

*Leica*

# StereoZoom® Series Microscopes

INSTRUCTION MANUAL

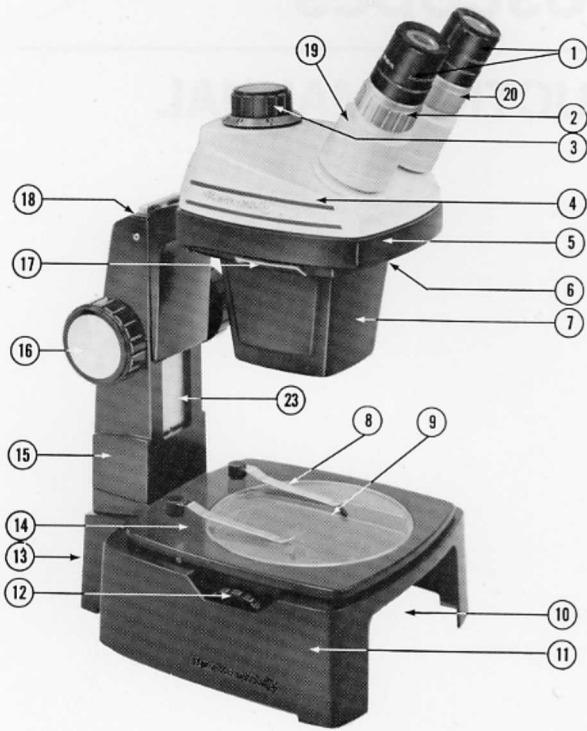


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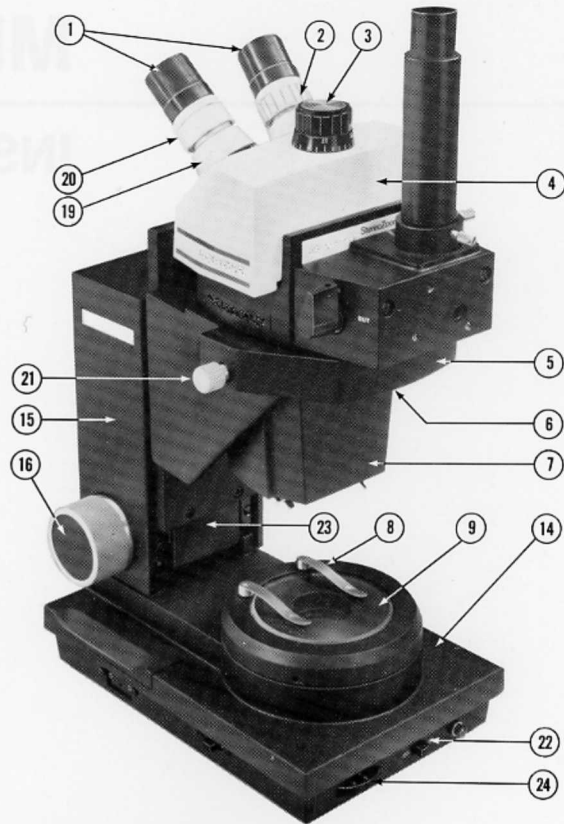
# StereoZoom® Series Microscopes

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## INSTRUCTION MANUAL



**StereoZoom 4 Pod  
on a B Stand**



**StereoZoom 7 Pod  
on an R Stand**

1. Eyepieces
2. Eyepiece Adjusting Ring
3. Magnification Knob
4. Power Pod
5. Arm
6. Illuminator Stations
7. Objective Cover
8. Spring Clip

9. Glass Stage Plate
10. 3-Way Mirror (not shown)
11. Trans-Illumination Base
12. Mirror Axle
13. Port Hole (not shown)
14. Base
15. Upright
16. Focusing Knob

17. Lock Lever
18. Port Hole (not shown)
19. Eyepiece Adapter
20. Eyepiece Ring
21. Thumbscrew
22. Base Illuminator
23. Focusing Slide
24. Thumbwheel

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Image excellence, rugged construction and exceptional versatility are the hallmarks of the Leica StereoZoom® series of stereo microscopes. These features are in keeping with a tradition of quality Leica has maintained for more than 100 years as a microscope manufacturer. The StereoZoom series, introduced in the 1950's, has become the world standard for stereo microscopes.

Since its introduction, the StereoZoom series has undergone constant improvements and expansion through the development of new models and accessories. Interchangeability between Power Pods, Stands, Eyepieces, Supplementary Lenses and a host of special accessories provides the user with a nearly limitless choice of feature combinations which permit the exact tailoring of the StereoZoom equipment to the requirements of the task.

The StereoZoom series can be used to advantage for nearly any visual task requiring 3-D observation at moderate magnifications. Frequently, the StereoZoom series offers the most economical approach to providing microscope magnification even when there is no requirement for 3-D observation.

Six Power Pods form the nucleus of the StereoZoom series. Two of these are fixed power while four of them provide continuously variable magnification by means of operator controlled zoom systems. Eyepieces and Supplementary Lenses extend the magnification ranges of these Power Pods both upward and downward. All optical elements are sealed into the Power Pods so that all Pods may be interchangeably mounted on any one of the thirteen Stands and Arms offered as part of the StereoZoom series. For viewing convenience, the Pods may be turned 180 degrees for conventional or reversed eyepiece orientation.

Other accessories include a wide choice of illuminators and illumination modes, mechanical stages and stage plates, polarizing accessories, reticles and photographic equipment.

Selection of the right combination of components involves consideration of cost, magnification range, field of view, working distance, eye relief, specimen illumination requirements and convenience of use. With this in mind, descriptive data on the StereoZoom series components are presented in Section 9.0 of this manual both to assist you in interpreting the instructions presented here and to help you more fully utilize the StereoZoom equipment you already have purchased. For more detailed information, send for the latest edition of Leica's StereoZoom Microscope Catalog.

Many of the StereoZoom series microscope equipments are equipped with halogen illuminators. Please note the type with your equipment and follow the WARNING set forth below.

**WARNING: The Halogen-Cycle Lamp is pressurized and may shatter. DO NOT operate lamp in excess of rated voltage as this will increase lamp pressure and the risk of shattering. Protect the lamp against abrasions and scratches and against liquids when lamp is operating. Replace *only* with specified replacement lamp.**

To guard against personal injury, wear protective glasses and clothing when handling lamp. Turn power off when installing and before removing lamp. Allow lamp to cool before removing. Dispose of lamp with care.

Do not operate in proximity of substance or material that is flammable or adversely affected by heat or drying.

Each of your StereoZoom series microscopes and accessories have been carefully packaged to insure that they reach you in the best possible condition. Do not discard any packing material or shipping containers until you have assembled your equipment and checked carefully for any small items that may have been overlooked.

**Note: Parts and controls referred to in this section can be identified by referring to the photographs and legend preceding Section 1.0 and to Section 8.0.**

#### MOUNTING THE POWER PODS

Power Pods can be mounted on any Stand or Arm, except the R Stands, by simply swinging out the two Lock Levers at either side of the Arm, inserting the Pod so that it faces either forward or backward, and swinging the Lock Levers shut. The fit between Pods and Arms is intentionally snug to prevent movement during use. Therefore, be sure the Pod is fully seated in the Arm.

On R Stands, the Power Pod is retained in the Arm by two Thumb Screws instead of the Lock Levers.

#### CHANGING STAND WORKING DISTANCE

The Stands have provisions for a wide range of working distances when Supplementary Lenses are added to the Pods. Increased working distance can be accommodated on the A and B Stands by removing the four screws from the underside of the Stand, inserting the 31-27-03 Elevator between the Base and Upright and securing with the four screws supplied with the Elevator.

The R Stands incorporate a built-in provision for variable working distance. To change working distance, remove the four screws which secure the Focusing Slide, reposition the Arm in the desired location and reinstall the four screws. Three positions are available.

#### MOUNTING THE ILLUMINATORS

All Illuminators for StereoZoom microscopes, except the Coaxial, Ring, Eyepiece and Spot Illuminators, can be mounted in a variety of ways, either free standing or attached to a Power Pod or to a Stand. Refer to the Instruction Manual provided with your Illuminator for specific instructions.

#### TRANS-ILLUMINATION BASE

The B Stand for StereoZoom series microscopes is designed for use with both opaque and transparent



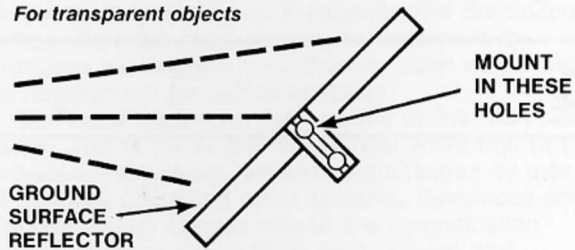
specimens. This stand is identical to the A Stand except with the addition of the Trans-Illumination Base, which includes a Clear Glass Stage Plate and a 3-Way Mirror.

The 3-Way Mirror, when used in conjunction with a Nicholas or General Purpose Illuminator inserted in the Port Hole in the rear of the Base, can be used to provide three types of transmitted illumination for the examination of a wide variety of transparent/translucent specimens.

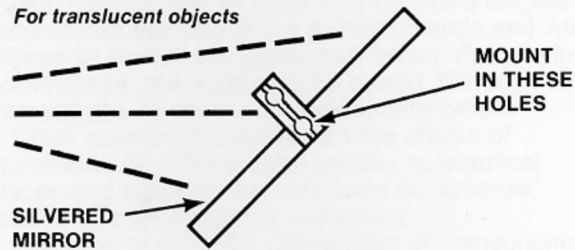
When looking at transparent objects, it is recommended that the ground surface of the 3-Way Mirror be used by placing the Mirror Axles of the Base in the lower pair of Mirror holes. If the object to be examined is translucent, rotate the Mirror to use the reflective surface.

If the specimen is transparent, and a dark field illumination effect is desired, place the Mirror Axles in the upper pair of holes.

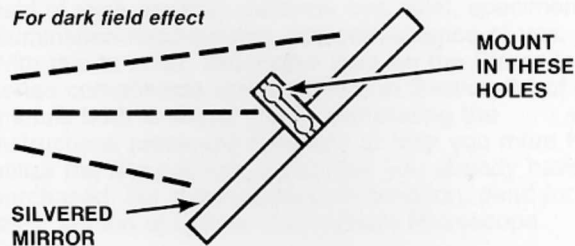
*For transparent objects*



*For translucent objects*



*For dark field effect*



These diagrams illustrate the mounting positions for the 3-way mirror.

For the examination of translucent living specimens, the use of the cool, white-light Fluorescent Illuminator is recommended. Refer to the Instruction Manual supplied with this Illuminator for installation instructions.

**INTERPUPILLARY DISTANCE ADJUSTMENT**

To set the Eyepieces for your proper interpupillary distance, grasp each Eyepiece Adapter while looking into the microscope and move the Eyepieces together or apart until you see the full field of view with both eyes. Check this by closing one eye and then the other without moving your head.

Each observer must adjust the interpupillary distance to their individual requirements and should recheck it each time they use the microscope.

**EYEPIECE LOCKING FEATURE OF StereoZoom 5**

The StereoZoom 5 Power Pod incorporates an Eyepiece locking feature which lets you lock the Eyepiece directly into the Power Pod while allowing free rotation of the Eyepieces.

First, rotate the inner Eyepiece Lock Ring until the Set Screw lines up with the access hole in the Eyepiece Ring, then insert the hexagonal Wrench (supplied with the Power Pod) into the Set Screw. Insert the Eyepiece completely, making sure that it seats properly on its locating shoulder, and tighten the Set Screw.

Repeat the above procedure for the other Eyepiece.

**FOCUSING FIXED POWER PODS**

1. Illuminate a flat specimen and then, using the right eye only, look through the right Eyepiece and focus on the specimen turning the Focusing Knob until the image is sharp.
2. Look through the left Eyepiece, and using only the left eye, rotate the Eyepiece Adjusting Ring clockwise or counterclockwise until the image is sharp.

Each observer must focus the microscope to their individual requirements and should recheck it each time they use the microscope.

**FOCUSING VARIABLE POWER PODS**

1. Set the Magnification Knob to the lowest power, illuminate and center a flat specimen within the field of view. Turn the Focusing Knob until the best image is obtained.
2. Set the Magnification Knob to the highest power and, using only your right eye, adjust the Focusing Knob until the image is sharp. The right Eyepiece is now properly focused.

**Note: depth of field decreases as magnification increases. It is many times greater at low power than it is at high power. This means that while it is quicker and easier to bring the specimen into focus at low power, the most critical focus can only be achieved at high power.**

3. Reset the Magnification Knob to low power and, using only the left eye, turn the Eyepiece Adjusting Ring until the image is clear and sharp. Make sure the Eyepiece shoulder maintains contact against the Adjusting Ring shoulder. The left Eyepiece is now properly focused.

The microscope will now be properly focused for

both your eyes throughout the magnification range.

Each observer must focus the microscope to their individual requirements and should recheck it each time they use the microscope.

**Note: Operators who normally wear glasses with a correction of 2 or more Diopters, and don't wear them when using the microscope may find refocusing necessary when changing magnification.**

**CHANGING THE MAGNIFICATION OF FIXED POWER PODS**

The magnification provided by the Fixed Power Pods may be varied by using different Eyepieces and/or Supplementary Lenses.

Total Magnification = Fixed Power × Eyepiece Power × Supplementary Lens Power.

**CHANGING THE MAGNIFICATION OF VARIABLE POWER PODS**

The Variable Power Pods allow you to change the power continuously to exactly the best magnification for a given specimen by simply turning the Magnification Knob located on the top of the Power Pod. The StereoZoom Microscopes allow you to scan an object at a lower power and then concentrate on some particular detail by increasing the power gradually to the desired value.

The power range can be further extended by using different Eyepieces and/or by adding Supplementary Lenses below the Objective.

Total Magnification = Variable Power × Eyepiece Power × Supplementary Lens Power.

**MEASURING PROCEDURE**

StereoZoom Microscopes may be used as measuring instruments by inserting a Reticle in one of the Wide Field Eyepieces. A variety of linear and grid patterned Reticles are available for particular applications as well as Stage Micrometers for calibrating the microscope. These are described in Section 9.0.

**SELECTING A RETICLE DISC**

Select the magnification that will enable you to see the necessary detail and yet cover as much total area of the specimen as is required. Greatest accuracy will result from measurements made within the central 2/3rds of the field of view in a north-south direction. After the magnification has been selected the appropriate reticle disc should then be selected. First, decide what unit you desire to measure the specimen by, then use the following formula to determine what reticle will provide that unit:

$$S \times M = K$$

S = Dimension each division is to equal in the specimen plane.

M = Magnification of the Power Pod *only*.

K = Actual dimension of each smallest division on the reticle.

Example: Desired dimension on specimen,  $S = .002''$   
 Magnification of Power Pod,  $M = 2X$   
 Actual dimension of division on reticle (equal to  $.002''$  on the specimen) would be  $K = .004''$  (approximately 0.1mm).

### INSERTING THE RETICLE DISC

#### Caution

Before installing a Reticle be sure it is free of dust, lint, smears, etc. To clean the Reticle wipe its surfaces with a cotton pad moistened with a mild soap. Rinse and dry without pressure using a soft lintless cloth.

1. Remove the black cylindrical Field Diaphragm by unscrewing it from inside the smaller diameter end of the Eyepiece (refer to the Assembly Views on page 8.14).
2. Place the Reticle into the thin metal rim on top of the Field Diaphragm so that the scale will face towards the inside of the Field Diaphragm.
3. The thin metal rim will extend beyond the surface of the glass. Using a pencil with eraser, or thumbnail or similar object, press against the outside of the rim to force it inward and downward against the Reticle. If the Reticle is to be temporarily installed, bend in the metal rim at three points around the glass. If the Reticle is to be permanently installed, do this at three points around the circumference and then bend the rim over the Reticle around the whole circumference by holding the mount at a  $45^\circ$  angle and rolling it on a hard surface such as a table top.
4. Replace the Field Diaphragm and Reticle assembly by screwing it in until the scale comes into sharp focus when viewed through the Eyepiece.
5. To remove the Reticle, press against the scale side of the Reticle and push it out of its mount.

### CALIBRATING THE RETICLE

After the correct Reticle has been selected it must be calibrated. If the Reticle is to be calibrated in inches a 31-16-89 or 31-16-87 Stage Micrometer should be used. If the Reticle is to be calibrated in millimeters a 31-16-90 or 31-16-99 Stage Micrometer should be used.

For the most accurate calibration and measurements, the Reticle and the Stage Micrometer both should be positioned in the north-south direction.

The Reticle must be calibrated for each objective power that it is used with and must also be calibrated for each StereoZoom microscope that it is used with.

1. It is recommended that the Eyepiece containing the Reticle be placed in the right Eyepiece Adapter.
2. Place the appropriate Stage Micrometer on the Microscope Stage Plate.
3. Focus carefully so that you see the Stage Micrometer scale sharply in focus at the same time as the Reticle scale is sharply in focus.
4. Align the Reticle scale with the Stage Micrometer scale so that they may be compared.
5. Read the number of scale intervals "b" on the Stage Micrometer which correspond to the number of intervals "a" on the Reticle. One interval of the Reticle then corresponds to  $b/a$  intervals of the Stage

Micrometer. Compute this ratio and use it to make measurements in the specimen plane.

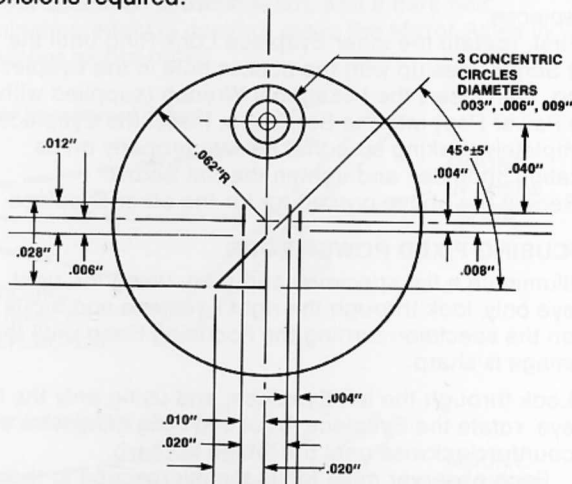
### SPECIAL RETICLES

Often industrial or experimental applications require special custom made scales such as a Reticle that could be used as a "GO - NO GO" gauge.

For a quotation on special reticles to your specifications write:

Leica Inc.  
 Special Products  
 P.O. Box 123  
 Buffalo, New York 14240-0123

In your request state the objective magnification you prefer to work with and model of Wide Field Eyepieces in which the reticle will be placed. An accurate drawing of the pattern you need, fully dimensioned, must be submitted. The example below illustrates the kinds of dimensions required.



TYPICAL PATTERN FOR RULING RETICLE DISC

### INSTALLATION OF SUPPLEMENTARY LENSES

Until you are familiar with the installation procedure it is recommended that you first remove the Power Pod from its Stand and remove the Eyepieces, turn the Power Pod upside down and install the Supplementary Lens as noted, then insert the Power Pod back in its Stand and replace the Eyepieces.

Once you have become familiar with the procedure, the Supplementary Lens may easily be installed without removing the Power Pod from the Stand.

### Stereo 1 & 2, StereoZoom 3, 4 & 5

Cat. No.	Working Distance
31-27-41 0.3X Supplementary Lens	247mm (9 3/4")
31-26-18 0.5X Supplementary Lens	178mm (7")
31-26-19 2.0X Supplementary Lens	38mm (1 1/2")
31-27-42 0.75X Supplementary Lens	105mm (4")
31-27-43 1.5X Supplementary Lens	44mm (1 3/4")

To mount one of these Supplementary Lenses, simply screw it into the large diameter thread located on the bottom of the Power Pod housing. Make sure it is threaded securely against the shoulder.

**NOTE: If the threads start to seize-up during installation, apply a very small amount of oil to the Lens thread, wipe away the excess and reassemble.**

The 0.3X and 0.5X Lenses are restricted to use on those Stands where the working distance is attainable as on K, KT, S or SK, or the A and B Stands when used in conjunction with the 31-27-03 Elevator.

The 0.75X and 1.5X lenses can be used on all stands.

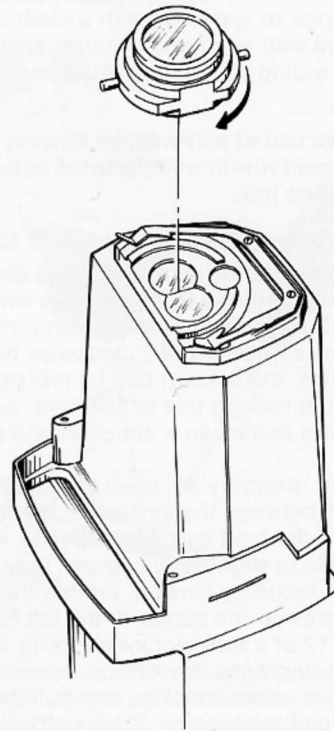
## StereoZoom 7

Cat. No.		Working Distance
31-27-08	0.25X Supplementary Lens	266mm (10½")
31-27-04	0.5X Supplementary Lens	127mm (5")
31-27-05	1.5X Supplementary Lens	32mm (1¼")
31-27-06	2.0X Supplementary Lens	14mm (9/16")

### CAUTION

**When installing or removing a Supplementary Lens, be careful that its pins do not scratch the objective lenses in the Power Pod.**

1. Position the Supplementary Lens so that the longer pin projects perpendicular to the flat face of the Power Pod as shown below.



2. Seat the Supplementary Lens in the shallow semicircular recess in the Power Pod and rotate it clockwise 90° until it clicks into position. Check to see that it is properly mounted and make sure that the flat side of the Supplementary Lens is aligned with the flat face of the Power Pod.
3. To remove the Supplementary Lens, rotate it counterclockwise 90° and then remove it carefully from the Power Pod.

**PROTECTING THE MICROSCOPE AND ACCESSORIES**

The primary rule to follow with respect to proper care of microscopes and accessories is to keep them as free from dust and dirt as possible. Dust, fingerprints or a smear on the optics will degrade the image. When the equipment is not in use, cover it with a plastic cover.

**CLEANING THE OPTICS**

The Power Pods have been factory aligned, cleaned and sealed. DO NOT attempt to disassemble them. Within each Eyepiece Adapter is a glass dust cover. The Eyepieces should be kept in place to prevent dust from settling on these covers. However, if dust does accumulate, it can be removed by unscrewing the Eyepiece Adapter and wiping the dust cover with a soft clean cloth. If the dust is gritty, it should be blown off with an air syringe or wiped off with a cloth or cotton swab moistened with soap and water or alcohol followed by a thorough wiping with a dry cotton swab.

**CAUTION**

**Avoid excessive use of solvents, as flowing solvents may cause cement run-in on cemented optics, making cleaning a tedious job.**

**ADJUSTING FOCUS TENSION ON ARMS AND STANDS**

Both Arms and all Stands except the R, S and SK Stands have two hex socket-head Gib Screw B's which can be used to adjust the tension of the focusing mechanism. By turning these screws slightly clockwise or counterclockwise, the tension can be increased or decreased. When making this adjustment, be sure to adjust the screws in the same direction and about the same amount.

Each R Stand is factory adjusted to establish the proper balance between the tension of the focusing mechanism and the load carrying capacity. After considerable use, a slight readjustment may be needed. To increase the focusing tension, tighten the hex socket-head screw in the center of the left Focusing Knob about 1/12 of a turn clockwise using a 7/64-inch hex wrench. To decrease the tension, loosen the screw about 1/2 turn counterclockwise and pull the left knob outward to reduce the tension. Then tighten the screw gradually until the desired tension is established.

**LUBRICATION**

Power Pods and R Stands are permanently lubricated at the factory and generally do not require periodic

lubrication. If cleaning and relubrication become necessary as a result of abnormal use or exposure to unusually harsh environments, the equipment should be returned to the factory or serviced by qualified maintenance personnel.

The Focusing Slide on all stands other than R stands should be wiped clean occasionally, using a solvent such as Xylol or alcohol, and relubricated with a light coating of grease. Alvania #2 grease, which is available at Shell service stations, is recommended for this purpose.

**SERVICE**

All optical, electrical and mechanical equipment requires periodic servicing to keep it performing properly and to compensate for normal wear.

Establishing a schedule of regular preventive maintenance will help to assure long life and sustained optimum performance for your instrument. It will also help to avoid unexpected trouble and the necessity of having the instrument serviced at inconvenient times.

A program of planned preventive maintenance, involving a thorough cleaning, checking and adjustment of mechanisms is recommended for all instruments.

This work should be performed by qualified personnel with the proper training and equipment. Your authorized Leica dealer, or Leica, can arrange this service.

**IMPORTANT**

**If unexpected trouble is experienced with your instrument, contact your Leica dealer. He may be able to suggest simple remedies to correct the apparent difficulty without your having to send the instrument out for servicing.**

Should it become necessary to send your instrument out for service:

Please pack the instrument carefully in a crush resistant carton with at least three inches of shock absorbing, dustless material surrounding it to prevent transit damage. Saving the original carton in which your instrument is received will prove helpful for this purpose. If a suitable carton is not available, one may be ordered from the factory at nominal cost.

Include a detailed letter in the shipping carton, preferably fastened to the instrument, describing the trouble experienced. This information will enable the service technician to effect required repairs promptly and at least expense.

