DIRECTIONS FOR USE

Lux UW

OPTICAL WORKS
C·REICHERT
VIENNA XVII · AUSTRIA

REICHERT

Brief Direction for Urgent Fluorescente Microscopic Work.

1. Substitute the "U.V,"mirror for the normal microscope mirror.
2. Substitute the "U.V."condenser for the normal condenser.
3. Guide the foot of the microscope between the angle stops on the lamp base,slide these stops symmetrically from ei. er side up to the microscope foot,and then clamp them down.
4. Remove the lamp excluder portion from the lamp-housing,and screw the burner into the holder.
5. Conneet the lamp up to the house supply as instructed on page of these directions.
6. Light the lamp by operating the flex switch.
7. Centre the burner as per the directions page .
8. Turn the lamp so that its light falls exactly on the centre of the illuminating mirror.
9. Insert the ultraviolet filter marked "D" in the slit in front of the illuminating tube.
10. Focus the illumination as described on page of this bokkled.

Macro Fluorescence Analysis.

1. Remove the illuminating tube fron the lamp-housing.(It is secured by a bayonet joint .)
2. Place the macro filter window on the lamp-housing.
3. Rotate the lamp-housing and tilt it so that the filter window is directed on the object to be examined.

Microscopy with ordinary Visible Light.

1. Remove the ultraviolet filter from the illuminating tube.
2. Place the white frosted filter in the illuminating tube.

Lux 7554 e - 250339.Dr.Gr./Werb/Me .

The Microscope.

Generally speaking, any good microscope can be used for fluorescence microscopy With the Simple Fluorescence Equipment "Lux UW". The ultra violet rays are very largely absorbed by ordinary glass, so that any passage of such rays through ordinary glass connotes a loss of energy. To obviate these losses, then, the particular microscope used must be fitted with a special illuminating mirror and a special condenser, both of which are made of "U.V." glass which is very permeable to the ultraviolet rays.

The Microscope Mirror (No.7514) and the Microscope Condenser (No.00.12.20. or No.00.11.20).

To remove the normal illuminating mirror made of ordinary glass, screw out the two small screws which secure it in its holder, and then remove the mirror from the holder, Then insert the U.V.Mirror (No.7514) in the holder, and fix it in position there by the two small screws mentioned above. Note: Only the plane side of the U.V. mirror consists of the special U.V. glass, for which reason only the plane side of the mirror should be used for fluorescence microscopy. For microscopic work with ordinary visible light, however, both sides of the mirror may of course be used.

Dependingon the type of substage fitted to the microscope, two different types of "U.V." condenser are used. If the instrument used for fluorescence microscopy has a simple or a medium substage of the type in which the aperture iris diaphragm and filter ring are secured to the sleeve-mount of the condenser, it is al o necessary to use a U.V. condenser mounted in a sleeve together with the aperture iris diaphragm and filter ring (No.00.12.20). If, however, the microscope substage has the aperture iris diaphragm and filter ring mounted independently of the condenser sleeve -mount ("Large Type Abbe Substage"), then a U.V. condenser mounted on a sleeve without aperture iris diaphragm and filter ring (No.00.11.20) is used. To remove the normal condenser of ordinary glass, slacken off the screw which secures this in the condenser sleeve of the substage, and withdraw the condenser from its sleeve in the direction of the microscope mirror. Then slip the U.V. condenser into the empty condenser sleeve-mount as far as it will go, and secure it in position by the small clamping screw previously loosened.

Connecting the Microscope to the Lamp.

The microscope is connected to the lamp by means of two angle stop-plates (positioning plates) located on the lower front side of the lamp-base. These plates are slotted so that they can slide on the screws which secure them to the lamp-base. There are two screw-holes located at different distances, and the screws can be screwed into either of these holes, depening on the width of the microsdope

foot. If the foot of the microscope used is less than 15 cm (6") wide in front, screw the angle-plate screws into the inside holes. If this width is more than 15 cm (6"), screw the screws into the outside holes. When the two angle-stop-plates have been placed at approximately the correct distance, slip the microscope foot between the rubber-tipped ends of the positioning plates. Then push the two plates close up to the limbs of the microscope foot by moving them, left and right, symmetrically to the side edges of the lamp-base, and then finally clamp them in position by their screws. The microscope will then be at the correct distance from the lamp, and symmetrically positioned relatively to it. To remove the microscope from the lamp, slacken off the screws and slip the microscope out from between the stop-plates. The microscope can afterwards be slipped back into place between the stop-plates without upsetting its correct adjustment.

Inserting the Burner in the Lamp-housing.

Slacken off the two small screws holding the lamp excluder portion on the lamp-housing, unlock the bayonet joint ring, and remove the excluder portion from the lamp-housing in an upward direction. Screw the burner, like an ordinary filament bulb, into the socket inside the excluder portion. Then place the excluder portion — with the burner screwed in — back into the lamp-housing, lock the bayonet ring, and afterwards tighten up the two small screws which were previously slackened off.

Connecting the Lamp to the Mains Supply.

The burner, a High-pressure Mercury Vapour Arc Lamp (No. 7706), can be run off alternating current only. The mains unit for plugging the lamp into the supply is located in the base of the lamp; for mains voltages of below 190 volts, this unit is a transformer (No. 7816), and for voltages above 190 volts, it is a choking coil (No. 7817). In view of the small amount of current the lamp consumes, a special heavy-duty fus is not necessary in the supply circuit.

The lenght of flex leading from the lamp excluder portion has a three-pin connector. Insert this in the engraved plug-box "Lampe" (Lamp) on the right-hand side of the back of the lamp-base. The loose lenght of flex supplied with the apparatus has a coupler (box) at one end and connector pins at the other. Place the coupler on the contact-pin engraved "Netz" (Mains) located on the left-hand side of the back wall of the lamp-base. Insert the pins at the other end of this flex in the wall-box of the mains supply.

Lighting the Lamp.

The lamp is lighted by pressing down the black push-button of the switch incorporated in the lamp flex. Note: The burner does not attain its full intensity until it has been switched on for about

5 minutes. If the burner has been extinguished by pressing down the red push-button in the flex switch, it cannot be lighted again until it has completely cooled down — a matter of 5 to 10 minutes.

Centring a New Burner relatively to the Lamp Collector (Condensor).

The burner must be mounted in the lamp-housing so that its position satisfies the three following requirements:

1. The wire which holds the actual burner in the glass balloon must come well to the side of the burner tube, so that this wire does not impede the light coming directly from the arc or from the reflector inside the lamp housing.
2. The actual arc, together with its image projected by the reflector, must coincide in height.
3. The actual arc, together with its image reflected by the reflector, must coincide laterally.

The centring of the burner to meet these three requirement is performed from the images of the arc and its reflected image as projected by the lamp collector. To obtainly a sufficiently clear projected image for centring purposes without using any additional optical components, proceed as follows: First withdraw the microscope from between its stop-plates and place it on one side for the time being. Then set up the entire apparatus on a table close to roo wall that is painted uniformly bright, so that two positioning (stop plates are pointing to the wall, and their rubber-covered ends are about 5 to 10 cm (2 to 4 inches) from the wall. Slacken off the screw clamping the lamp carrier to the column, and raise the lamp carrier (with lamp) about 15 cm (6") above its lowest level directly on the base, and at same time turn it so that the illuminating tube is directed on to the wall mentioned above. Then tighten up the clamping screw again. Next, loosen the screw clamping the lamp housing in the lamp carrier, and adjust the housing so that the illuminating tube of the lamp is horizontal, then tighten up the clamping screw again. The entire lamp is now directed, like a lantern, on to the wall, and the wall may be said to act as the screen.

Light the lamp (see section "Lighting the Lamp," page 2) and withdraw, by its handle, the ultraviolet filter mounted in a slot well forward on the illuminating tube. A bright, bluish-white spot of light will now be seen on the wall in front of the illuminating tube of the lamp. Adjust the lamp collector in its helical focusing mount so that this spot of light becomes a fairly sharp projected image of the burner with the arc inside it. This image can be made plain and clear - cut by the following expedient: Take a piece of cardboard and cut it so as to form a diaphragm (stop) with a circular hole 8mm diameter in the middle (cf. Fig.....), and then insert it in the free filter slot at the front end of the illumi-

nating tube is equipped with a Collector Field Iris Diaphragm(see section "The Collector Field Iris Diaphragm," page), this will of course be used for stopping down the collector, and the cardboard stop can be dispensed with.

Rotating the Burner: Slacken off the long screw fixing the lampholder in the lamp excluder portion, and begin turning the now movable lampholder. While doing so, observe the projected image of the burner on the wall. A thin vertical strip — an image of the wire holding the burner — will be seen to shift sideways from the burner while the lampholder is being turned. Keep on turning until the wire is as far as it will go sideways from the burner, and then tighten up to a fair extent the clamping screw which was previously loosened. This completes the centring operation to satisfy the first condition.

Adjusting the Burner for Height: There are three set-screws on top of the lampholder portion. Screw these up and down until two clearly separated images of the burner are visible alongside each other in the projected image. The smaller and sharper one is the image of the actual burner; while the other one, larger, not so bright and less clearly defined, is the image of the burner projected by the reflector in the lamp-housing. Slacken off again the above-mentioned long screw fixing the lampholder portion in the lamp excluder part, and then move the lampholder portion up or down (without turning it) until, in the projected image, the centre of the actual burner and the centre of its reflected image are on the same level. When this position is attained, finally tighten up the long clamping screw that has previously been loosened. This concludes the centring operation to satisfy the second requirement.

Lateral Adjustment of the Burner: By manipulating the three set-screws located on the lampholder portion of the lamp, displace the two images — direct and reflected images of the burner — sideways relatively to each other until both images merge into each other and only one image of the burner is visible. This adjustment will satify the third of the above conditions.
Note: This complete centring operation is performed once only, when a new burner has been fitted. As long as this burner remains in the lamp, do not alter centring in any way. Do not loosen the long clamping screw securing the lampholder in the lamp excluder portion, nor touch the three set-screws on the lampholder portion.

The Illuminating Tube with the Lamp Collector and the Filter Arrangement.

On the front side of the lamp-housing, and attached to it with a bayonet joint ring, is an illuminating tube (No. 7506 or No. 7507).

The Illuminating Tube (No.7506) with Solid Glass Red Filter Tra p:

In the portion of this tube facing the lamp is the Lamp Collector in its helical focusing mount(see section"Focusing the Illumination" page).
The ultraviolet rays producing fluorescence are separated from the ordinary visible light also supplied by the lamp,by a two-stage filter arrangement fitted in the illuminating tube.This arrangement consists of the actual ultraviolet filter, and a red filter trap.

The Ultraviolet Filter (No.8083 or No.8076): The ultraviolet filter is accomodated in a slit located well forward on the illuminating tube.The filter is contained in a mount which slips into this slit. For general purposes,use the darker ultraviolet filter engraved with a "D" (= "Dark") on its mount. When materials of low fluorescence are being examined, however, it may sometimes be necessary to use a lighter ultraviolet filter (No.8076) which has the letter "H"(= "Hell" , this being the German word for "light") engraved on its mount.

The Red Filter Trap (No.8064): Any traces of visible light of long wavelenght("red") which are transmitted by the ultraviolet filters, are absorbed by a red filter trap which is incorporated in the illuminating tube between the collector and ultraviolet filter.This filter must remain in the apparatus when fluorescence-microscopic work of any kind is being done, and it hardly causes any trouble at all when doing work with ordinary visible light.(See section "Photography with Ordinary Visible Light," page).

The Collector Field Iris Diaphragm (No.7522).

If desired,the illuminating tube No.7506 can also be supplied with an adjustable collector field iris diaphragm. This is used for three purposes, viz, :

(a) When the burner is being centred,it is used as an aperture diaphragm so as to obtain a very clear image of the burner. (See section "Centring a New Burner relatively to the Lamp Collector," page).

(b) It is used for focusing to the "Köhler type of illumination" when the illumination is being focused for the purpose of accurately centring the rays from the lamp to the microscope. (See section "Focusing the Illumination," page).

(c) It is used as a field stop for fluorescence microscopy and photomicrography,being closed so that only the field of view directly surveyed in the microscope is reached by the ultraviolet rays,and to prevent any over-radiation by highly fluorescent elements lying outside the field of view.

The Illuminating Tube with the Lamp Collector and the Filter
The Illuminating Tube (No.7507) with Liquid Chamber (Cell) as anRed Filter Trap-.

When the experimenter is doing work which necessitates his accurately observing the tints of fluorescenee--and particula rly where red and yellowish-red fluorescence colours are involved--he should use the illuminating tube No.7507. With this, proportion of light of long wavelength ("red") which the ultraviolet filter lets through is not absorbed by a solid glass filter, but by a solution of sulphate of copper contained in a liquid chamber or cell. The necessary solution of copper sulphate is prepared as follows:

Dissolve 25 grams of chemically pure sulphate of copper ($CuSO_4 + 5$ aq) in about 3/4 of a litre of hot water. After it has cooled, fill it into a 1,000 c.c. measuring flask. Allow it to settle for several days, and then finally filter it carefully several times until the solution is perfectly clear. Keep the solution in a glass-stoppered bottle.

The liquid chamber (or cell) is contained in a widened portion of the illuminating tube. Fill the chamber-bottle nearly up to the neck with the copper sulphate solution, and then close the chamber with its rubber stopper. Note: Make sure the small glass tube in the rubber stopper is clear. If it is stopped up, the chamber-bottle may burst in course of work owing to the heat set up.
The illuminating tube No. 7507 has the same lamp collector as illuminating tube No. 7506, but is additionally equipped with the collector field iris diaphragm. (No.8)

Adjusting the Lamp to the Microscope.

Slip the microscope between the angle stop-plates of the lamp base (see section "Connecting the Microscope to the Lamp," page 1), light the lamp, and remove the ultraviolet filter from the illuminating tube. Slacken off the clamping screw securing the lamp-carrier on the column. Slacken off the screw securing the lamp-housing in the lamp-carrier. Then position the lamp by pivoting it about its vertical axis (the column) and tilting it about its horizontal axis (the bearings of the lamp-carrier) so that its light falls exactly in the middle of the microscope mirror. Move the lamp collector in its helical mount until it is at its maximum distance from the burner, when the spot of light on the microscope mirror will contract into a narrow vertical strip of light.

By pivoting it sideways, position the lamp so that this vertical strip of light runs exactly through the centre of the microscope mirror. Next hold a piece of paper--about the size of a post card--on the mirror, and adjust the lamp by raising or lowering it, so that a horizontal line passing midway through the strip of light--which of itself is much longer than the diameter of the microscope mirror--also coincides exactly with the centre of mirror. When the lamp has been accurately positioned on the microscope in this way, tighten up again the screws securing lamp-carrier to the column and the lamp-housing to the lamp-carrier.

Focusing the Illumination.

The luminous intensity and definition of the fluorescence-microscopic image depend very largely on the correct focusing of the illumination in the microscope. It is therefore essential that this focusing be performed very accurately and conscientiously, and checked over from time to time, especially after long intervals between using the instrument.

The illumination may be focused both in terms of the fluorescence microscopic image, and with ordinary visible light, For ordinary work it is sufficient to focus it in terms of the fluorescence image. For the examination of materials of low fluorescence, and for fluorescence photomicrography, however, it is better to focus with ordinary visible light, since, by following this method, greater accuracy may be achieved in the focusing of the illumination, at least for those who are less experienced in manipulating the apparatus.

(a) Focusing the Illumination in Terms of the Fluorescence -Microscopic Image.

1. Adjust the lamp collector so that it is at its maximum distance from the burner.
2. Place the darker ultraviolet filter, engraved "D" , in the slit on the front part of the illuminating tube.
3. Open to its fullest extent the aperture iris diaphragm of the microscope.
4. Place on the microscope eyepiece an Eyepiece Ultraviolet Filter Trap (No. 8082 or No, 8085). Note: Never do any microscopic or photomicrographic work with the Simple Fluorescence Equipment Lux "UW" -- even work with ordinary visible light -- without placing an Eyepiece Ultraviolet Filter Trap on the microscope eyepiece to protect the eye or the photographic material.
5. Place the focusing specimen supplied with the apparatus on the object stage of the microscope so that the cross-section on the specimen comes just in the optical axis of the optical axis of the microscope immediat ly below the the microscope objective.
6. Insert a low-power objective (say, objective "Lo x ") in the microscope and, by means of the coarse focusing adjustment, bring it to approimately the correct working distance relative to the preparation (specimen) (say, about 7 mm when using objective "10 x "). An actual "focusing" or "adjustment" by the microscope is usually impossible up to this juncture, as the field of view is too dark for the purpose.
7. Rotate and tilt the microscope mirror so that, on looking into the microscope, the observer sees, if not any microscopic image as yet ,, a field of view which is lit up a bright

yellowish-green by the fluorescence of the specimen.

8. Look into the microscope, and focus the instrument on to the specimen in the usual way by means of the coarse and fine focusing adjustments,
9. By means of the adjusting device on the microscope substage, raise the condenser until it comes up against the plate of the object-stage.
10. Rotate and turn the microscope mirror so that the field of view fluoresces evenly and as bright as possible over its entire surface.
11. Slowly lower the condenser until the fluorescence of the specimen has attained its maximum luminosity. If the apparatus is equipped with a collector field iris diaphragm (see section "The Illuminating Tube with the Lamp Collector and the Filter Arrangement", page), first stop down this diaphragm fairly considerably and lower the condenser until a highly fluorescent spot of light (an image of the opening of the diaphragm) is visible in the field of view of the microscope mirror again until the image of the collector field iris diaphragm comes truly in the middle of the field of view. As a final measure, open the field iris diaphragm to its fullest extent.

(b) Focusing the Illumination with Ordinary Visible Light.

1. As "a" (1) above.
2. Remove the ultraviolet filter from the illuminating tube of the lamp.
3. Place a grey filter (No.8029) in the filter ring of the microscope sub . to subdue the bright light.
4. As "a" (3) and (4) above.
5. Place any desired specimen on the object stage of the microscope.
6. Place a low-power objective (say, objective "10 x") on the microscope.
7. As "a" (9) above.
8. First raise the microscope condenser by means of the adjusting device on the substage until it comes against the plate of the object-stage.
9. Rotate and tilt the microscope mirror until the field of view of the microscope is evenly flooded with bright light.
10. Insert in the slit farthest forward on the illuminating tube the paper diaphragm that was used for centring the burner (see section "Centring the Burner relatively to the Lamp Collector," page).
If the apparatus is equipped with a collector field iris diaphragm (see section "The Illuminating Tube with the Lamp Collector and the Filter Arrangement," page),

stop this down to an aperture of about 1 cm (0.4") diameter. The paper diaphragm can then dispensed with.

11. Lower the microscope condenser by its focusing device until a bright and clearly outlined circle of light -- the image of the hole in the paper diaphragm, or the free opening of the collector field iris diaphragm -- is visible in the field of view of the microscope. Note: The actual specimen has been focused (as Paragraph 8) in the usual way with the coarse and fine focusing adjustments. This setting should not be altered in any way, but the image of the diaphragm opening is focused exclusively with the focusing device on the substage.

12. The clearly outlined bight circle of light will now usually lie excentrically in the microscopic field of view. By very carefully turning and tilting the microscope mirror, bring the image of the diaphragm opening exactly into the middle of the field of view of the microscope.

13. Remove the paper diaphragm from the illuminating tube of the lamp, or open the collector field iris diaphragm.

14. First close the aperture iris diaphragm of the microscope. Then move the lamp collector back and forward in its helical focusing mount, at the same observing whether there is any particular setting which illuminates the field of view better and more evenly.

15. Open the aperture iris diaphragm of the microscope to its fullest extent, and keep it open for all further fluorescence microscopic work.

16. Remove the grey filter from the filter ring of the microscope condenser.

The Objectives for Fluorescence Microscopy.

It is of course possible to make fluorescence-microscopic examinations with all the usual types of achromatic objectives. Under the influence of the ultraviolet radiation, however, a certain amount of fluorescence is set up at the lenses of the ordinary microscope objectives under certain conditions. For more accurate work, then, and for examining specimen of low fluorescent power, it is preferable to use special objectives that are entirely free from fluorescence. These special objectives -- distinguished by the addition " fl." in their catalogue denominations and engraving -- are supplied (a) for ordinary specimens examined under cover-glasses, and (b) corrected for the examination of bacteriological smear preparations without cover-glasses. Depending on the particular requirements, the following special objectives are used:

Dry Achromatic Objective " 40 x fl." for specimens examined with or without cover-glasses.

Dry Achromatic Objective " 60 x fl." for specimens examined with cover-glasses over them.

Dry Achromatic Objective " 60 x fl.od." for bacteriological smears examined without cover-glasses.

Oil Immersion Achromatic Objectibe with incorporated Apertube Iris Diaphragm "Öl - Im Blende A = 1.25 100 x fl." for specimens examined with cover glasses.

Oil Immersion Achromatic Objective with incorporated Aperture Iris Diaphragm " Öl - Im Blende A = 1,25 100 x fl.od." for spedimens examined without cover-glasses over them (bacteriological smear preparations).

These objectives are used in the same way as are the corresponding normal objectives for microscopy with ordinary visible light. The aperture iris diaphragm of the oil immersion objectives is used as follows: It may happen that, in the field of view, there are very highly fluorescent elements the intensity of which is suffi cient to cause over-radiation of their own structural details and of juxtaposed of lower fluorescent capacity. In cases of this kind, the aperture iris diaphragm of the oil immersion objective should be stopped down until the microscopic image is not perceptibly impaired by over-radiation. The diaphragm should not of course be stopped down too much, or else the resolving power of the objective will be impaired.

The Eyepieces for Fluorescence Microscopy.

For fluorescence microscopy, use only ordinary Huyghenian eyepieces with uncemented eye-lenses. When preparations of low fluorescent capacity are being examined, use objectives of high numeriaal aperture compared to their initial power, in combination with low-eyepieces, so as to obtain a microscopic image that is as bright as possible.

Macro Fluorescence Analysis.

Withdraw the microscope from between its angle stop-plates, and put it away. Slacken off the two screws which secure the illuminating tube to the lamp-housing, unlock the bayonet ring, and detach the entire illuminating tube. In its place, attach to the lamp-housing the Macro Filter Window (No. 8074) intended for Macro Fluorescence Analysis; lock the bayonet ring on the housing, and then tighten up again the two small screws previously slackened off.

Loosen the screw clamping the lamp-carrier on the column, raise the lamp slightly on its column, and turn it so that the lamp-housing come on one of the two long sides of the lamp base. Next slacken off the screw clamping the lamp-housing in the lamp-carrier, turn the housing so that the filter window attached to it points downwards on to the top of the work-table, and afterwards tighten this clamping screw up again too.

Depening on the size and nature of the materials to be examined, the lamp can be adjusted to different heights on its column. Small objects and those of low fluorescent capacity should be examined with the lamp in its lowermost position. In this setting, the lamp illuminates a zone of about 20cm diameter. Large objects are examined with the lamp high up on its column, when a field of about 60cm diameter is illuminated.

Part of the ultraviolet radiation impinging on the materials examined is diffusely dispersed and reflected at the surface of the material, with the result that the fluorescence colour of these objects, when placed under the lamp for macro fluorescence analysis, appears more or less tinged with violet. In cases where it is necessary to determine the fluorescence colour accurately, it is preferable for the experimenter to use a pair of Ultraviolet Filter Trap Spectacles (No. 7508). The glasses of these spectacles have the property of absorbing all the ultraviolet reflected from the materials under examination, so that, when they are used, the observer sees only really true fluorescence colours, of the different materials, without the tint being falsified by a violet tinge.

When carrying out macro fluorescence analyses on very glossy material (glazed papers an. textiles, polished synthetic materials and woods; glazed pottery, metals, and the like), the observer will find that red glints are set up, due to the fact that the ultraviolet filter of the macro filter window allows a small amount of visible light of very long wavelength ("red") to pass through in addition to the invisible ultraviolet rays. In order to prevent mistakes in interpreting the true colour of fluorescence, it is advisible, when examining these glossy materials, to additionally insert a Red Filter Trap (No. 8072) in the macro filter window. To fit this trap, screw out the large screwed collar located on the front side of the macro filter window, place the Red Filter Trap on the Ultraviolet Filter situated in the macro filter window, and then screw the collar into place again.

Microscopy with Ordinary Visible Light.

When the fluorescence equipment is used as an ordinary microscope lamp, and particularly when comparative examinations are to be

made with ordinary visible light, it is only necessary to remove the ultraviolet filter from its slot in the illuminating tube, and replace it by White Frosted Filter (No.8075). The red filter trap, however, can usually be left where it is.
Note: The Eyepiece Ultraviolet Filter Trap must of course remain on the midroscope eyepiece.

Photomicrography.

Any good photomicrographic camera can be used for taking photomicrographs with the Simple Fluorescence Equipment "Lux UV". If it is intended to use for this purpose one of our Type "Kam V" Camera Attachments with viewing telescope, the customer when ordering the camera, should state specially that it is to be used with the fluorescence Equipment. In this case, the camera has to be fitted with a dividing prism in the intermediate portion of a type suitable for this purpose. Note: When photomicrograohs are being tak the Eyepiece Ultraviolet Filter Trap must remain on the microscope eyepiece, irrespective of whether fluorescence phenomena are to be photographed, or photograp.s taken with ordinary visible light. When the camera used is of the swing-out type, the same ultraviolet filter trap can be used as is employed for visual microscopy. If, however, the camera is of the attachable type, it is preferable to use the Double Eyepiece Ultraviolet Filter Trap (No.8085). For the purposes of photomicrography, screw the inner portion of this filter trap -- where the actual filter glass is located -- out of its larger collar mount. Then screw off the eye-lens of the particular eyepiece used; place the screwed-out inner portion of the filter trap on the field stop of the eyepiece, and then screw the eyepiece together again.

Fluorescence Photomicrography.

To obtain comparatively short exposure times, observe the following points:

1. The microscope objective must have as high a numerical aperture as possible compared to its initial power.
2. Use a microscope eyepiece of low initial magnification.
3. Keep the scale of photographic magnification low; or use a short extension on bellows type cameras.
4. Use highly sensitive photographic material: and, if yellow, yellow red or red fluorescence colours are present, use only panchromatic material.

When specimens of very low fluorescent capacity are being photographed, involving exposures lasting sometimes for hours, it is advisable to take the phtotographs in a darkened room. Otherwise it

may happen -- especially when working with microscope objectives of very low magnifying power and having a big free working distance- that light from the room may penetra te between the microscope objective and the specimen during the prolonged period of exposure, and also reach the camera and the photographic plate or film. If an attachable camera incorpoating a viewing telescope exposures are being made, so as to prevent any trace of the lighting room reaching the camera from this source. This precaution is necessary even when the microscopist is working with high-power microscope objectives having a short working distance.

Photomicrography with Ordinary Visible Light.

When doing photomicrographic work with ordinary visible light, be sure to remove the ultraviolet filter from its slot on the illuminating tube. The white frosted glass filter - which is used for microscopic work with ordinary visible light - is, however, not inserted. When the photographs have to be taken with a standard green filter, the red filter trap can be left in its place. If, however, the photographs have to be made correct as regards tone values (e.g., with a yellow filter, or without any filters at all), the red filter trap must removed. To do this, screw off the front portion of the illuminating tube in which the red filter trap is accomodated. If the instrument is equipped with a liquid chamber (cell) acting as a red filter trap, simple remove the chamber from its housing.

Supplementary Directions
for Using the High-pressure Mercury Vapour Arc Lamp (running off Direct or Alternating Current) No.7707 for the Fluorescence Equipments "Lux UV" and "Lux UW".

Placing the Burner in the Lamp Housing.

(Referring to page 1 of the Directions "Lux 7556" for the Large Fluorescence Equipment "Lux UV", or page 2 of the Directions "Lux 7554" for the Simple Fluorescence Equipment "Lux UW".)

Slacken off the two small screws (14/12) securing the lamp excluder portion (15/13) on the lamp housing (12/11); unlock the bayonet ring fitting, and remove the lamp excluder portion upwards from the lamp housing. The burner (No.7707) is screwed, like an ordinary filament bulb, into the holder situated inside the lamp excluder portion. When fitting it, be careful to see that the bare metallic end of the small contact wire projecting from the lampholder (socket) makes good electrical+ with the metal sleeve of the burner socket. Then replace in the lamp housing the lamp excluder portion with the burner screwed into it; lock the bayonet ring, and then tighten up again the two small screws which have been slackened off.

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Connecting the Lamp to the Mains Supply.

(Referring to page 1 of the Directions "Lux 7556" for the Large Fluorescence Equipment "Lux UV", or page 2 of the Directions "Lux 7554" for the Simple Fluorescence Equipment "Lux UW".)

The burner can be operated both with Direct Current and Alternating Current of 220 volts pressure. For both types of current, the connection to the house supply is made through a Mains Unit (No.7815). In view of the small amount of current the lamp consumes, no special heavy-duty fuses are necessary at the particular wall socket (plug box) used.

The lamp has attached to it a length of flexible cable (20/23). Insert the four-pin connector of this flex into the plug-box mounted on the base-plate of the mains unit.

to "Lux 7556" and "Lux 7554". 0805339.Dr.Gr./Me.

Note: The fourpin connector can only be inserted in one position in the plug-box. Insert the connector of the cable on the mains unit into the wall plug-box of the house supply.

Note: Since the burner can be used for alterhating as well as for direct current, it has no particular polarity. Even when plugged into a D.C. mains supply, then, no heed need be taken of the polarity, at least when a new burner is first connected up. When, however, the burnermhas been in use for some time on D.C. at a definite polarity, it is "burned in" and will only ignite subsequently when the polaritiy is the same as before. If, then, the burner should not light up when connected up to a D.C.supply, the reason for this is that the poles have been reversed by reversing the points of the plug in the wall-box. In this case, it is only necessary to revers the pins in the wall box (plug-box), when the burner will immediately ignite again without trouble. (See "Lighting the Lamp" in the next section of these directions.) To obviate any trouble in this connection, it is desirable to mark the pins of the mains unit connector and the wall-plug of the mains supply with the corresponding polarity signs.

Lighting the Lamp.

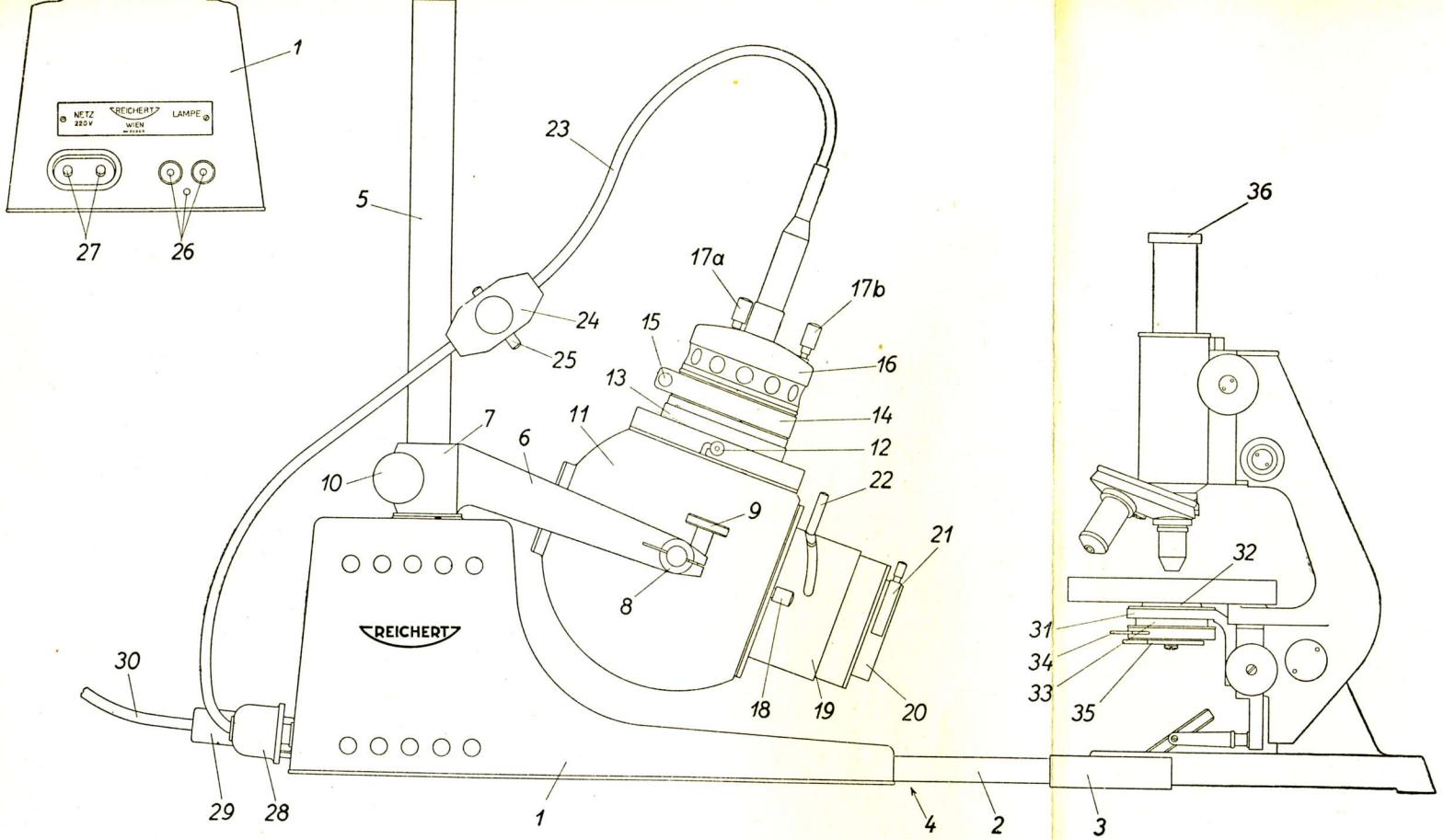
(Referring to pagelof the Directions "Lux 7556" for the Large Fluorescence Equipment "Lux UV", or page 2 of the Directions "Lux 7554" for the Simple Fluorescence Equipment "Lux UW).

To light the lamp, first press down the black push-button (22/25) of the switch (21/24) incorporated in the lamp-flex, and then keep pressed down for about 1 second the push-button located on the casing of the resistance.
Note: The burner does not reach its full candlepower until about 5 minutes after being switched on. If the burner has been switched off by pressing down the red push-button in the flex switch, it cannot be lit again until it has completely cooled down--a matter of about 5 to 10 minutes.

Rotating the Burner.

(Referring to page 2 of the Directions "Lux 7556" for the Large Fluorescence Equipment "Lux UV", or page 4 of the Directions "Lux 7554" for the Simple Fluorescence Equipment "Lux UW".)

Slacken off the long clamping screw (17/15) which secures the lampholder portion (18/16) in the lamp housing, and then begin to rotate the lampholder portion which is now free to turn. When doing this, observe the image projected by the burner. At first, when the burner tube lies across the optical axis, the arc in the burner will be visible as a strip of light which is much longer in the horizontal direction than it is in the vertical. By turning the lampholder so that the burner tube turns through 90 degress and comes parallel to the optical axis of the lamp, the arc will assume the form of a spot of light which is approximately as wide in the horizontal direction as it is high in the vertical direction. Continue turning the burner until the image of the arc forms a spot of light which is as nearly as possible circular in shape. The narrow side of the burner will then exactly face the lamp collector (condenser) Then tighten up again, to a slight extent at first, the clamping screw which was previously slackened off. This completes the centring to satisfy the first condition.



Simple Fluorescence Equipment "Lux UW"

Base, Column and Lamp Carrier
(Nos. 1 to 10)

1. Base (containing Transformer No. 7816, or Choking Coil No. 7817)
2. Positioning stop plate
3. Rubber sleeve on 2
4. Screw for securing 2 to 1 (not visible in the illustration, because concealed by 2)
5. Column
6. Lamp Carrier
7. Clamping sleeve for fixing 6 on 5
8. Clamping sleeve for fixing 11 on 6
9. Clamping screw for 8
10. Clamping screw for 7

Illuminating Tube, Electrical Fittings and Lamp
(Nos. 11 to 30)

11. Lamp Housing
12. Bayonet lock for securing 13 to 11
13. Lamp Excluder Portion
14. Clamping collar for fixing 16 on 13
15. Clamping screw for 14
16. Lampholder portion
17a, 17b. Screws for centring the lamp socket in 16
18. Clamping screw for fixing 19 on 11
19. Illuminating Tube (No. 7506)
20. Filter Holder (containing the red filter trap No. 8064)
21. Ultraviolet Filter (No. 8083 or No. 8076)
22. Set-pin for focusing lamp collector in 19
23. Flex between lamp and transformer (No. 7816) or choking coil (No. 7817)
24. Switch incorporated in 23
25. Push-button in 24
26. Three-hole plug-box on 1 for 28
27. Two-pin plug on 1 for 29
28. Three-pin plug on 23 for 26
29. Two-hole plug-box on 30 for 27
30. Flex to house supply box

Additional Optical Components on the Microscope
(Nos. 31 to 36)

31. Condenser clamping collar of the microscope substage (Medium Condenser Carrier with Rackwork, No. 13.00.00)
32. U. V. Condenser (No. 00.00.20)
33. Condenser Sleeve Mounting (No. 00.12.00)
34. Pin for adjusting aperture iris diaphragm on 33
35. Filter ring on 33
36. Eyepiece ultraviolet filter trap (No. 8082)