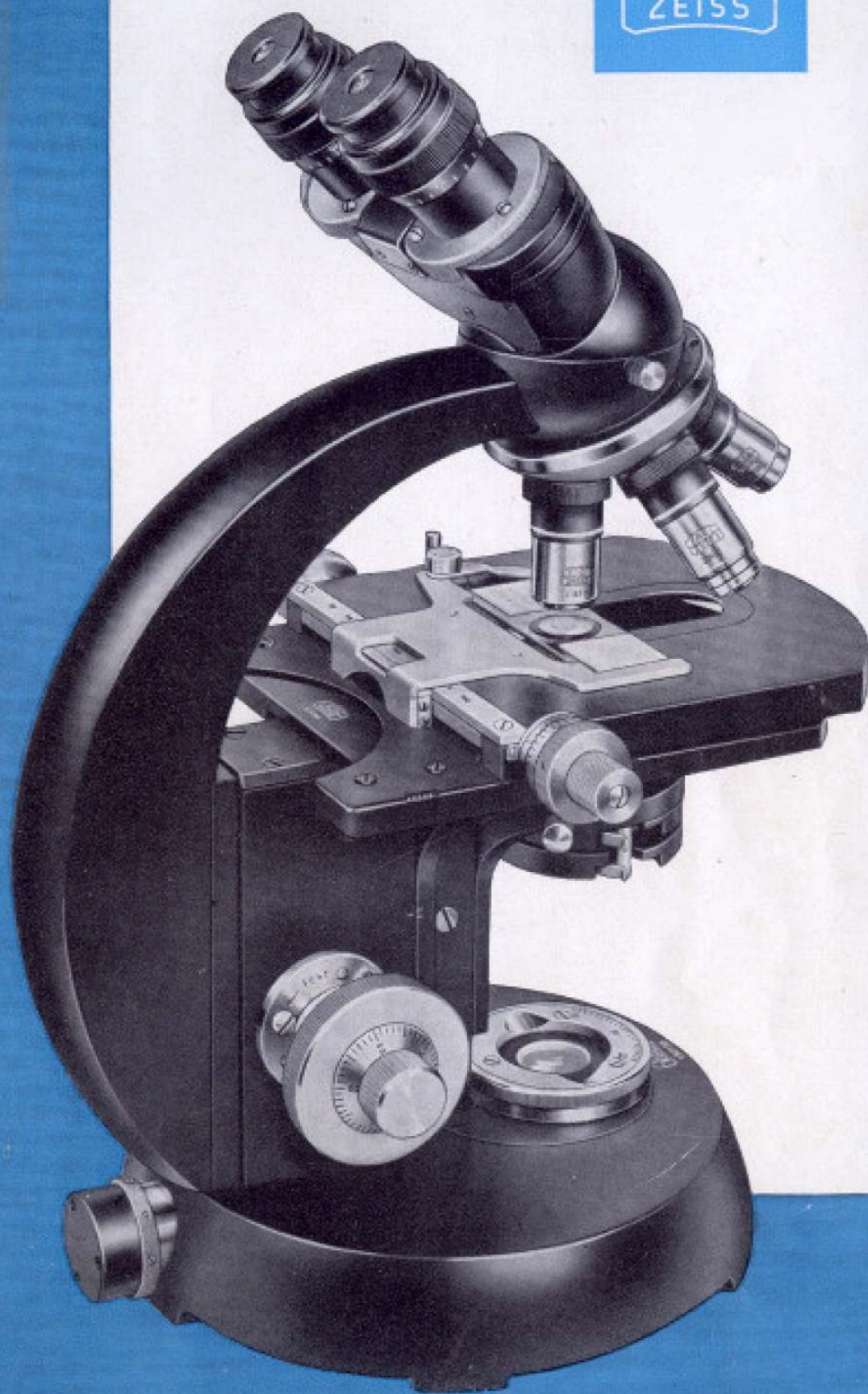
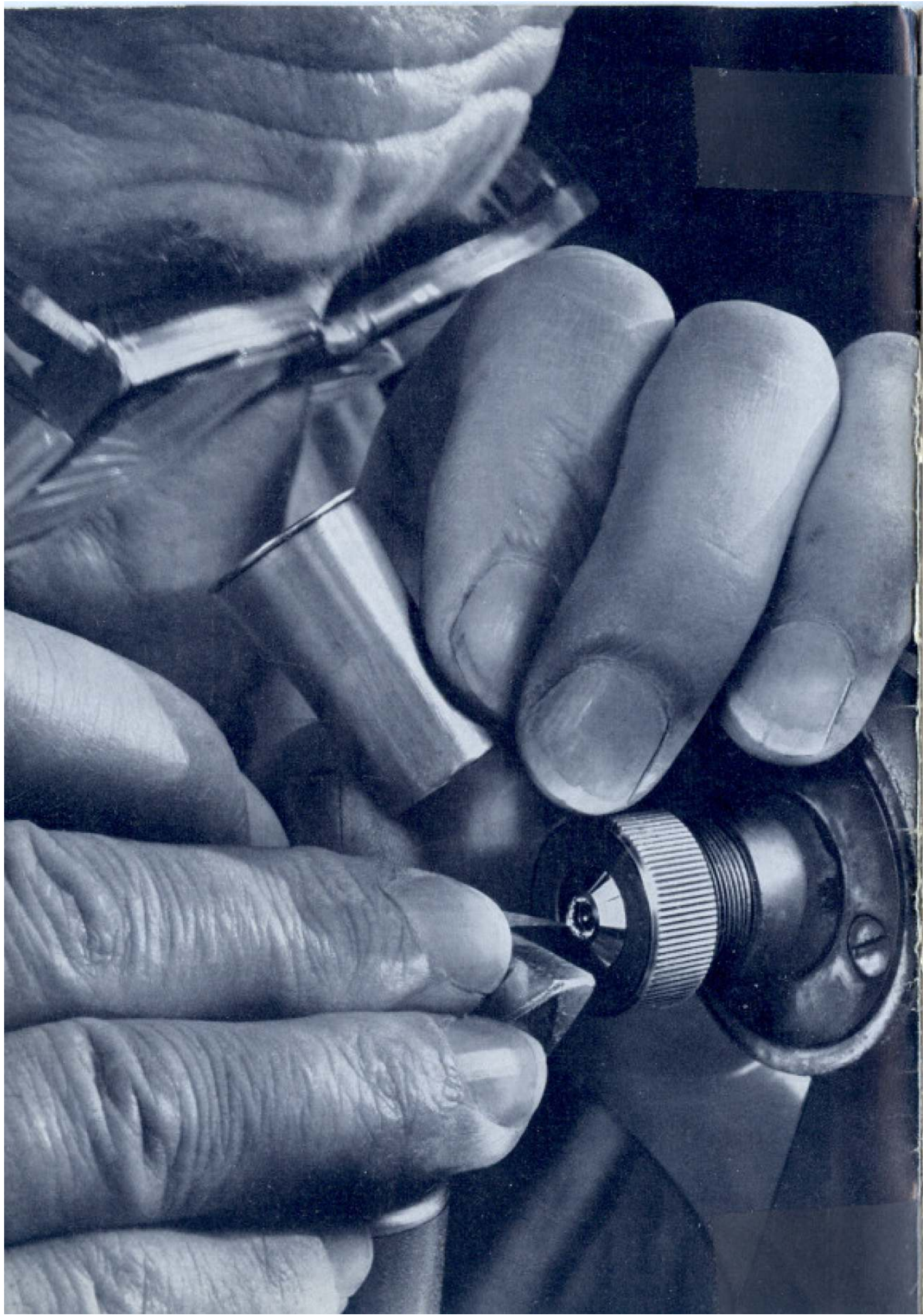




ZEISS

**STANDARD Microscope
GFL**



The STANDARD Microscope

is a versatile laboratory and research microscope for which a large variety of accessories is available which may be added to the original equipment at later dates. During the past decade it has proved itself highly satisfactory for practical applications in scientific institutes, in laboratories and in medical practice.

All the demands made on a modern working instrument were considered in the development of this Microscope. The operating elements are so arranged that a few turns of the hand suffice for passing to other modes of illumination or observation, to photomicrography, etc.

In the present publication you will find in addition to a description of the STANDARD Microscope also several suggestions for popular outfits (pages 5 and 6). Our representatives throughout the world are at your disposal for further recommendations.

ZEISS Microscopes are a testimony to harmonious collaboration of scientists and expert workers in the shops. Most modern manufacturing methods are paired with the

TRADITIONS OF A CENTURY

STANDARD Microscope GFL

Essential features:

Permanently centered illuminator installed in the base of the Microscope.

Monocular or binocular observations with comfortable position of the observer.

Horizontal position of the stage, hence no flowing away of immersion oil or mounting liquid.

Low position of the knobs for coarse and fine adjustment. Fine adjustment with ball bearings.

Positive protection of the specimen and of the sensitive front lenses of the objectives through resilient objective mount.

Extensive expansion possibilities for

all procedures of microscopic investigation, e. g. bright field, dark field, phase contrast

examinations under epi-illumination

microscopic measurements

fluorescence microscopy

drawing with the Microscope

photomicrography from the lowest to the highest magnifications (Attachment and Universal Cameras)

microprojection

examinations with polarized light

examinations of preparations dependent on temperature, etc.



Fig. 2

STANDARD Microscope GFL 658-632

with coarse and fine adjustment GF, circular base with built-in illuminator L, condenser carrier with pinion, tube carrier with slide fitting, revolving nosepiece 4x on slider, large rectangular mechanical stage (63), inclined binocular tube, 3 low-voltage incandescent bulbs 6 V 15 W, transformer 5/6/8 V 15 W, neutral filter, condenser n. a. 1.3 Z with swing-out front lens, Planachromat 2.5, Achromat 10, Achromat 40, Achromat 100 oil immersion, 2 C-eyepieces 8x, 2 C-eyepieces 12.5x, in case

Catalogue No. 491164

In the above illustration an ultracondenser (for dark-field observations) is shown in front of the Microscope at the left, and at the right a revolving nosepiece 5x on slider.



Fig. 3

STANDARD Microscope GFL 654-632

with coarse and fine adjustment GF, circular base with built-in illuminator L, revolving nosepiece 4x fixed to tube carrier, large rectangular mechanical stage (63), inclined binocular tube, 3 low-voltage incandescent bulbs 6 V 15 W, transformer 5/6/8 V 15 W, neutral filter, phase-contrast condenser II Z, Planochromat 2.5, Achromat 16 "Ph", Achromat 40 "Ph", Achromat 100 oil immersion "Ph", phase-contrast centering telescope (at the right of the Microscope), 2 C-eyepieces 8 x, 2 C-eyepieces 12.5 x, in case
 Catalogue No. 49 11 65
 Eyecups for the eyepieces (see illustration)
 Catalogue No. 46 49 00

At the left of the Microscope, condenser n. a. 0.9 Z with swing-out lens.

STAND GFL 65.-...*)

The circular base provides good stability for the Microscope. The low-voltage illuminator is installed in the base. A diaphragm insert, interchangeable with a mirror, rests in the opening on the upper surface of the base. If the Microscope is used in conjunction with our micro-projection equipment the lamp socket of the integral illuminator and the diaphragm insert in the round base must be removed so that the light from the carbon arc lamp can pass freely through the opening in the base.

The mechanism of the **coarse** adjustment acts on the tube carrier, that of the **fine** adjustment running in ball bearings on the stage carrier. The coaxial operating knobs due to their low location provide for a relaxed position of the focusing hand.

The condenser carrier is adjustable in height by rack and pinion and has a centering device for the condensers which are inserted from above. Two swing-out holders are attached below the condenser carrier, the lower one for light filters 32 mm. dia., the upper for an auxiliary lens supplementing the condenser.

The essential parts of the built-in illuminator (collector tube diaphragm insert, lamp socket and auxiliary condenser lens) belong to the basic equipment of STANDARD Microscopes.

The lamp socket with inserted pre-centered low-voltage bulb 6 V 15 W is pushed into the microscope base. In general the low-voltage bulb is fed from an alternating circuit by way of a plug-in transformer with secondary outlets of 5, 6, and 8 V or a regulating transformer with voltmeter. The arrangement of the built-in illuminator permits use of the **Koehler illuminating principle**. The light of the low-voltage bulb is so effectively utilized that sufficiently bright

* For explanation of model designations see pages 16/17.

images arise in phase contrast, dark field, and for photomicrography. For particular methods which require special light sources, e.g. for fluorescence microscopy, we recommend our multi-purpose microscope lamp. Various light sources can be inserted in this (see leaflet 40 – 340).

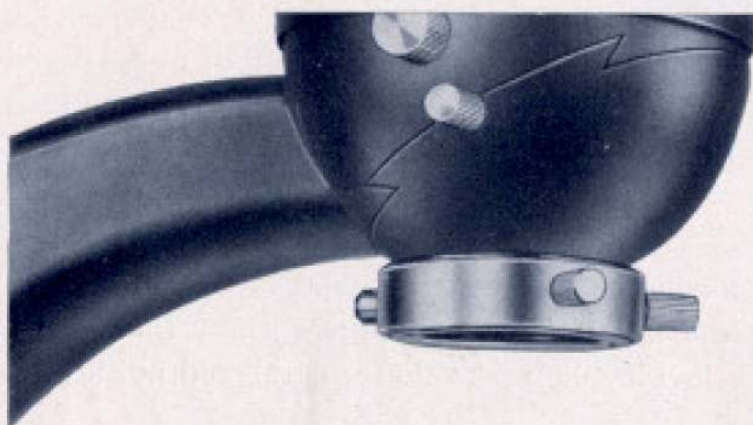


Fig. 4: Single objective carrier with centering device.



Fig. 5: STANDARD-stand GF with tube head with slide conveyor. The base contains the diaphragm insert and the built-in lamp. A swing-out illuminating mirror which can be attached to the diaphragm insert can be supplied on request.

TUBE CARRIERS

.. 4 - ...

.. 8 - ... *)

STANDARD Microscope GFL is generally furnished with a quadruple revolving nosepiece firmly attached to the tube carrier. Upon request, the stand can be equipped with a tube carrier with dovetail slideways for attaching a quadruple or quintuple revolving nosepiece on slider, Epi-condenser for incident light**) or single objective carrier with centering device (Fig. 4).

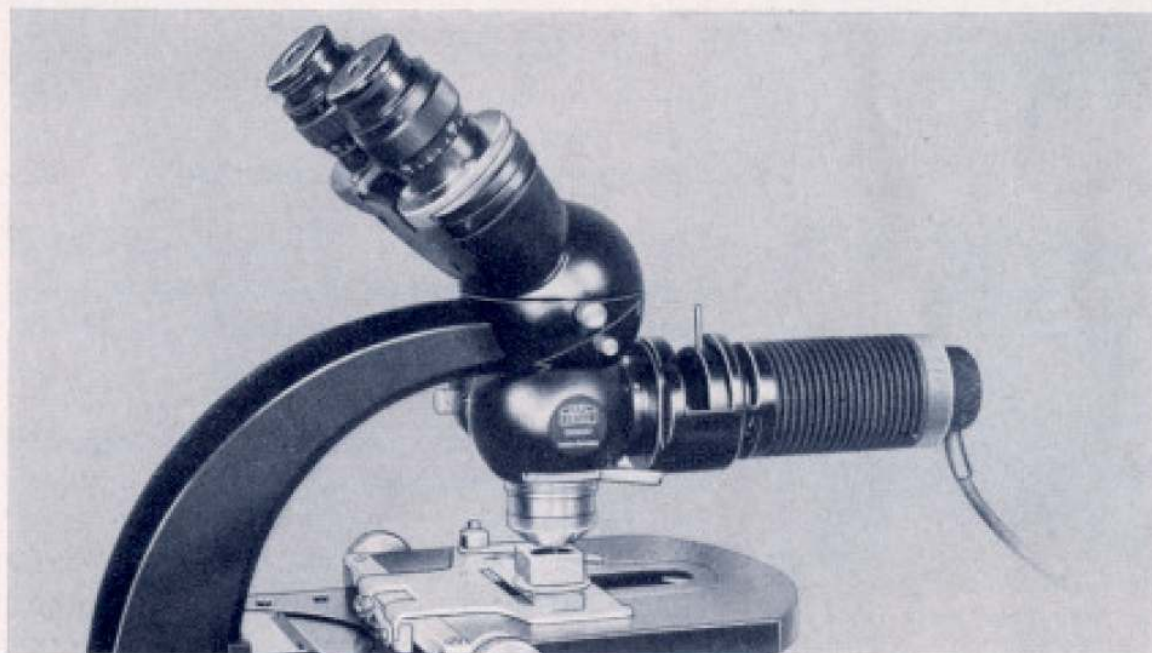


Fig. 6: Epi-condenser 11 A

Our revolving nosepieces are equipped with a large ball-bearing, positioned near the periphery, guaranteeing smooth, trouble-free operation. A special clickstop device insures precise engagement when rotating the nosepiece.

*) For explanation of model designation, see pp. 16 and 17.

**) Epi-condensers are described in detail in leaflet 40 - 650.

Stages

... - 52 .	... - 56 .
... - 53 .	... - 60 .
... - 54 .	... - 63 .

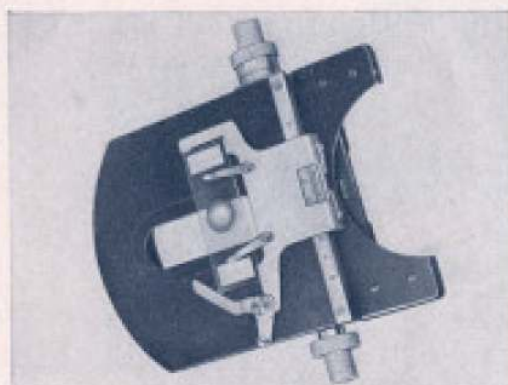


Fig. 7: Large rectangular mechanical stage 50/75 (stage 63)

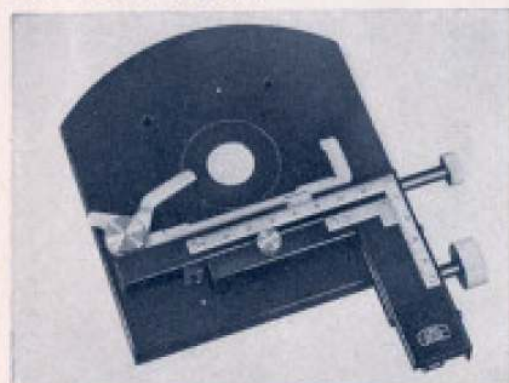


Fig. 8: Fixed rectangular stage (stage 60) with attached mechanical stage 24/75

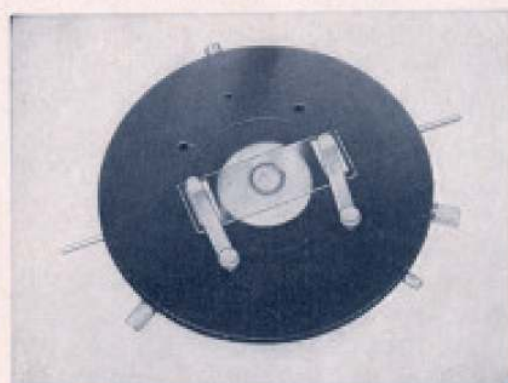


Fig. 9: Circular revolving and centering gliding stage (stage 54)

The large rectangular mechanical stage (63) has a range of 50x75 mm. Its pinion knobs are mounted coaxially and can be operated with either hand. Any given position of the stage can be read from the scales and verniers with a precision of 0.1 mm. The microscope slide holder is detachable and can be replaced by a holder for Petri dishes or larger slides (see Fig. 23, in front of the multi-purpose microscope lamp). In the same manner one of our heating stages can also be attached.

Two spring clips hold the microscope slide in position on the fixed rectangular stage (60). This stage frequently is supplemented by an attachable mechanical stage (see Fig. 6).

The revolving and centering gliding stage (54) has a circular stage plate of 15 cm. dia. which can be moved by hand in all horizontal directions. The most minute as well as larger displacements are equally readily carried out. This stage can also be supplied with graduated periphery and is then designated stage (57).

The circular centering revolving stage is supplied without graduation (stage 52) or with graduated periphery (stage 53) (illustration on next page).

The range of displacement is 50x75 mm. in the circular revolving and centering mechanical stage (56). It permits systematic search of slides as well as centered rotation, e. g. for general investigations in polarized light.

All circular stages fit into the same centering piece and are readily interchangeable. (The rectangular stages cannot be interchanged by the user.)

All stages without rack and pinion movement can be supplemented by an attachable mechanical stage, range of movement 24 x 75 mm. (Fig. 8). This can be furnished with or without graduation.

Catalogue Number for attachable mechanical stage with graduation 47 33 21
without graduation 47 33 20

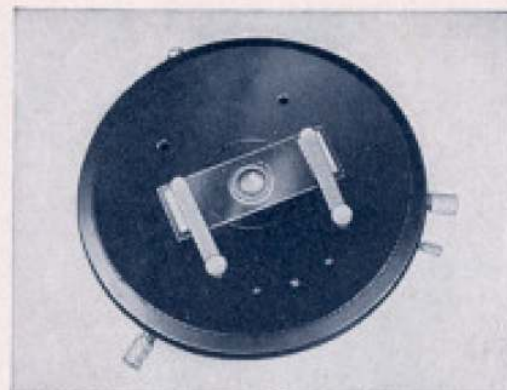


Fig. 10: Circular centering revolving stage (stage 52)



Fig. 11: Circular revolving and centering mechanical stage (stage 56)

Tubes

. . . — . . 1
. . . — . . 2
. . . — . . 3

The quick changer on the tube carrier provides for rapid and secure insertion and exchange of tubes and intermediate tubes. All tubes can be rotated in the tube carrier and thus permit viewing from any side. A spring plunger prevents the tube from slipping out, even if the clamping screw is not tightened.

Usually the inclined binocular tube (2) is used with STANDARD Microscope GFL. Binocular observation reduces eye strain and prevents premature fatigue. Our inclined binocular tube does not alter the total magnification of the Microscope. Its interpupillary distance is adjustable and the change in mechanical tube length brought about by so doing can be compensated by readjustment of the sleeves.



Fig. 12: Inclined binocular photo tube (3)

An inclined monocular tube (1) is available for monocular observation (Fig. 13), for photomicrography and binocular observation an inclined binocular photo tube (3) (Fig. 12).

The prisms in the inclined tubes are provided with a reflection-reducing coating. In addition we manufacture a series of tubes for special purposes, e.g. a straight tube for carrying an attachment camera, an inclined monocular tube with draw tube for measuring purposes, and a number of special tubes for polarizing measurements.

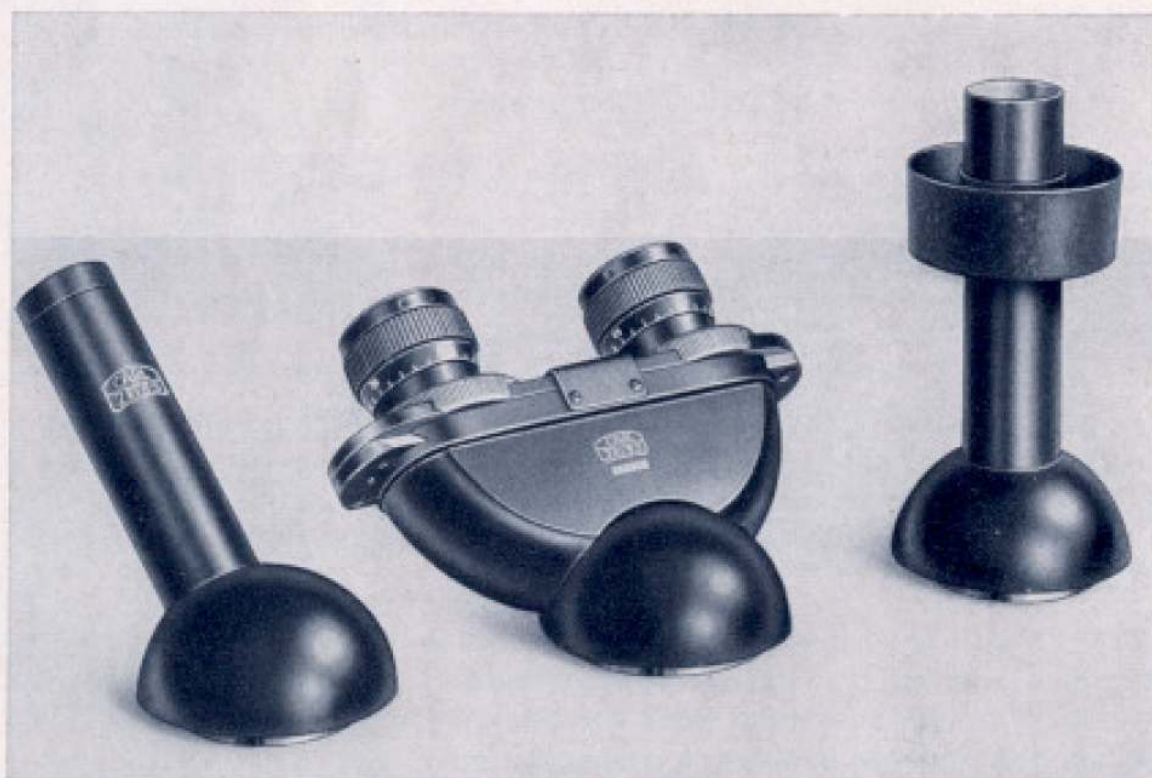


Fig. 13: Inclined monocular tube (1), inclined binocular tube (2), straight tube with light-excluding collar

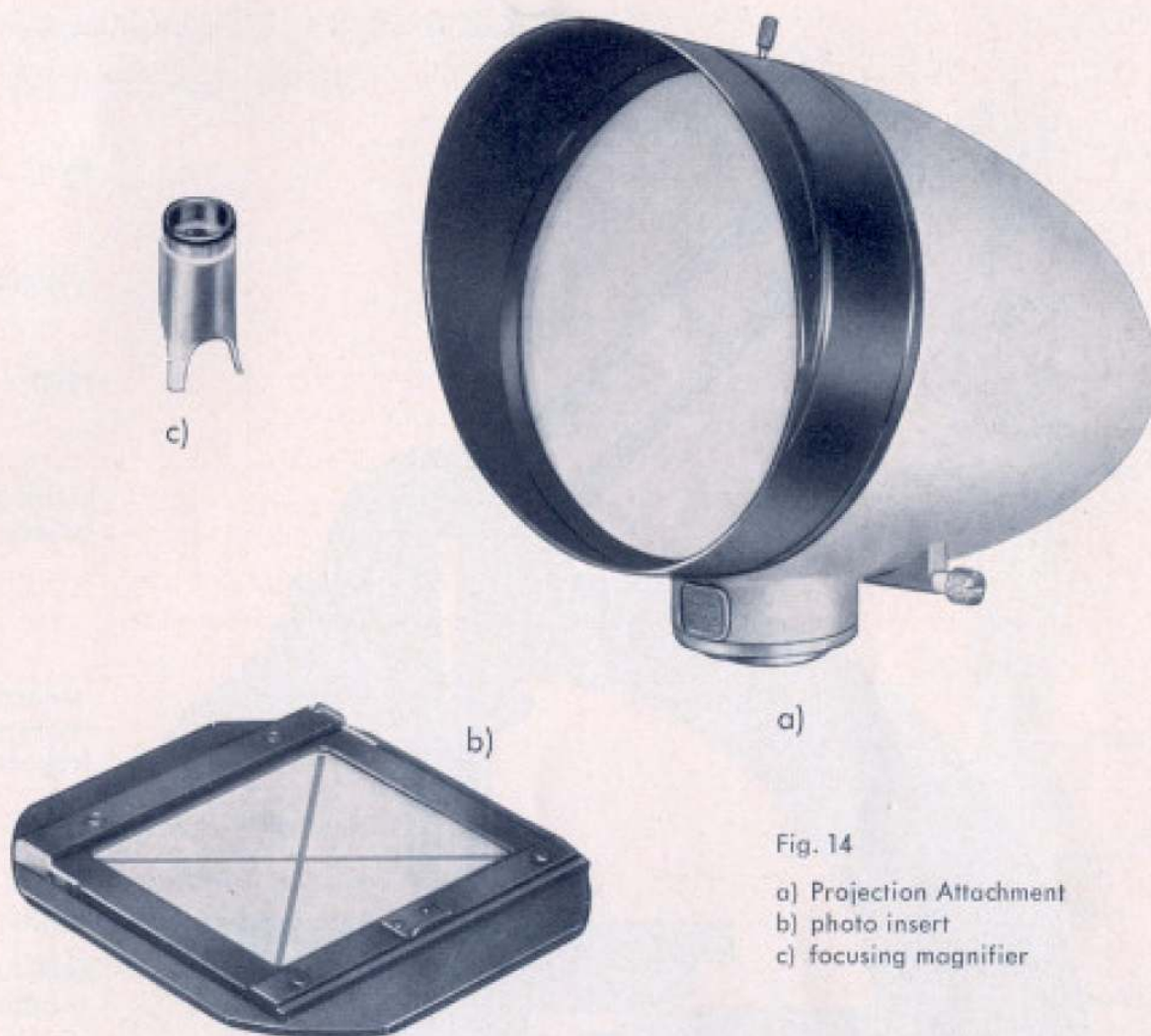


Fig. 14

- a) Projection Attachment
- b) photo insert
- c) focusing magnifier

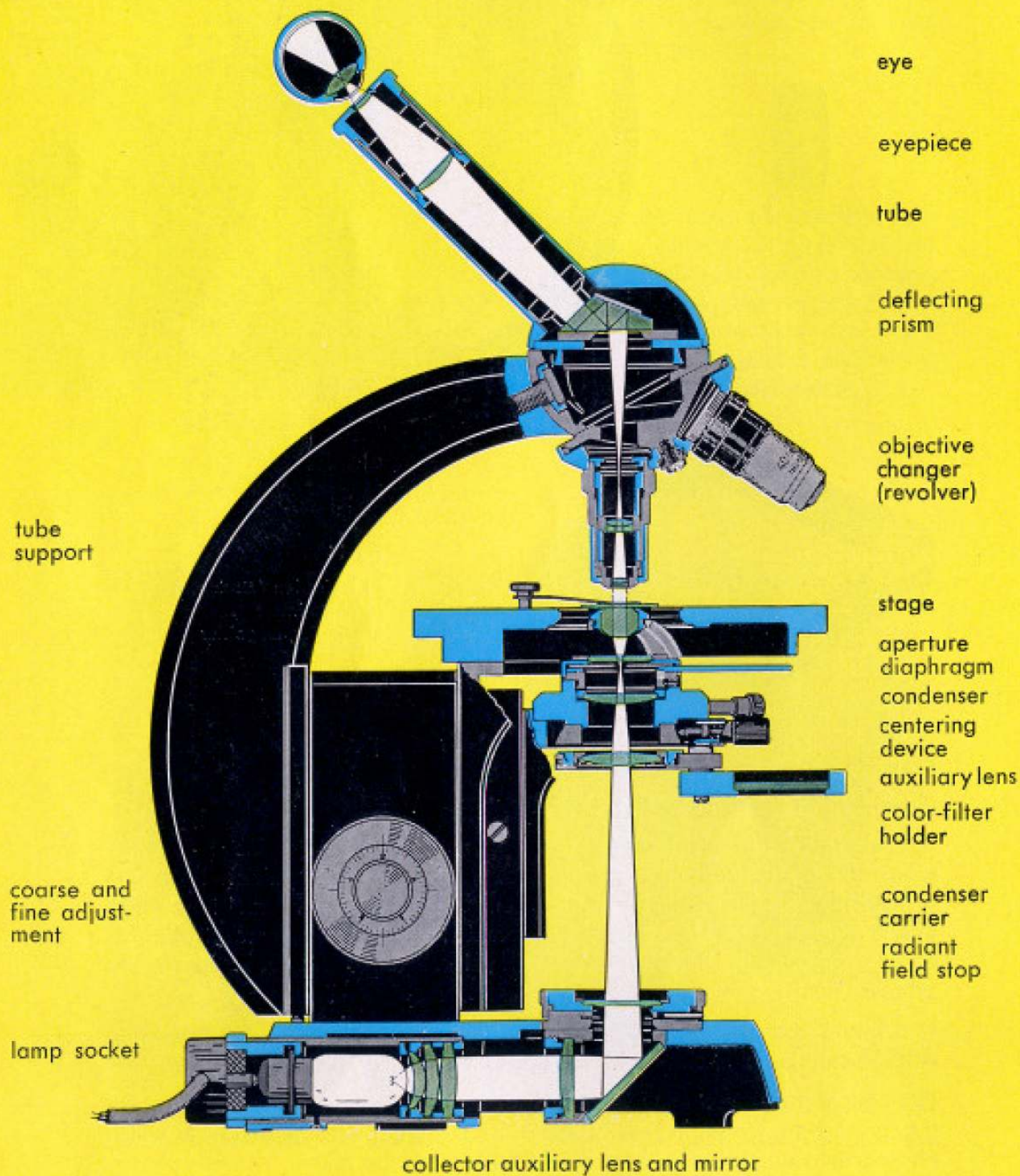
Projection Attachment and photo insert

(Described in detail in leaflet 40 - 360)

A Projection Attachment can be set up on the Microscope instead of the tubes described. The microscopic image is properly illuminated on the ground glass of the Projection Attachment by means of a Fresnel lens which has a diameter of 15 cm. This is an excellent solution for demonstration to small groups. Only dark specimens may have to be observed in slightly subdued light.

If a photo changer is placed between the tube carrier and the Projection Attachment, the tubes shown on the opposite page can also be attached.

Photomicrographs are easy to take with the Projection Attachment because the projection screen is easily replaced by the photo insert with which photographs on plates or sheet films 9 x 12 cm can be taken.



Section through STANDARD Microscope GFL
with path of rays

Path of rays in STANDARD Microscope GFL

L = Aperture diaphragms

They correspond to the planes in the path of rays which are conjugated to the light source.

L = light source

L' = condenser (aperture) diaphragm

L'' = exit pupil of the objective

L''' = exit pupil of the Microscope

O = Field of view diaphragms

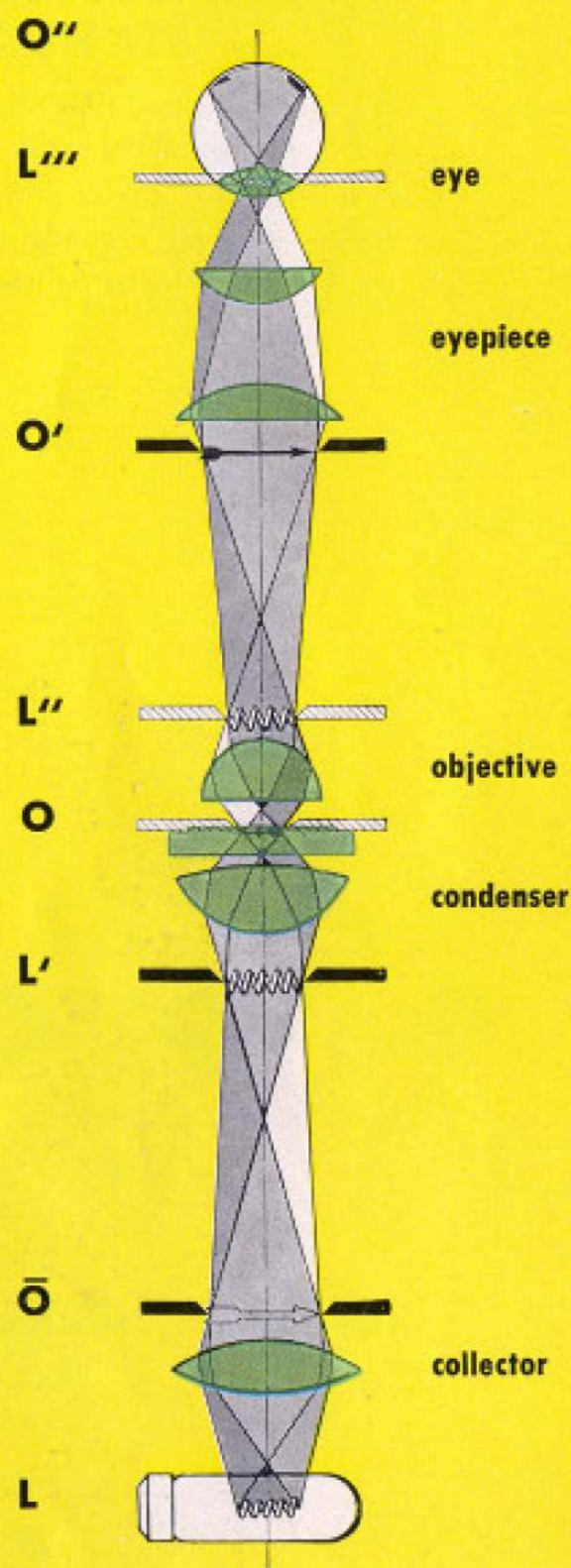
They correspond to the planes in the path of rays which are conjugated to the specimen.

$\bar{O}$ = radiant field stop

O = specimen

O' = true intermediate image

O'' = final image



Diagrammatic representation of the path of rays in STANDARD Microscope GFL

Explanation of the model designations for **STANDARD Microscopes**

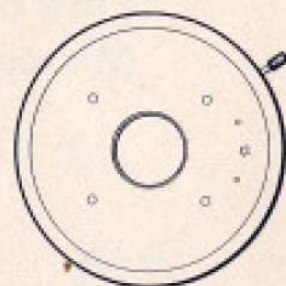
GF = coarse and fine adjustment

L = built-in illuminator

First digit (**6**) = circular base with built-in illuminator

Second digit (**5**) = condenser carrier with rack and pinion

The third digit indicates the tube carrier, the two digits following the hyphen designate the stage. The last digit refers to the tube.



52

Tube carrier

GFL 65 8 - 63 2

Stand

4
— Tube carrier with
quadraple revolving
nosepiece



8
= Tube carrier with
dovetail slideways



Swing-out
microscope
mirror (optional)

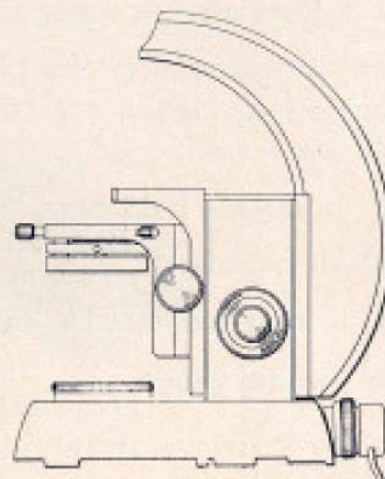
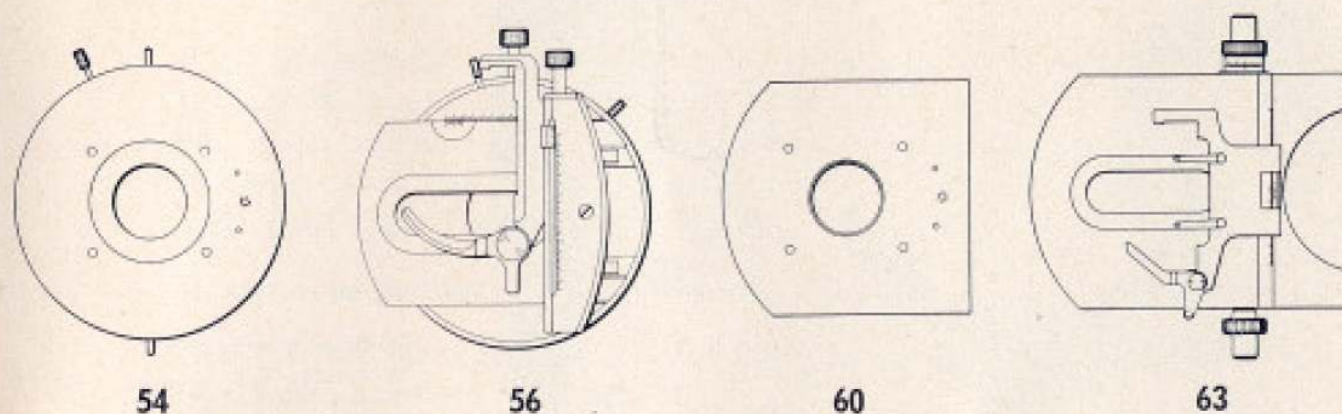


Fig. 17

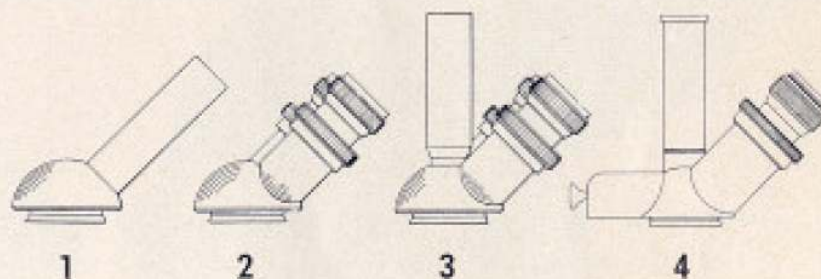


Stages

- 52 = circular centering revolving stage
- 53 = circular centering revolving stage with graduated periphery
- 54 = circular revolving and centering gliding stage
- 56 = revolving and centering mechanical stage
- 57 = revolving and centering gliding stage with graduated periphery
- 60 = fixed rectangular stage
- 63 = large rectangular mechanical stage

Tubes

- 1 = inclined monocular tube
- 2 = inclined binocular tube
- 3 = inclined binocular photo tube
- 4 = binocular photo tube with sliding prism



In addition the following tubes can be attached:

inclined monocular tube with draw tube
Catalogue No. 47 30 02

straight monocular tube for carrying the Attachment Camera
Catalogue No. 47 30 20

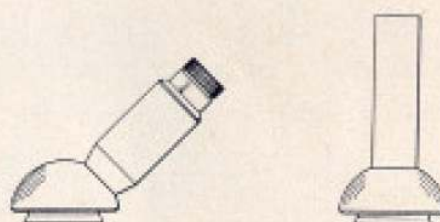




Fig. 18

Beam splitter for two observers. Two monocular or binocular tubes can be attached

Intermediate tube

serve for various purposes and are placed between the tube carrier and tube. They do not change the optical tube length of the Microscope.

The **Optovar** is a further development of the magnification changer mentioned on page 9. By turning a knurled disc the eyepiece magnification can quickly be changed in the steps 1 x, 1.25 x, 1.6 x, and 2 x. Thus, when using an eyepiece 8 x, the eyepiece magnifications 8 x, 10 x, 12.5 x, and 16 x are obtained with the Optovar. In so doing the sharpness of focus remains undisturbed. In addition, an Amici-Bertrand lens (auxiliary microscope) in the Optovar can be swung into the path of rays for checking the centering of the phase ring of the objective and the annular stop in the condenser in phase contrast investigations. Finally also an analyser can be switched in.

Optovar: Catalogue No. 47 30 50
Analyser: Catalogue No. 47 36 54

If the STANDARD Microscope is to be equipped for fluorescence investigation, an intermediate filter tube with 6 barrier filters and 2 neutral filters can be placed on the tube head. These filters are mounted on 2 superimposed revolving discs and can be brought into the beam of light singly or in combination (see Fig. 20).

Catalogue No. 47 30 53

By means of the **adapter for the tutoring tube**

Catalogue No. 47 30 57

and 2 monocular or binocular tubes (see illustration on opposite page) or with the **double eyepiece K 8 x with pointer**

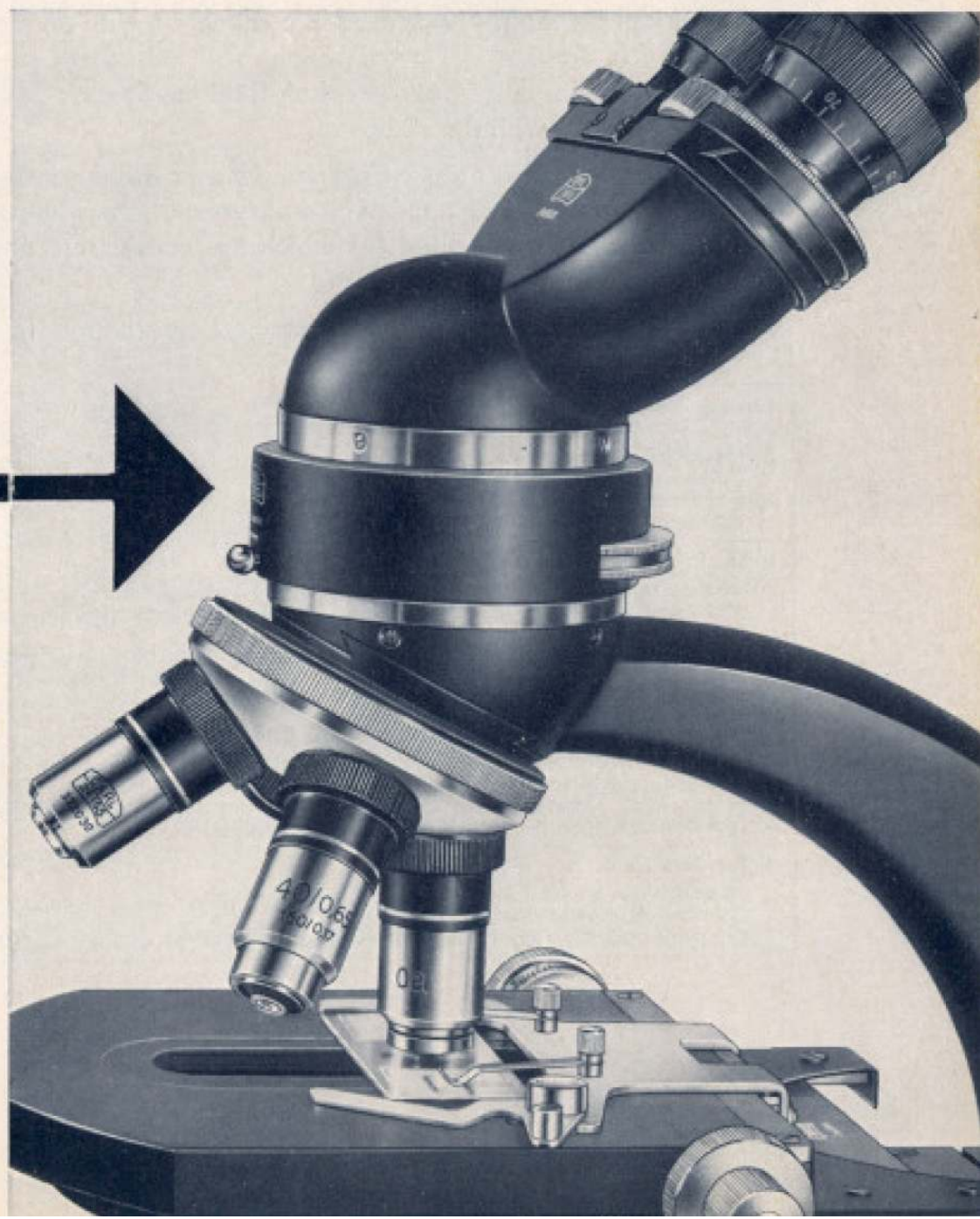
Catalogue No. 46 49 20

the STANDARD Microscope can be equipped for simultaneous observation by 2 persons.

OPTOVAR

Fig. 19

The OPTOVAR permits an easy change of eyepiece magnification in four steps and, in addition, contains an auxiliary lens, for checking the centering of annular stop and phase ring in phase contrast observations. An analyzer can subsequently be built in.



Condensers

The illumination of the microscopic specimen can be adapted to any microscopic procedure by selection of the appropriate bright-field or special condenser. In some of our condensers the front lens can be swung out. Thus large fields at low magnifications are quickly and conveniently fully illuminated. All bright-field and phase-contrast condensers are equipped with an iris diaphragm for cutting down the aperture. A condenser aperture of 0.9 suffices for normal bright-field investigations. Should an illuminating aperture above 1.0 be required, a condenser with a n. a. 1.3 is to be used. However, this aperture is obtained only if the front lens of the condenser is connected with the object slide by immersion oil.

For dark-field investigations with immersion objectives we produce an **ultra-condenser**, a doubly reflecting condenser with the requisite good chromatic and spherical corrections. It is used in conjunction with an immersion objective having an iris diaphragm. Investigations with objectives of lower power can be carried out with one of our **dry dark-field condensers** which do not require immersion contact with the slide.

The aperture values for dark-field condensers listed in the table below indicate the minimum and maximum apertures of the illuminating beam. The aperture ranges of objectives for which the condensers are specially suited are enclosed in parentheses.

Phase-contrast condensers are described in detail in leaflet 40-160

Condensers for centering condenser carrier Z (e. g. STANDARD GFL):	
a) for bright field Condenser n. a. 0.9 Z with swing-out front lens Condenser n. a. 1.3 Z with swing-out front lens achromatic-aplanatic condenser n. a. 1.4 Z	Catalogue No. 46 52 52 46 52 53 46 52 57
b) for bright field and phase contrast phase-contrast condenser II Z (0.9/swing-out lens) with green filter, in case phase-contrast condenser IV Z/6 (with long focal intercept) with green filter and ground glass, in case achromatic-aplanatic phase-contrast condenser V Z with interference broad-band filter green $\lambda = 546 \text{ m}\mu$ and condenser auxiliary lens IV, in case	48 52 70 48 52 81 48 52 77
c) for bright field, phase contrast, and dark field bright-field, phase-contrast, dark-field condenser III Z with green filter and ground glass, in case bright-field, phase-contrast, dark-field condenser III Z/6 (also for long focal intercept) with green filter and ground glass, in case	48 52 80 48 52 71
d) for dark field ultracondenser 1.1/1.4 Z (0.75 - 1.0), in case dry dark-field condenser 0.85/0.95 Z (0.6 - 0.75), in case dry dark-field condenser 0.65/0.85 Z (0.4 - 0.6), in case	48 55 01 48 55 15 48 55 07

Objectives

During recent years all of our objectives have been recomputed with utilization of latest knowledge. Above all, importance was attached to a far-reaching reduction of image curvature. In order to eliminate defects during use, the chromatic magnification difference, which cannot be eliminated in the objective itself, especially not in high-grade systems, was brought to a uniform value in all objectives and compensated by the eyepiece. Therefore our objectives should be employed exclusively with the eyepieces computed for them in our program. Only then will one obtain an optimum image. The magnifications were so selected that the user has available a series of appropriately graded total magnifications. With the exception of a few special objectives all are parfocalized, so that upon turning the revolver the image immediately appears in the eyepiece. At most a slight movement of the fine adjustment is required to re-establish maximum sharpness.

The more powerful systems are set in resilient mounts, providing perfect protection for slide and objective front lens.

Our **Achromats** are as well corrected as is at all possible for this simple type. Generally they are used with C-eyepieces. The residual image curvature still present in Achromats is completely eliminated in the **Planachromats**. Hence they are specially suited for photomicrography.

NEOFLUARS are objectives whose image excellence, through use of fluorite, has been substantially improved compared to that of the Achromats.

The **Apochromats**, developed 1886 by Ernst Abbe, are most perfectly corrected, spherically and chromatically. Beyond that the new **Planapochromats** equalize the image curvature still present in the Neofluars and customary Apochromats.

Phase-contrast objectives (Ph) are used in conjunction with our phase-contrast condensers. They differ from standard objectives in that a phase ring is mounted in their focal plane.

Unless they are engraved with "o.D." (ohne Deckglas = without cover glass) our microscope objectives are computed for cover glasses 0.17 mm. thick. Dry

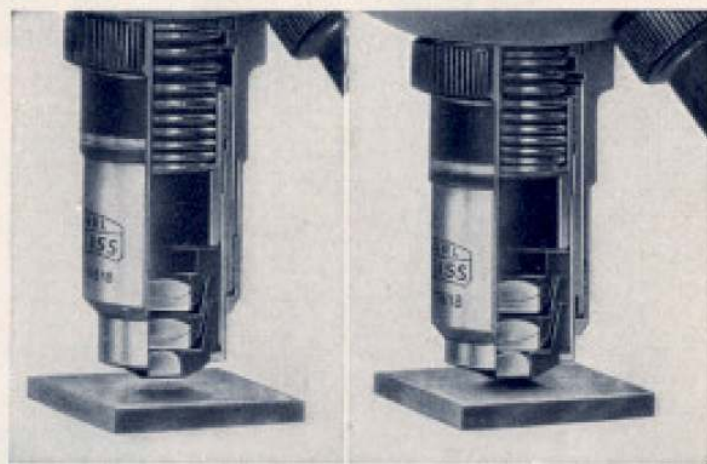


Fig. 20: The more powerful objectives are set in resilient mounts. These retract if the objective strikes the cover glass and thus provide perfect protection for slide and objective front lens.

objectives so corrected having an aperture above 0.4 give the best images only with 0.17 mm. cover glasses. Objectives with an aperture below 0.4 are equally suitable for covered and uncovered objects.

Special strain-free objectives for photoelastic measurements are described in leaflet 40-550. Special objectives for use with epi-condensers will be found in leaflet 40-650.

A plastic bottle for immersion oil accompanies each immersion objective. It facilitates precise dosage of the oil and neat handling.

The series of our objectives are listed in the following tables. It is to be noted that the development has not yet been completed, and that still existing gaps will be filled in due time.

Fig. 21: Bright-field, phase-contrast, dark-field condenser III Z 6 with centering telescope (left), phase-contrast objectives, and C-eyepieces.



Microscope objectives

for transmitted-light microscopy, in standard mount,

dry objectives corrected for the observation of objects covered with a cover glass, cover glass thickness $D = 0.17$ mm.

immersion objectives (= oil) and objectives having an aperture below 0.4 are insensitive to changes in cover glass thickness

Magnification Number	Achromats	Plan-achromats	NEOFLUARS	Apo-chromats	Planapo-chromats
1.0 black		0.04 46 20 10			
2.5 brown		0.08 46 01 10			
4.0 red					0.16 46 02 40
6.3 orange	0.16 46 03 00	0.16 46 03 10	0.20 46 03 20		
10 yellow	0.22 46 04 00 "Ph" 46 04 01	0.22 46 04 10	0.30 46 04 20		0.32 46 04 40
16 light green	0.32 46 05 00 0.40 oil 46 15 06 "Ph" 46 05 01	0.32 46 05 10	0.40 46 05 20 "Ph" 46 05 21		
25 dark green	0.45 46 06 00 "Ph" 46 06 01	0.45 46 06 10 "o.D." 46 06 60	0.60 46 06 20 "Ph" 46 06 21	0.63 44 01 54	0.65 46 06 40
40 light blue	0.65 46 07 00 0.85 oil 46 17 06 0.75 water 46 17 02 "Ph" 46 07 01 "Ph" 46 17 03	0.65 46 07 10 "o.D." 46 07 60	0.75 46 07 20 "Ph" 46 07 21	1.0 oil 46 17 36 with iris "Ph" 46 17 37 with iris	
63 dark blue		0.90 corr. 46 08 12 "o.D." 46 08 60	0.90 corr. 46 08 22 "Ph" 46 08 23		
100 white	1.25 oil 46 19 00 "Ph" 46 19 01	1.25 oil 46 19 10	1.30 oil 46 19 20 "Ph" 46 19 21	1.32 oil 46 19 30 "Ph" 46 19 31	1.32 oil 46 19 40
100 iris white	1.25 oil 46 19 06	1.25 oil 46 19 16		1.32 oil 46 19 36	

The color specifications (1st vertical column) refer to the colored marking rings on the objectives. The first number in the fields of columns 2-6 indicates the aperture, the second the Catalogue Number. "Ph" (= phase-contrast objectives) on blue field, "o. D." (without cover glass correction)-objectives on yellow field.

Eyepieces

All eyepieces have been computed anew. Also simple types are so constructed that they compensate the chromatic magnification difference of the objectives. In the series of "Komplan" eyepieces importance was attached to flattening the image field of the eyepiece as much as possible in order to achieve an optimum effect in conjunction with our "plan" objectives.

Eyepieces

in standard mount 23.2 mm. dia. with compensating effect, suited to all of our more recent microscope objectives, whose primary image lies 10 mm. below the upper end of the eyepiece tube. (S = field of view number, FK = photocompensating eyepiece; the number below the field of view number is the Catalogue Number.)

Magnification	f = mm.	C-eyepieces	Kpl-eyepieces	FK-eyepieces
5 x	50	S = 20 46 37 10		S = 18 45 21 40
6,3 x	40	S = 18 46 38 10		S = 16 45 21 41
8 x	32	S = 16 46 39 10	S = 18 46 39 20	S = 16 46 39 33
10 x	25	S = 16 46 40 10	S = 16 46 40 20	S = 16 46 40 33
12,5 x	20	S = 12,5 46 41 10	S = 12,5 46 41 20	
16 x	16		S = 10 46 42 20	
20 x	12,5		S = 8 46 43 20	
25 x	10		S = 6,3 46 44 20	
Eyepieces for spectacle wearers				
8 x	32		S = 18 46 39 22	
12,5 x as above	20		S = 12,5 46 41 20	
Kpl wide- angle eyepiece 12,5	20		S = 18,5 46 41 42	

Eyepieces

with adjustable eyelens for measuring, counting, also with pointer (the optical systems are the same as in the standard eyepieces).

		8 x	12.5 x	20 x
Eyepieces with adjustable eyelens (for insertion of graticule discs 17 mm. dia. see below.)	C	S = 16 46 39 13	S = 12.5 46 41 13	
	Kpl	S = 18 46 39 23	S = 12.5 46 41 23	S = 8 46 43 23
Eyepieces with pointer	C	S = 16 46 39 18		
	Kpl		S = 12.5 46 41 28	

Special eyepieces

Goniometer eyepiece with Kpl 8 x (precision of reading 0.2°)

Counting eyepiece with Kpl 8 x (with adjustable square diaphragm)

Integrating eyepiece Kpl 8 x with graticule I (test-point graduation)

Integrating eyepiece Kpl 8 x with graticule II (length graduation)

Eyepiece screw micrometer K 8 x

Eyepiece screw micrometer K 16 x

Double eyepiece K 8 x with pointer for two observers

Eyepiece graticules 17 mm. dia.

to be placed in eyepiece with adjustable eyelens and in photokomplan eyepieces 8 x and 10 x:

Eyepiece micrometer 5 : 100 (5 mm. scale)

Eyepiece micrometer 10 : 100 (10 mm. scale)

Contrast micrometer 10 : 100/200

Line contrast micrometer 10/100

Net micrometer 10 x 10/20

Cross line graticule

Stage micrometers

Stage micrometer, positive 5 + 100/100 mm., in case

Stage micrometer, negative 5 + 100/100 mm., in case

Catalogue Number

46 39 74

46 39 71

47 40 36

47 40 37

46 39 72

46 42 72

46 49 20

47 40 10

47 40 11

47 40 12

47 40 13

47 40 14

47 40 16

47 40 20

47 40 21

Photomicrographic Cameras

Our **Attachment Camera** is mounted on the straight tube of the binocular photo tube and firmly connected with this to the Microscope (see Fig. 23). However, it can also be mounted on a supporting arm and swung over the Microscope as needed. In that case the Microscope is set on a base plate. A system of interchangeable parts meet all requirements. There are available e. g. basic bodies with fixed beam splitting prism or with a variety of beam splitting prisms can be moved into the path of rays.

The photographs can be taken with a 35 mm. film attachment or with a miniature camera, e. g. the Contax, or with a 6.5 x 9 cm. plate attachment. A light measuring device eliminates the necessity of trial exposures after a single calibration. It is indispensable for photomicrographs on color film.

In addition to the Attachment Camera we supply a 9 x 12 cm. Universal Camera (bellows camera). It is extensively adaptable to the most varied requirements of photomicrography.

Fig. 22:

The STANDARD Microscope GFL is also used in conjunction with the large fluorescence outfit (Medical Research Institute of the Max Planck Society, Goettingen, Silicosis Division).



The following publications describe a number of supplementary devices for STANDARD Microscope GFL:

- 40-160 Phase-contrast Devices
- G 40-165 Dark-field Condensers
- 40-171 Heating Stages for Microscopes
- G 40-180 Measurement of Lengths by the Microscope
- 40-195 Integrating Eyepieces
- 40-215 Fluorescence Microscopes
- 40-310 Drawing Apparatus
- 40-340 Microscope Illuminators
- 40-360 Projection Attachment
- 40-370 Micro-projection Apparatus
- 40-410 Attachment Camera
- 40-480 9x12 cm. Universal Camera
- 40-520 Pupillary Spectroscope
- 40-585 Polarizing Filters
- 40-650 Apparatus for Epi-microscopy

Wall charts showing the path of rays through the STANDARD Microscope (see pages 14/15) are available to those interested.

In addition we manufacture the following special Microscopes and special equipment for microscopy, described in publications:

- 40-250 Plankton Microscope
- 40-375 Revolver Micro-projection Apparatus
- 40-380 Television Microscope
- 40-430 ZEISS PHOTOMICROSCOPE
- 40-451 Camera Microscope ULTRAPHOT II
- 40-550 Apparatus for Polarization Microscopy
- 40-660 STANDARD Metal Microscope
- 40-705 Stereomicroscope

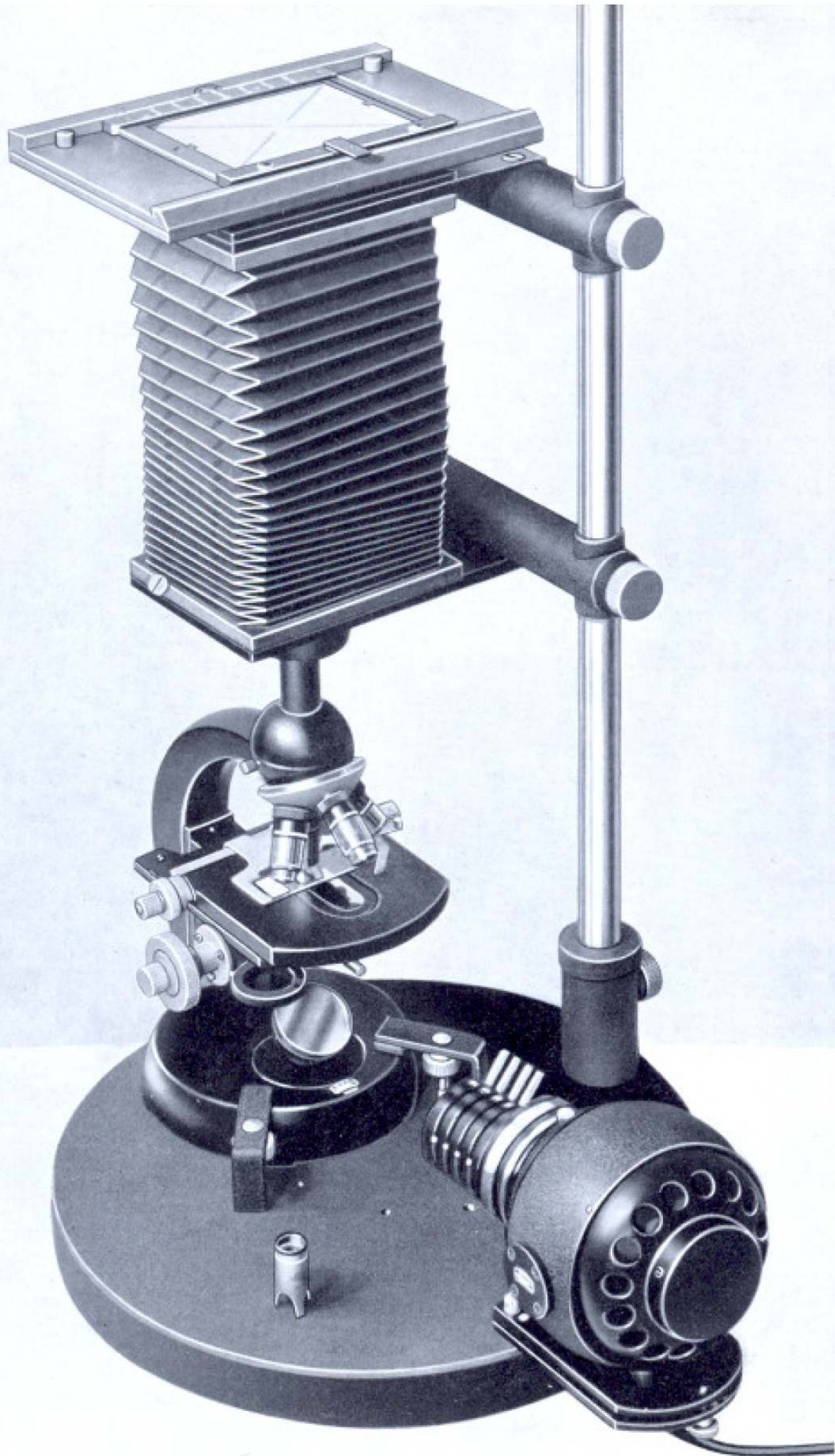
Illustrations are not binding in all details for the construction of the instruments. Photographs suitable for reproduction or electros will be gladly supplied for scientific publications. Reproductions of illustrations or text without our consent is not permitted.

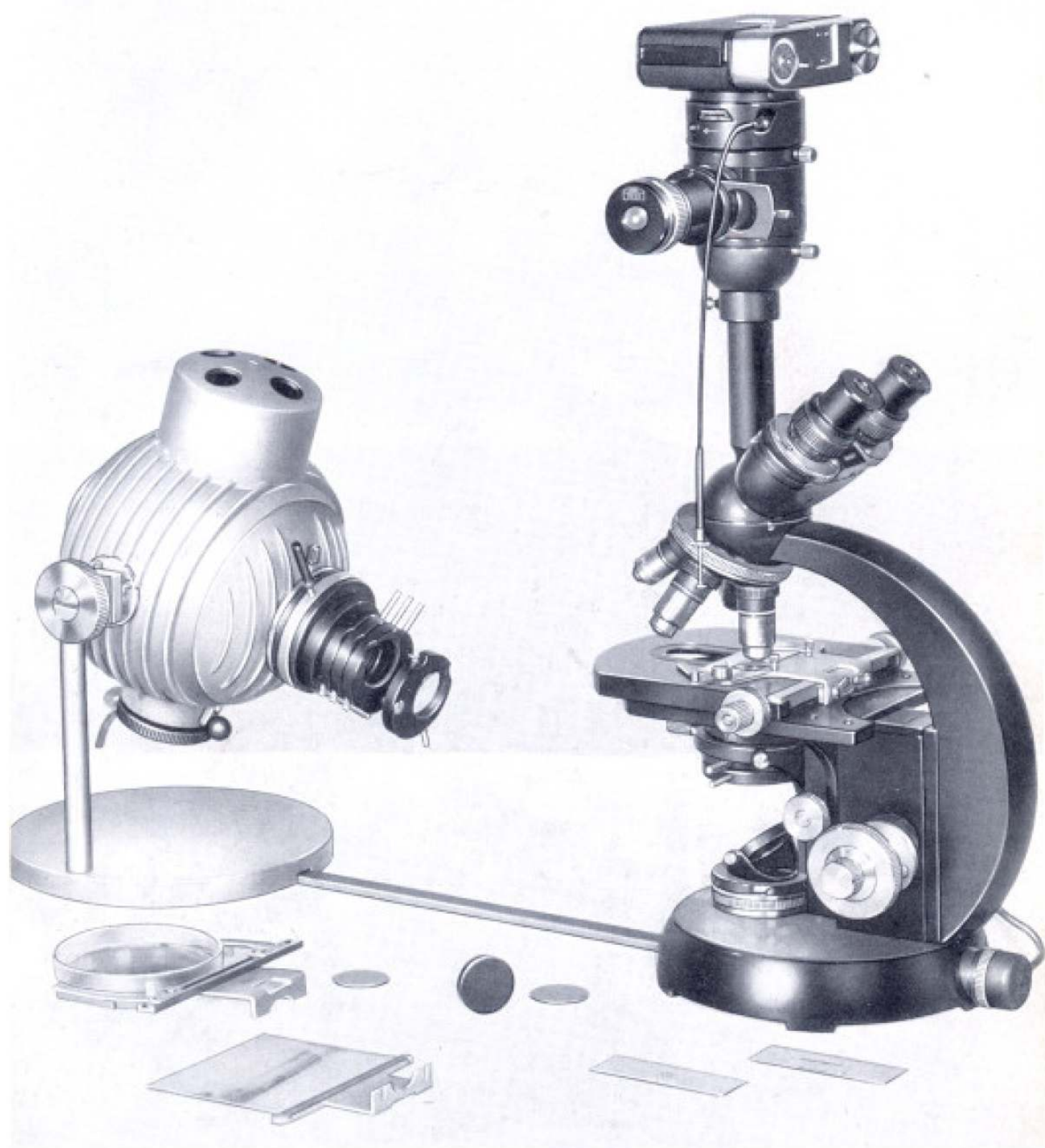
On the back cover Fig. 23:

The Attachment Camera may be left on the Microscope during observations provided it is mounted on the photo tube having an inclined binocular observation tube.

If the intensity of the illuminator installed in the Microscope is insufficient, a multi-purpose microscope lamp can be rigidly joined to the Microscope by means of a connecting rail.

Fig. 24: Universal Camera with multi-purpose microscope lamp





The illustrations are not binding in all details for the construction of the instruments.

Electros, or reductions of same when available, are supplied for scientific publications.

Reproduction of illustrations or text without our consent is not permitted.

Kindly consult our nearest branch (in the German Federal Republic), ZEISS representative (abroad) or CARL ZEISS, Oberkochen, Wuerttemberg, direct regarding all questions of functioning, maintenance, and repair of our instruments, as well as for the procurement of spare parts.



CARL ZEISS Oberkochen/Württ.

CARL ZEISS INC.

485 FIFTH AVENUE
NEW YORK

Delivery Programme:

Microscopes for all Fields of Application in Science and Technics • Electron Microscopes • Instruments for Particle Size Analyse • Ophthalmological and Medical-Optical Instruments • Optical-Physical Measuring Instruments • Interferometric Instruments • Precision Measuring Instruments for Workshop and Control Room • High-Voltage Units • Surveying Instruments • Magnifiers • Binoculars • High-Performance Objectives • Spectacle Lenses, Sun Glasses • Astronomic Telescopes and Planettaria