid Condenser, 6.5-v., 2.75-amp. lamp, dark field slide, in case. Without transformer or resistance..... | 31-33-43-31 | \$ 41.00 |
| Dark Field Illuminator No. 31-33-43-31 above, and Paraboloid Condenser, in case. Without transformer or resistance..... | 31-33-43-61 | 113.00 |

DARK FIELD ILLUMINATOR (Cont'd)

ACCESSORIES AND REPLACEMENT PARTS

| Description | Catalog No. | Price |
|--|-------------|----------|
| Transformer for 6.5-v., 2.75-amp. lamp, 115-v., A.C..... | 31-36-47 | \$ 17.00 |
| Adjustable Transformer, 115-v., A.C..... | 31-36-45 | 19.00 |
| Resistance for 6.5-v., 2.75-amp. lamp, 115-v., A.C. or D.C..... | 31-36-44 | 14.00 |
| The above transformers and resistance are also suitable for use with the Nicholas Illuminator. | | |
| Lamp, 6.5-v., 2.75-amp. clear, in special adapter, prefocused, precentered, and pre-oriented for use in illuminating units No. 31-33-43-31 and No. 31-33-43-61.... | 31-31-39 | 4.00 |

PANFOCAL ILLUMINATOR



| Description | Catalog No. | Price |
|---|-------------|----------|
| Panfocal Illuminator, including 2 lamps and adjustable transformer for use with 115-v., 60-cycle A.C., in case..... | 31-33-57-02 | \$240.00 |

ACCESSORIES AND REPLACEMENT PARTS

| | | |
|---|----------|----------|
| Adjustable Transformer, 115-v., 60-cycle A.C., 3.5-v. to 8.5-v..... | 71-72-42 | \$ 24.00 |
| Fixed Transformer, 115-v., A.C. (6.5-v.)..... | 31-36-47 | 17.00 |
| Polaroid Cap Analyzer for monocular microscopes..... | 31-57-11 | 14.00 |
| Polaroid Body Tube Analyzer for binocular microscopes..... | 31-57-37 | 30.00 |
| Replacement Lamp, 6.8-v., 0.41 amps., 2-c.p..... | 31-31-95 | .15 |

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BAUSCH & LOMB OPTICAL CO.
ROCHESTER 2, NEW YORK, U.S.A.