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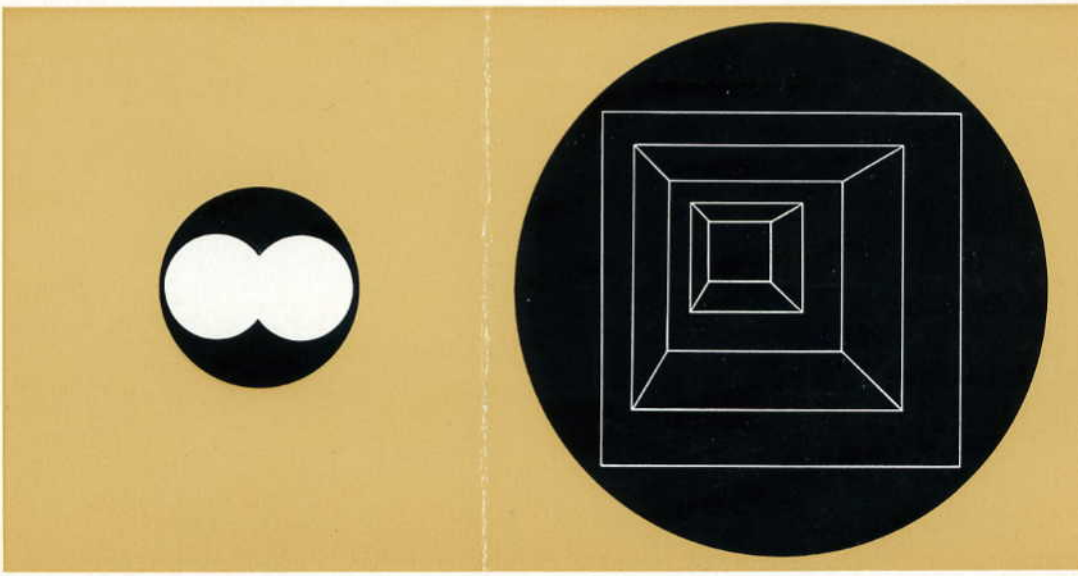
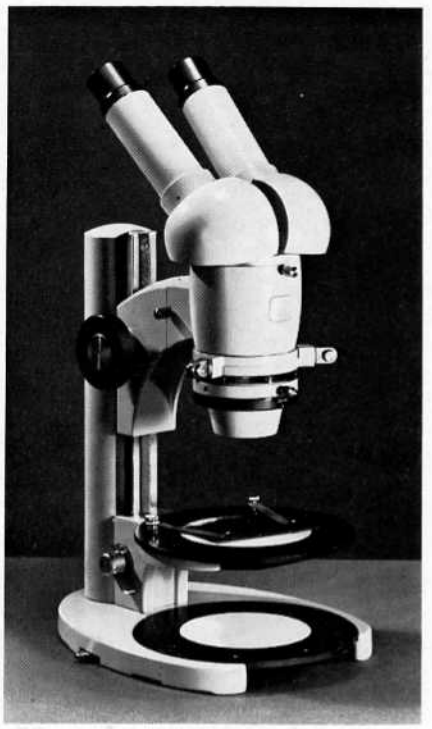
CARL ZEISS

Stereomicroscope I
Stereomicroscope III
Stereomicroscope IV

Operating Instructions





1 Stereomicroscope I

Stereomicroscope I

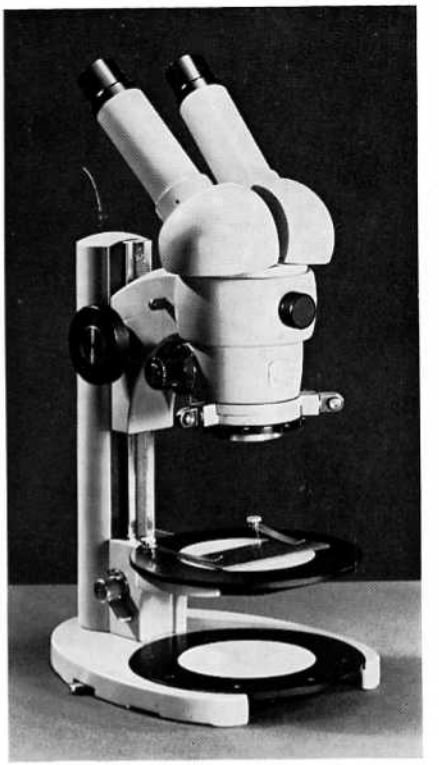
Objective	seven interchangeable pairs of objectives
Auxiliary lens attachments	none
Eyepieces	4× 10× 25×
Image	erect and unreversed
Body tube	removable, can be attached facing in the opposite direction
Specimen stages	see Fig. 11
Stand	see Fig. 11
Also fits on	our table stands for examining large objects (page 14)
Illumination	by two illuminators which can be attached either for reflected or transmitted light. Choice of low voltage or diffuse-light illuminator (page 10). In addition, trans-illuminator (page 11).
Accessories	for drawing under the microscope (page 18).
Special model	with a straight binocular body (page 19).

Magnifications, object-field diameters, working distances

Pair of objectives	Cat. No.	**10× eyepiece**		4× eyepiece		25× eyepiece		Working distance
		Magn.	Dia.	Magn.	Dia.	Magn.	Dia.	
0.63	47 50 10	**6.3 x**	32 mm	2.5 x	48 mm	16 x	16 mm	app. 85 mm
1	47 50 11	**10 x**	20 mm	4 x	30 mm	25 x	10 mm	
1.6	47 50 12	**16 x**	12.5 mm	6.3 x	18.5 mm	40 x	6 mm	
2.5	47 50 13	**25 x**	8 mm	10 x	12 mm	63 x	4 mm	
4	47 50 14	**40 x**	5 mm	16 x	7.5 mm	100 x	2.5 mm	app. 65 mm
6.3	47 50 15	**63 x**	3 mm	25 x	5 mm	160 x	1.6 mm	app. 43 mm
10	47 50 16	**100 x**	2 mm	40 x	3 mm	250 x	1 mm	app. 28 mm

Stereomicroscope III

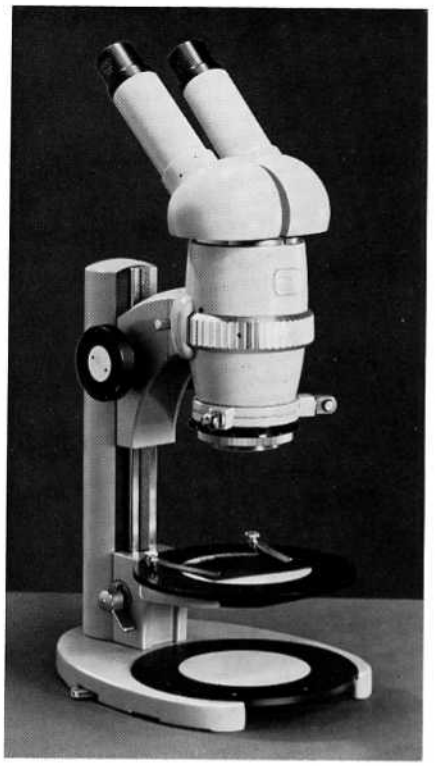
Objective	1 – 4× pancratic objective (zoom optical system)
Auxiliary lens attachments	see Fig. 4
Eyepieces	4× 10× 25×
Image	erect and unreversed
Body tube	permanently mounted. After slackening a black knob, the microscope body can be rotated and clamped in any desired position.
Specimen stages	see Fig. 11
Stand	see Fig. 11
Also fits onto	our table stands for examining large objects (page 14).
Illumination	by two illuminators which can be attached either for reflected or transmitted light. Choice of low-voltage or diffuse-light illuminator (page 10). In addition, trans-illuminator (page 11).
Accessories	for polarized-light work (page 12), for drawing under the microscope (page 18).
Special model	Stereoscopic Depth-measuring Microscope III T (page 19). Straight binocular body (page 19).



2 Stereomicroscope III

Magnifications, object-field diameters, working distances

Zoom magnification changer set to	**10× eyepiece**		4× eyepiece		25× eyepiece		Working distance
	Magn.	Dia.	Magn.	Dia.	Magn.	Dia.	
1	**10 x**	20 mm	4 x	30 mm	25 x	10 mm	app. 75 mm
1.2	**12 x**	16.5 mm	5 x	25 mm	30 x	8 mm	with 2× auxiliary lens attachment app. 25 mm
1.6	**16 x**	12.5 mm	6.3 x	18.5 mm	40 x	6 mm	
2	**20 x**	10 mm	8 x	15 mm	50 x	5 mm	
2.5	**25 x**	8 mm	10 x	12 mm	63 x	4 mm	with 0.5× auxiliary lens attachment app. 122 mm
3.2	**32 x**	6 mm	12.5 x	9 mm	80 x	3 mm	
4	**40 x**	5 mm	16 x	7.5 mm	100 x	2.5 mm	



3 Stereomicroscope IV

Stereomicroscope IV

Objective	0.8 – 4× pancratic objective (zoom optical system)
Auxiliary lens attachments	see Fig. 4
Eyepieces	10× 25×
Image	erect and unreversed
Body tube	removable, can be attached facing in the opposite direction
Specimen stages	see Fig. 11
Stand	see Fig. 11
Also fits onto	our table stands for examining large objects (page 14).
Illumination	by two illuminators which can be attached either for reflected or transmitted light. Choice of low-voltage or diffuse-light illuminator (page 10). In addition, trans-illuminator (page 11).
Accessories	for polarized-light work (page 12), for stereophotomicrography (page 17), for low-power photography (also with LUMINAR) (page 16), for drawing under the microscope (page 18).

Magnifications, object-field diameters, working distances

Zoom magnification changer set to	10× eyepiece		25× eyepiece		Working distance
	Magn.	Dia.	Magn.	Dia.	
0.8	8 x	25 mm	20 x	12.5 mm	app. 84 mm
1.2	12 x	16.5 mm	30 x	8 mm	
1.6	16 x	12.5 mm	40 x	6 mm	
2	20 x	10 mm	50 x	5 mm	with 2× auxiliary lens attachment app. 25 mm
2.4	24 x	8.5 mm	60 x	4 mm	
2.8	28 x	7 mm	70 x	3.5 mm	
3.2	32 x	6 mm	80 x	3 mm	
3.6	36 x	5.5 mm	90 x	2.8 mm	with 0.5× auxiliary lens attachment app. 118 mm
4	40 x	5 mm	100 x	2.5 mm	

Auxiliary lens attachments

for Stereomicroscopes III and IV

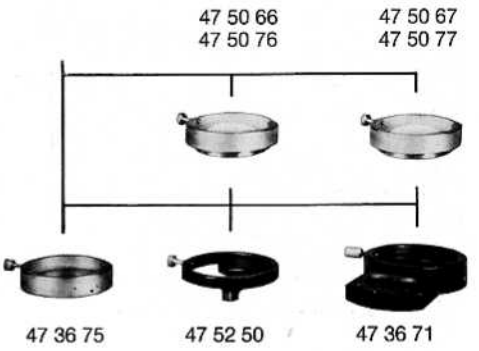
The **2× auxiliary lens attachment** doubles the magnification and numerical aperture of the microscope and halves the object-field diameter.
Model for Stereomicroscope III: 47 50 66
Model for Stereomicroscope IV: 47 50 76

The **0.5× auxiliary lens attachment** halves the magnification and numerical aperture and doubles the object-field diameter. Owing to the long working distance, this attachment should be used only in conjunction with table stands.
Model for Stereomicroscope III: 47 50 67
Model for Stereomicroscope IV: 47 50 77

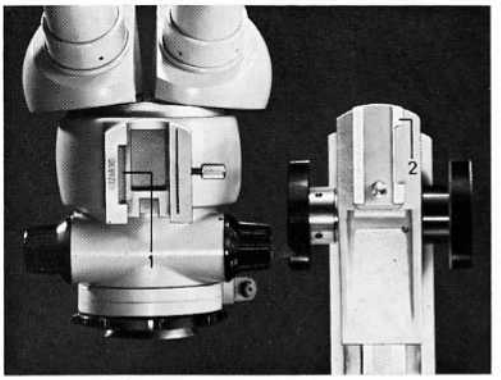
The **analyzer attachment,** 47 36 71, should be clamped to the objective or 2× auxiliary lens attachment so that the slide points towards the stand. 4× eyepieces cannot be used due to vignetting. For further details, see page 12.

The **simple analyzer,** 47 36 75, used in conjunction with a polarizer, serves to eliminate reflections on the specimen under vertical illumination. Clamp the analyzer to the objective and auxiliary lens attachment and insert the polarizing filter, 47 36 00, (heat-absorbing filter!) into the filter holder of the low-voltage illuminator. Rotate the two filters in opposite directions until the reflections disappear.

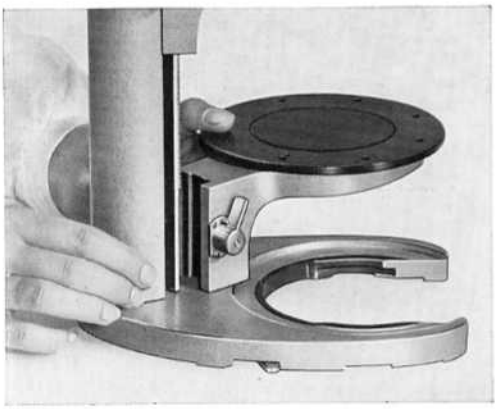
The **prism for vertical illumination,** 47 52 50, reflects the light from the illuminator into deeper regions of the specimen. Without an auxiliary lens attachment, an object field of 26×26 mm is illuminated. At low magnifications, vignetting will occur (with 10× eyepiece up to a magnification factor of 2). The prism should be clamped to the objective or lens attachment with the holder pointing to the stand to prevent partial occultation of the objective aperture. To ensure passage of the largest possible amount of light through the small prism, the filament of the low-voltage lamp should be imaged in the aperture of the prism by shifting the lamp socket.



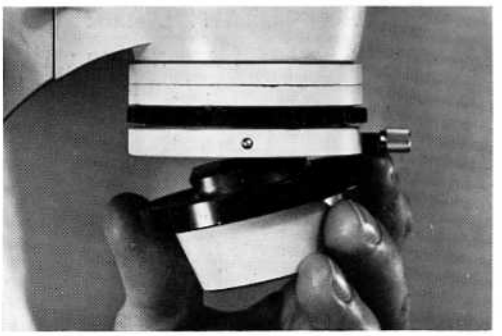
4 Auxiliary lens attachments. The illustration shows that, for example, the analyzer attachment, 47 36 71, can be clamped either directly to the main objective or to the auxiliary lens attachments.



5 Attaching the microscope body to the stand



6 Attaching the stage carrier



7 Stereomicroscope I: Changing objectives

Assembling the microscope

If the stereomicroscope was supplied in a **cabinet,** the stand is secured by a screw projecting from the bottom of the cabinet. This screw can be removed with the aid of the wrench contained in the cabinet.

To fit the **microscope body** to the stand, loosen the clamp screw and attach the body so that the guide edge 2 engages the cutout 1 (Fig. 5). Then slide it down as far as it will go and tighten the clamp screw.

Insert the **stage carrier** with the edge opposite the clamp lever into the dovetail guide of the stand (Fig. 6). Then swing it towards the stand until the spring bolt engages the guide. Move the clamp lever down, thus arresting the stage carrier.

Insert the **specimen stage** into the base of the stand or the stage carrier so that the red dots are opposite each other. Then turn the stage through about 90° and lock it by means of the lever on one side (or the clamp screw in the stage carrier, which acts from below).

Applicable only to Stereomicroscope I:

Loosen the clamp screw and attach the desired **pair of objectives** at an angle from below. With the side of the dovetail collar push the spring bolt back until the paired objectives snap into position (Fig. 7). It is advisable to practise this manipulation several times until it takes only a few seconds.

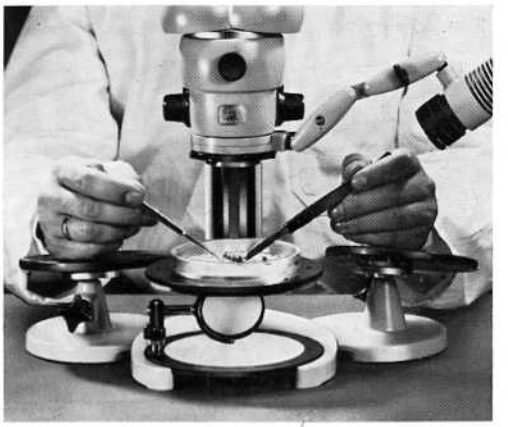
To attach the **illuminator holder,** turn the thumb screw back until the holder can be slipped over the pair of tapers on the microscope body. Adjust the stiffnes of the joints by means of the thumb screws.

Insert the **6-volt, 15-watt filament lamp,** 38 01 77, into the socket (red dot opposite red pin) and lock it by clockwise rotation. Remove all finger prints to prevent their burning in and slip the black shield onto the lamp bulb for glare protection. To insert (or remove) the lamp socket, turn the black clamp ring of the illuminator so that the two red dots are opposite each other.

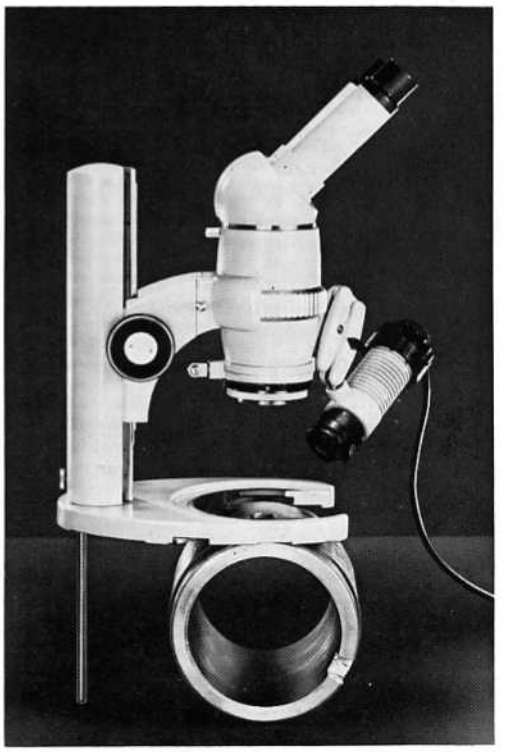
To insert the fluorescent tubes into the diffuse-light illuminator, unscrew the transparent cover plate, introduce the tubes and turn them about 90° about their axis. Insert the plastic safety clip with its notches facing down as shown in Fig. 8. Then replace the cover plate.

The **transformer** must be set for the correct line voltage. Check the voltage setting in the window provided in the base plate.

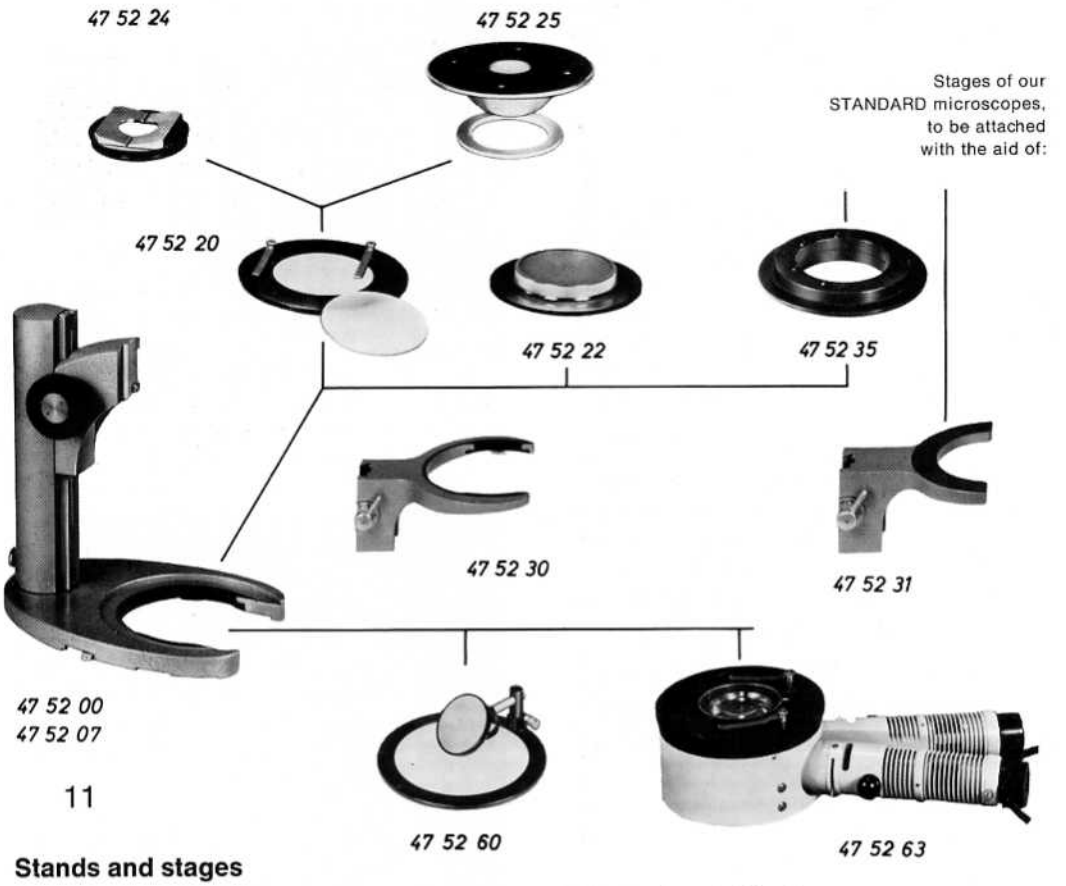
8 Diffuse-light illuminator: After inserting the fluorescent tubes, replace the plastic clip.



9 Hand rests, 47 52 68, facilitate dissecting work. They can be vertically adjusted as well as tilted and turned by means of ball-and-socket joints.



10 Stereomicroscope IV resting on a large object.



Stands and stages

47 52 00 **Stand F** with 250 mm column, for transmitted and reflected-light work.

47 52 07 **Stand E** with 225 mm column, for reflected light.

The base of the stand has cutouts on its underside so that the stereomicroscope can be placed directly on large objects. For the same purpose, the Vee-block insert can be attached upside down. With the aid of the 6 mm-thick prop incorporated in the stand, the microscope can be set up on objects as high as 120 mm (Fig. 10).

Stiffness of control knob

The control knob can be adjusted for greater or lesser stiffness. To increase the stiffness of motion, insert the pin supplied into one of the holes in the bright disks in the center of the knobs and turn them counterclockwise. The motion of the knob should be just stiff enough to prevent the stereomicroscope from sliding down under its own weight.

47 52 20 **Plain circular stage,** to be inserted into the base of the stand (for incident light only) or into the stage carrier, 47 52 30, (for combined incident and substage

illumination). The stage comes with a metal contrast plate and a glass plate frosted on one side, which can be exchanged for special inserts.

47 52 22 **Glide stage** for displacing the specimen by hand – to be attached to the stand in the same manner as the plain circular stage. The rotatable ground-glass stage top can be shifted 9 mm from the center in any direction.

Inserts for plain circular stage

47 52 24 **Vee-block insert** for cylindrical objects. Can also be inserted from below if the microscope is to be placed directly on top of such objects (Fig. 10).

47 52 25 **Ball-and-socket hemispherical stage.** Can be rotated and tilted in its supporting ring together with the object, for observation by transmitted or reflected light.

47 52 30 **Stage carrier.** Accepts the stages for transmitted and reflected light in the same manner as the base of the stand. The stages are clamped by means of a projecting screw on the underside.

47 52 31 **Carrier** for stages of the STANDARD series of microscopes. Is attached to the stand with the stage screwed to it. Uniform rotation of centering specimen stages is fully guaranteed.

47 52 35 **Holder** for stages of the STANDARD series of microscopes. Screwed to this holder, the stage is attached to the stand like the plain circular stage.

47 52 60 **Trans-illumination insert** with a polished concave mirror and a diffusely reflecting plane mirror. For low magnifications, direct the low-voltage illuminator at the bright surface which reflects the light to the specimen, swinging the mirror out of the way. For substage illumination at higher magnifications, use the concave mirror.

47 52 63 **Trans-illuminator,** page 11.

Eyepieces 12

10× wide-angle eyepieces, 46 40 01, are supplied as standard equipment. In addition, 4×, 46 36 01, and 25× eyepieces, 46 44 01, are available for special purposes. However, the latter lead to excessive magnification and are therefore primarily intended for measuring and counting. In this case, the image is, of course, less bright.

The 10×, 46 40 04, and 25× eyepieces, 46 44 04, can be supplied with a focusing eyelens to compensate for visual defects. These eyepieces will also accept micrometer disks, cross-hair disks and eyepiece net micrometers of 22.5 mm diameter. For this purpose unscrew the black insert on the lower side of the eyepiece, withdraw the ring from the field stop, insert the micrometer disk (with its graduation facing up) and replace the ring. Then lock the eyepiece in position by means of the clamp ring 46 49 12.

For accurate length measurements eyepiece micrometers must be calibrated once and for all with the aid of a stage micrometer. On the stage micrometer No. 47 40 25, there are 25 whole millimeters and 5 millimeters subdivided into 50 intervals. For calibration, the ratio between a certain number of divisions of the eyepiece and stage micrometers is determined. This micrometer value must be ascertained for every magnification.

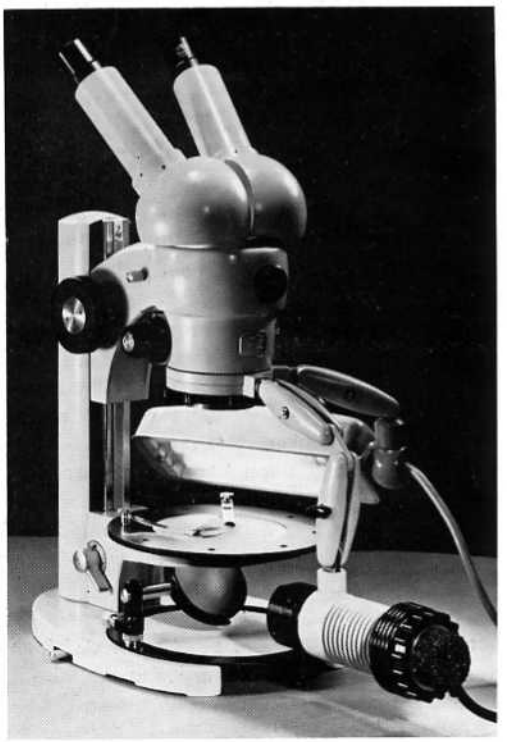
Once this has been done, it will then only be necessary to multiply the number of divisions by the micrometer value in order to measure a distance in the specimen.

The eyepieces should always remain in place in the body tube in order to prevent the entry of dust.

Illumination

The 6-volt, 15-watt illuminator is used for both transmitted-light and reflected-light work. The light is focused on a small area. This also explains why this illuminator is generally employed in conjunction with the transmitted-light insert, 47 52 60, or the prism for vertical illumination, 47 52 50.

The illuminator is connected to AC via a suitable transformer. The plug-in transformer, 39 25 21, can be set for 110, 127, 220 or 240 volts after removing its base plate and has taps for 2.5, 3.5, 4.5, 5.5 and 8 volts. It is usually sufficient to operate the lamp at lower than rated voltage, which considerably increases its life.



13 Low-voltage and diffuse-light illuminators on Stereomicroscope III

If a light filter of 32 mm diameter is to remain permanently in the light path (for instance a heat-absorbing filter), unscrew the lamp housing with its cooling fins from its supporting collar and insert the filter in front of the lamp condenser. In order to permit filters to be exchanged during observation, a filter holder, 46 60 50, can be attached. Whenever the polarizing filter, 47 36 00, is used, a heat-absorbing filter should be inserted in front of the lamp condenser for its protection.

The diffuse-light illuminator should be used whenever it is desired to examine large objects under uniform incident illumination. Likewise, a combination of diffuse-light and low-voltage illuminators may frequently prove of advantage because additional highlights and shadows will enhance the relief of the stereo image. The illuminator can be rotated, swung and tilted in any direction.

The diffuse-light illuminator is connected to AC via a choke for 100, 110, 115, 127, 220 or 240 volts and 50 to 60 Hz. The illuminator is always operated with two fluorescent tubes.

The following fluorescent tubes may be used:

Fluorescent tube	Manuf.	Our Catalog No.
Type F 4 T 5/D – daylight	SYL-VANIA	38 00 53 – 2570
Type F 4 T 5/W – white light		38 00 53 – 2580
Type TL 4 W/29 –	PHILIPS	–
Type TL 4 W/33 –		–

The white-light tubes produce slightly brighter light, while the daylight tubes are specially suitable for the examination of specimens in natural colors. A combination of both these tubes has given the best results. The standard equipment of the diffuse-light illuminator therefore includes a combination of both types of tube.

The illuminator is switched on by pressing the white button for a few seconds. The red button serves to switch it off.

Trans-illuminator, 47 52 63

This illuminator can be used with any of our stereomicroscopes, with the exception of the model E stand and the table stands. The permanently centered light paths are particularly advantageous for high magnifications. A low-voltage illuminator is mounted on the optical axis of each of the two image-forming light paths of the stereomicroscope. Each of these illuminators has an aperture diaphragm controlling contrast and resolution. Under no circumstances must this diaphragm be used to attenuate the light. This is achieved exclusively by reducing the lamp voltage.

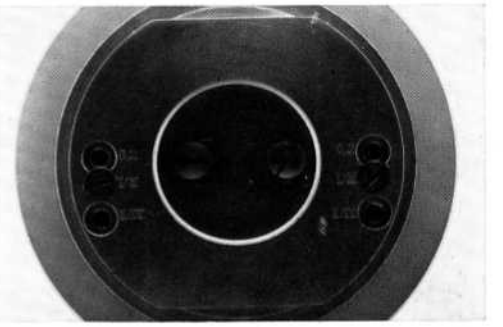
The upper side of the illuminator is designed as a specimen stage. Bores are provided for stage clips or for the attachable mechanical stage, 47 33 22, for scanning the specimen.

Below the removable glass plate, 47 33 78, (72 mm diameter) of the stage an illuminating lens is located in a slip-in mount, which can be changed in accordance with the type of microscope used:

Stereomicroscope I	Auxiliary lens III, 47 52 70, for O.63x to 1.6x objectives. Objectives of higher power are illuminated either with or without the auxiliary lens.
Stereomicroscope III	Auxiliary lens III, 47 52 70.
Stereomicroscope IV	Auxil. lens, IV/1, 47 52 71.
Stereomicroscope 02	Auxiliary lens III, 47 52 70.

The illuminator tubes can be swung in and out to allow the illuminating beams to be accurately matched to the convergence of the image-forming beams. The stop limiting the motion of the illuminator tubes must be set for the type of stereomicroscope with which the equipment is used. To do this, turn the illuminator upside down (Fig. 14) and insert the screws into the holes marked with the microscope type concerned. If no auxiliary lens attachment is employed, press the illuminator tubes together as far as they will go. With the 2× auxiliary lens attachment, spread the tubes until they rest against their external stops.

Insert the equipment into the base of the stand and turn it through about 90°. In this position (shown in Fig. 16) clamp it with the aid of the lever in the base of the stand.



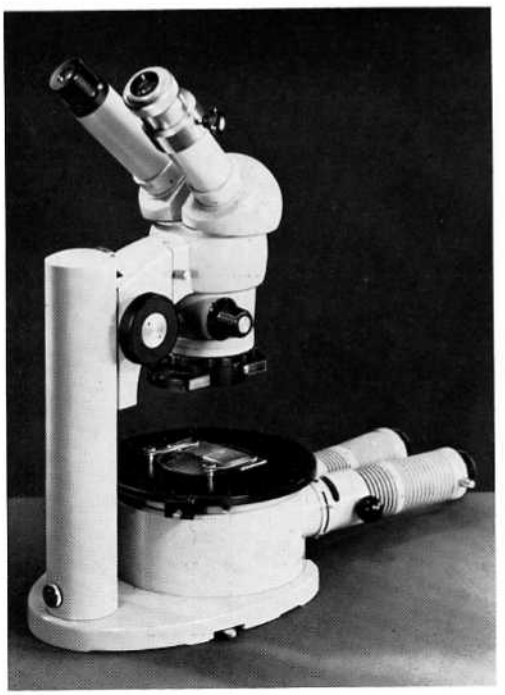
14 Underside of trans-illuminator: stop screws, here set for Stereomicroscope I or III

15 The auxiliary lens is exchanged only if the equipment is to be used in conjunction with another type of stereomicroscope (see table on left).

POL Stereomicroscopes

In addition to simple examination by polarized light, Stereomicroscopes III and IV can also be equipped for **measurements** by transmitted light (using the orthoscopic light path), such as the extinction angle or the principal directions of optical anisotropy, etc.

In contrast to the equipment No. 47 52 63 described on page 11, the **trans-illuminator** No. 47 52 64 has a centering piece. This normally holds the graduated rotary stage, 47 33 53, but the circular mechanical stage or the glide stage may likewise be used. With the aid of a vernier, the graduation allows angles to be read to within 1/10°. The polarizer, 47 36 02, is placed on the illuminating lens with the glass plate, 47 33 78, (72 mm diameter) removed. Dots are provided for orientation.



16 Stereomicroscope III POL

The specimen is displaced by means of the attachable mechanical POL stage, 47 33 25, which is fitted to the stage top by means of two pins and one screw in holes provided for this purpose. The excursion range of this attachment is 30×40 mm. The coordinates of a point on the specimen can be determined to 0.1 mm with the aid of millimeter graduations and verniers. For quantitative determinations the point counter attachment, 47 40 35, is available for the attachable mechanical POL stage.

The analyzer, 47 36 71, (Fig. 4) has the following positions:

1. First position (marked λ):
   Analyzer combined with first-order red quartz plate.
2. Second position: Analyzer used alone.
3. Third position: Unobstructed passage of light for work with plane-polarized light.

When polarizer and analyzer are crossed, the background field appears dark. An optimum setting can be obtained by slightly rotating the

body tube or the analyzer. Only birefringent components of the specimen will then light up as the stage is rotated.

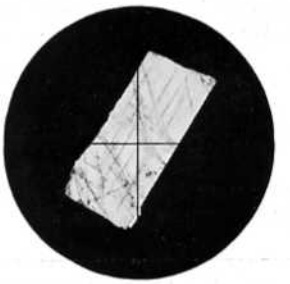
An eyepiece with focusing eyelens containing a cross-line disk is required for this purpose. First point the eyepiece at a bright surface and screw the eyelens in until the cross lines are just in sharp focus. Then adjust the eyepiece tubes to suit your interpupillary distance and orient the cross lines so that they are parallel to the vibration direction of the crossed polarizers. This is done with the aid of the anhydrite test slide supplied with the equipment, in the manner familiar to every mineralogist.

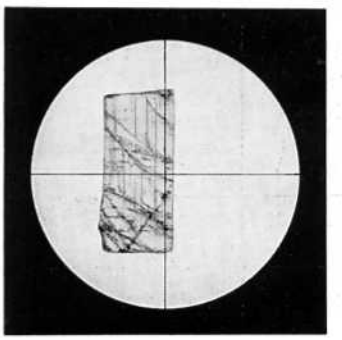
17 Micrometer-disk eyepiece

Adjusting the cross-line disk in relation to the vibration direction of the light

1. Set eyepiece tubes to interpupillary distance and switch on illuminator.
2. Attach analyzer in viewing direction (see Fig. 16) and move it to second stop position (center).
3. Correct for optimum darkness of background field by slight rotation of tube or analyzer. Lock in this position.
4. Place anhydrite test slide on stage (Fig. 18) and rotate stage until this is also dark.
5. Move analyzer out of light path and orient the vertical cross line so that it coincides with any long, clearly visible cleavage in the test slide by rotating the eyepiece (not the eyelens) (Fig. 18).
6. Lock eyepiece in this position by means of clamping ring.

If another observer readjusts the interpupillary distance setting of the binocular body, the position of the cross lines must also be readjusted, since the eyepiece tubes are slightly rotated in the process.





18 Anhydrite test slide used for adjustment

19 Supplementary rack and pinion, 47 52 10, for table stands

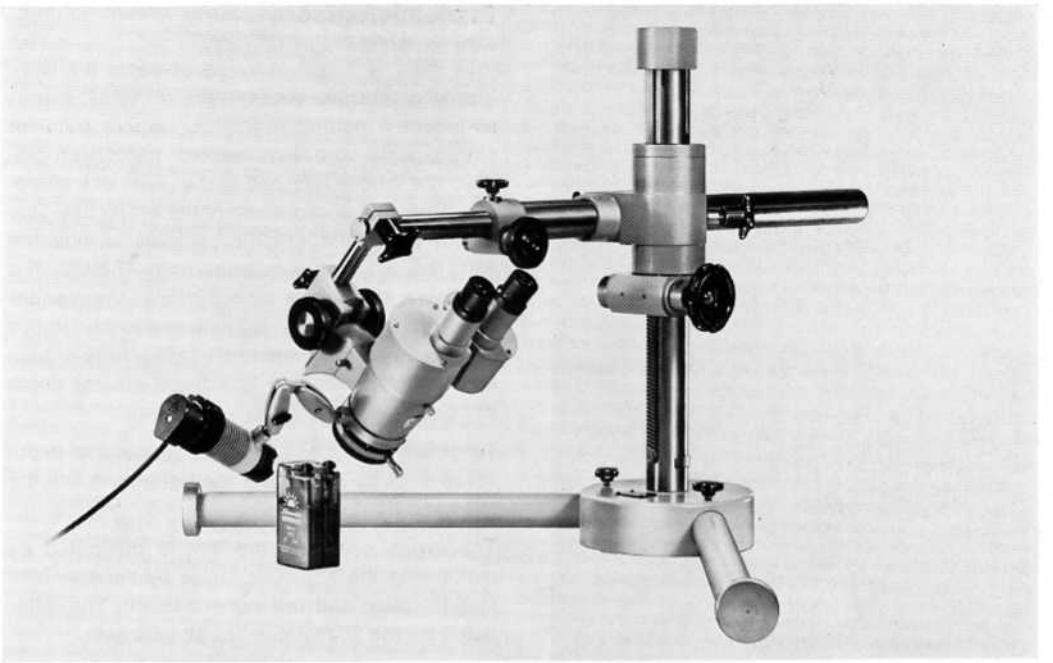
20 For observing vertical surfaces, the stereomicroscope is set up in this manner

Table stands

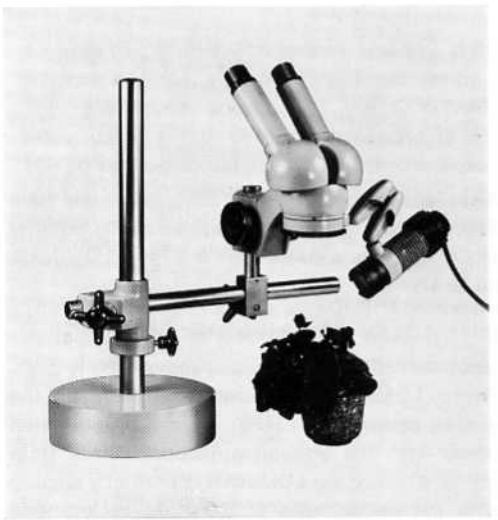
Mounted on a table stand, any stereomicroscope can be set up in a multitude of different positions over large objects. The ring serving to swivel the horizontal arm supporting the microscope is adjusted on the vertical column on the type C or D stands to suit the height of the object to be examined. The model H stand, however, has a rack-and-pinion movement for a vertical displacement of 22 cm. The microscope arm of all table stands can be shifted axially, is protected against rotation about its own axis and can be clamped in any desired position.

The supplementary rack and pinion, 47 52 10, serves as connection between the stereomicroscope and the table stand. The rack and pinion has an excursion range of 50 mm and is slipped onto a stud of 18 mm diameter where it is clamped. Provision has been made to prevent the rack from sliding down under its own weight.

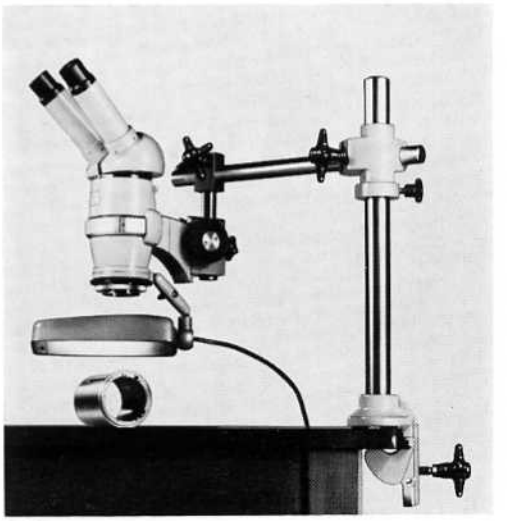
Table stand	**Maximum distance** between optical axis and base	**Lateral excursion**	**Type of base**
Stand H, 47 52 02, with 22 cm vertical rack-and-pinion adjustment	70 cm + 8 cm horizontal	90 °	Circular base with outriggers. Eccentric disks at their ends guarantee perfect seating. The disks can be turned after loosening a clamp screw.
Stand C, 47 52 05	30 cm	360 °	Circular base
Stand D, 47 52 06	40 cm	360 °	Clamp with two different positions for table tops up to 2.5 cm and 8 cm thick.



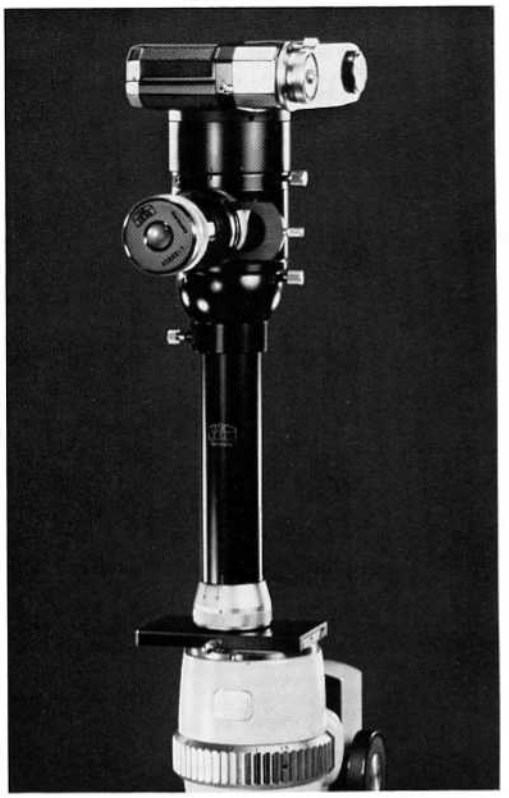
21 Table stand H: Stereomicroscope I with straight binocular body



22 Table stand C: Stereomicroscope 02



23 Table stand D: Stereomicroscope IV



24 Camera attachment on photographic sliding tube above left-hand beam

Photomicrography

with the Stereomicroscope IV

The photographic sliding tube, 47 50 81, serves to mount a potomicrographic camera both for stereoscopic and monoscopic photomicrography. The tube is attached in the place of a binocular body and accepts one of the eyepieces. One of our photomicrographic cameras is mounted with the aid of the adapter ring, 47 60 02. For exposure, the tube is moved over to the stop for the right or left-hand light path and locked in this position. The iris diaphragm in the tube should be stopped down only to achieve greater depth of field in reflected light.

To obtain stereomicrographs, successive exposures must be made over the right-hand and the left-hand light path.

The image scale on the film is computed by multiplying the objective factor by the eyepiece magnification and the camera factor. The latter is 0.5 for the 35 mm camera attachment.

25 Left: 63 mm LUMINAR; right: adapter, 47 50 91, for mounting the objective

Excellent image quality is achieved if the main objective is removed and replaced by the adapter No. 47 50 91 as a holder for a 63 mm LUMINAR, 46 25 17.

Initial adjustment of LUMINAR:

Unscrew main objective and remove body tube. Screw LUMINAR into adapter and loosen the slotted screw of the latter. Screw adapter from below into the stereomicroscope. Check from above whether the LUMINAR is perfectly aligned with the optical axis of the right or left-hand light path. Hold LUMINAR fast and turn lock

ring of adapter (bright knurled ring) in opposite direction. Then tighten slotted screw from below using a screwdriver. Whenever it is used again, the adapter need only be srewed in as far as it will go.

The iris diaphragm of the LUMINAR should only be stopped down to increase the depth of field in the case of three-dimensional objects.

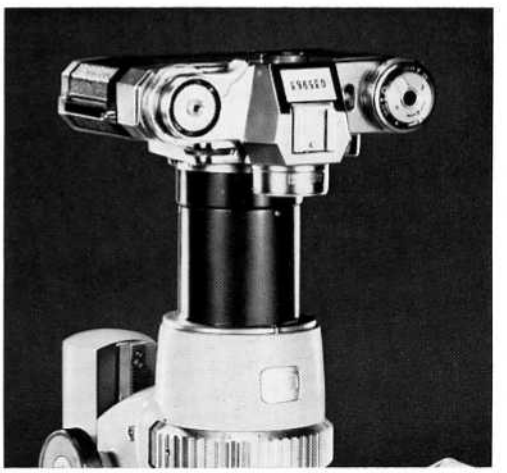
The image scale on the negative is computed by multiplying the objective factor by 1.6, the eyepiece magnification and the camera factor. For the latter, see page 16.

26 63 mm LUMINAR attached in place of the main objective

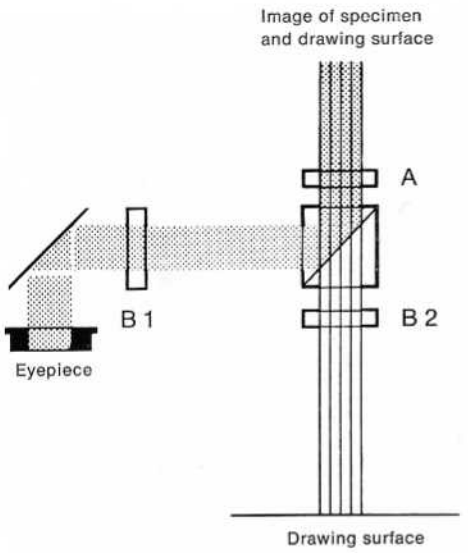
To take true stereomicrographs, use the **stereo adapter,** 47 62 11, instead of the binocular body. This adapter is attached to the CONTAREX reflex camera like an interchangeable lens. A 24×36 mm photo then contains the two component images required for stereoscopic vision side by side. Stereomicrographs must be viewed with the aid of a stereoscope.

The image scale on the negative is computed by multiplying the magnification reading of the objective by the factor 1.25. It thus ranges from 1 : 1 (position 0.8) to 5 : 1 (position 4).

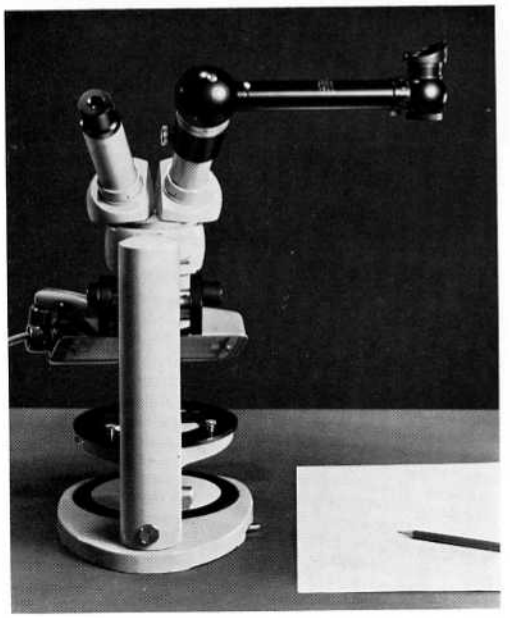
Work with the photomicrographic camera is described in the Operating Instructions G 41–410.



27 CONTAREX on stereo adapter



28 Diagrammatic sketch of camera lucida



29 Camera lucida on Stereomicroscope III

Drawing with the microscope

The camera lucida, 47 46 06, is used in a normally lit room. The observer looks through the camera lucida onto the drawing surface. He then sees the microscopic image, which is reflected into the light path from one side, superimposed on the drawing surface. The special advantage of this equipment is that both the brightness of the object and that of the drawing surface can be varied continuously, so that perfect matching is extremely easy.

The light coming from the microscope eyepiece is transmitted by the polarizing filter B 1 and reaches the eye via the beam-splitting cube and the polarizing filter A. The vibration direction of the polarizing filter B 1 in relation to that of the fixed polarizing filter A can be varied by rotation. It is thus possible to vary the intensity of the light reaching the eye from the microscope. In the same way, the polarizing filter B 2 in conjunction with filter A controls the intensity of the light coming from the drawing surface.

1. Mount camera lucida on body tube:
   Remove eyepiece, slip clamping member of camera lucida onto body tube, replace eyepiece and slowly lower camera lucida to the stop. Clamp it in this position.
2. Swing up camera lucida out of the way, adjust microscope as usual and swing camera lucida back into position in front of the eyepiece.
3. Align camera lucida:
   Arrange drawing surface directly beneath the eyepiece head. The center of the drawing surface must coincide with the center of the field that is visible in the eyepiece head. This will avoid image distortion. For greater convenience, the drawing surface may be arranged at an angle. In this case, the eyepiece head must be turned accordingly. To ensure that the microscopic image is formed exactly in the drawing plane, first align your eye with a point on the drawing surface (e. g. the point of a pencil). Avoid parallax.
4. Match brightness of microscopic image and drawing surface by simultaneous rotation of polarizing filters B 1 and B 2 (Fig. 28).

In conjunction with a reducing 33/25 mm adapter, 47 46 53, the camera lucida can also be used in STANDARD microscopes.

Straight binocular body

For certain types of work a straight rather than an inclined body tube is required. Stereomicroscopes I and III can therefore be supplied with a straight binocular body (Fig. 21). Subsequent exchange is not possible for reasons of adjustment.

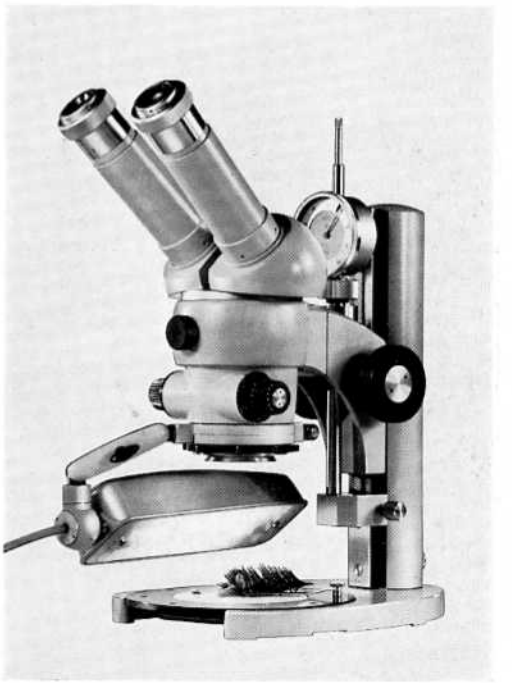
Model III T Stereoscopic Depth-measuring Microscope, 49 53 20

A special version of Stereomicroscope III can be supplied with a stand having an adjustable and clamping slide serving as a stop for the dial gage. In addition, this microscope comes with two 10× eyepieces with focusing eyelens and built-in triangular marks. Its rack and pinion has an 8 mm hole accepting a commercial dial gage reading to 1/100 mm.

Eyepieces and eyepiece tubes have single-dot and double-dot marks. Accurate measurement is guaranteed only if the same marks on the eyepiece and eyepiece tube are opposite each other. Only then will the two triangular marks coincide in the required manner. To adjust the eyepieces for your own refractive error, look into the eyepiece and screw the eyelens in until the triangular marks are sharply focused.

For measurement, lower the binocular body so that first a higher object point is sharply defined beside the index, and then a lower one, or vice versa. The depth (difference) can then easily be determined with the aid of the dial gage. Measurements should always be made with an initial magnification of 4× which gives the shallowest depth of field.

The accuracy of dial gages is, of course, limited and may be further reduced by mechanical slackness, soiling of the contact point, etc. It is therefore advisable to repeat measurements to obtain maximum possible accuracy.



30 Model III T Stereoscopic Depth-measuring Microscope

The illustrations are not binding in every detail for the design of the instruments.

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