

**LEITZ LABOVERT**

**Inverted transmitted light microscope**



# Leitz LABOVERT

## An exceptional inverted microscope with unsurpassed handling

The LABOVERT inverted transmitted-light microscope belongs to a revolutionary new series of instruments from Leitz which combines the operating advantages of the inverted microscope with the familiarity of the conventional stand. In particular, the ease of access to the object stage and an unhindered view of the specimen from the normal observation position allow appreciably simpler handling of the object, either manually or with micromanipulators. The focusing knobs, the stage movement controls and the observation port are all placed in the same ergonomically-favourable positions as on a conventional Leitz microscope; this, together with the availability of accessory armrests, optimizes the relaxed and simple operation of the LABOVERT and makes it extremely suitable for applications in scientific/diagnostic microscopy and in extended inspection processes.

The instrument possesses an exceptionally large specimen space, and holders for a wide variety of laboratory containers can be inserted into the object guide. The optical performance, as with all Leitz microscopes, is exemplary, the range of eyepieces and long-working-distance objectives allowing large fields (field of view index up to 22.5) and work in brightfield, darkfield, phase contrast, interference contrast, polarized light or oblique illumination.

The LABOVERT system is, therefore, tailor-made for the typical applications of an inverted microscope and guarantees wide-ranging suitability in research and routine work. In particular, it is the first choice instrument for observation and control of:

Immunological reactions in microtest- or microtiterplates, i. e. HLA,

Cell or tissue growth in petri dishes, culture flasks, tissue-culture plates amongst others in biotechnology, genetics or gene technology,

Plankton and other small organisms in plankton chambers or other containers,

Pharmacological processes,

Chemical reactions,

Pollution control (water or air),

Foodstuffs,

Toxicological investigations,

as well as other similar specimens.

The Leitz customer, however, has available not only the technical advantages of a high-performance instrument. Right from the start, he belongs to a world-wide community of Leitz users who are looked after by a specially structured advisory, maintenance and repair service. For Leitz, this, too, belongs to the meaning of quality. And quality gives confidence.





LABOVERT with FSA tube, S 50 special condenser, object guide and lamphousing 20

# Leitz LABOVERT

## Combines the advantages of conventional and inverted microscopes

The LABOVERT is an inverted transmitted-light microscope with the features of a modern upright Leitz instrument and offers, therefore, all the ergonomic advantages that one is used to from the latter. Only the different positions of the objective revolving nosepiece and the condenser indicate that the light path has been reversed.

The controls are positioned as on the more usual Leitz microscopes, where they have been placed in the course of time in the most functional and convenient locations. The LABOVERT user does not, therefore, need to adapt his familiar way of working. These controls consist of:

- coaxial coarse and fine focus, mounted on both sides of the stand for left- and right-handed use;

- coaxial mechanical stage adjustment, for movement of the specimen in both x- and y-directions;

- an adjustable focus stop (protects the objectives and specimen from damage due to contact during focusing);

- a brightness regulator for the 6V 20W halogen lamp.

The low position of the stage allows the operator a direct view of the stage surface, making specimen insertion, positioning and manipulation very much easier. The cleanliness of the front objective elements, which is extremely important for image quality, can be readily checked and maintained from the operator's normal observation position. The highly-recommended accessory armrests, which can be mounted on both sides of the stand base, allow a relaxed body position and therefore longer and more concentrated observation periods.

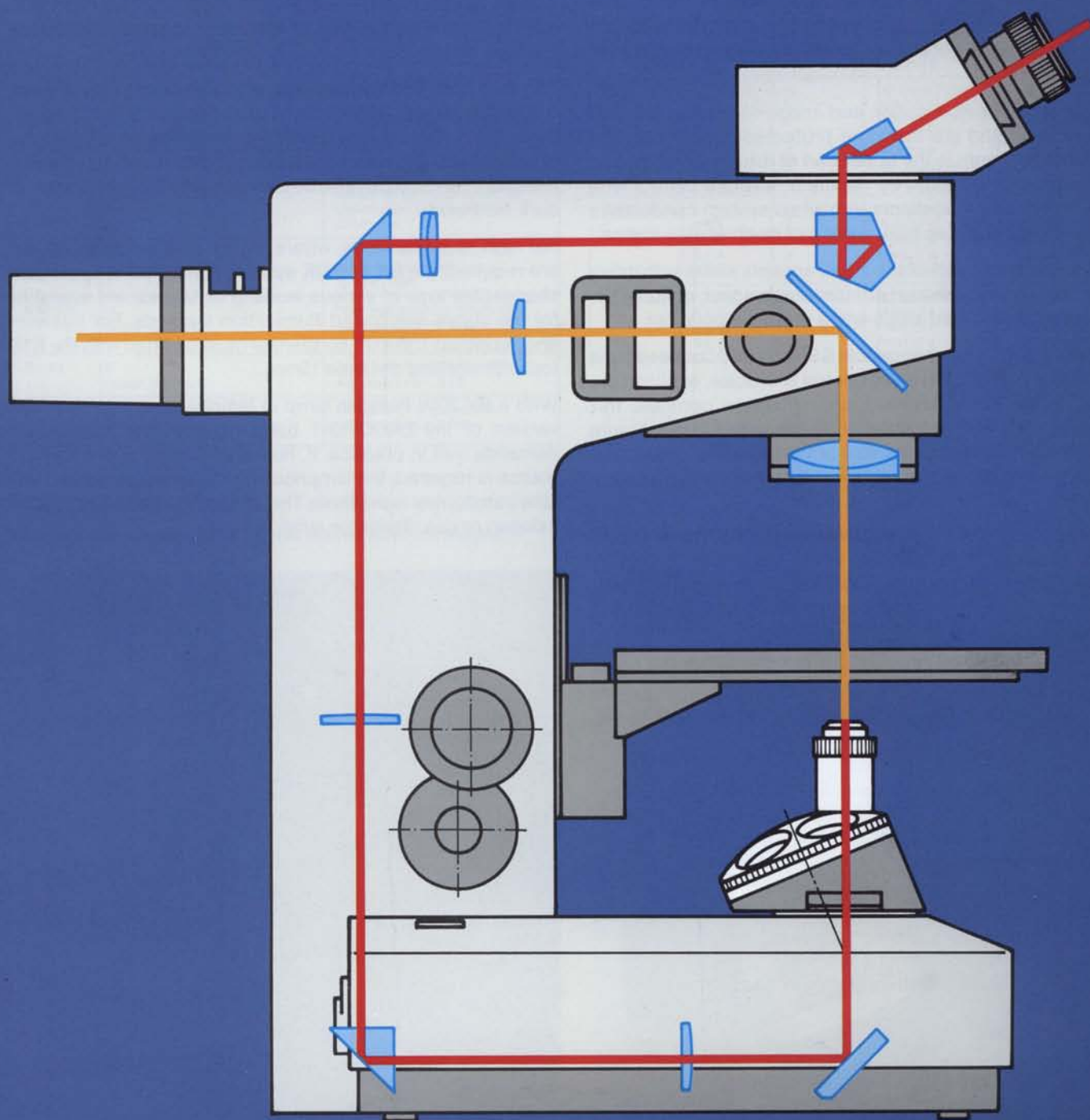
Right:

Ray path diagram illustrating the REINHEIMER principle in inverted microscopes whereby the illuminating and image forming beams cross at a point in space, so allowing transmitted- and incident-light observation in an inverted system with an orthodox stand design.



LABOVERT with armrests





# Leitz LABOVERT

## A unique design incorporating advanced technology

With a design using the REINHEIMER principle, the LABOVERT offers not only the advantages of conventional upright Leitz microscopes, but also technical innovations designed to aid actual use.

The elements for illumination and image-formation are built into the stand and are therefore protected against dirt. The aperture diaphragm in the upper part of the stand, which can be reproducibly adjusted by means of a rotary control with scale, works as a field diaphragm when system condensers are used and facilitates easy setting of Koehler illumination.

A slot in the upper part of the stand accepts slides with interchangeable phase contrast annular diaphragms, oblique illumination and dark field stops and a rotatable polarizer.

The height of the interchangeable S95 and S50 condensers is adjusted by means of a rotary control with scale, enabling the setting to be exactly reproduced. In phase contrast, this adjustment allows the diameter of the annular diaphragm image to be matched to the size of the objective phase ring, thus optimising study of objects with liquid layers up to 45mm deep.

The large object space allows specimens in **containers up to 95mm in height** to be studied, whilst the depth of 115mm, measured from the optical axis to the stand, means that investigation of samples in oversize microtiter-, tissue culture and macroplates is possible.

The attachable **mechanical stage**, with coaxial drive controls providing an adjustment range of 127x83mm, was developed to accept **interchangeable laboratory container holders**.

These are available for:

**Standard size slides**, 76x26mm

**Microtest plates**, 82x56mm with 60 or 72 cells

**Microtiter plates**, 127x82mm with 96 cells

**Tissue culture plates**, 136x92mm with 384 cells

**Tissue culture plates**, 127x88mm with 24 cells

**Culture flasks**, size 1, 125x77mm

**Culture flasks**, size 2, adjustable for 82x37mm, 80x40.5mm and 77x51.5mm

**Hamax plates**, 93x67mm

**Petri dishes**, 35mm, 60mm or 94mm in diameter

**Plankton cells**

**Bellko test tubes**

Further special holders are planned.

A large range of **condensers** with various working distances allows optimal illumination of the specimen, independent of the type of container.

The **S95 and S50 condensers**, with numerical apertures of 0.20 and 0.30 and working distances of 95 and 50mm respectively, are suitable for objectives with magnifications from 2.5x in bright-field, phase contrast, polarized light and oblique illumination. The S50 can also be used for large working distance dark-field work.

For high magnifications, where higher condenser apertures are required, the **SK and UK system condensers**, with interchangeable tops of various working distances, are available for the above mentioned illumination methods. For interference contrast T, the UK condenser must be fitted with the S15 top with working distance 15mm.

With a 6V 20W halogen lamp in lamphousing 20, the basic version of the LABOVERT fulfils most of the illumination demands met in practice. If, however, a more powerful light source is required, the lamphousing 102Z with separate variable transformer is available. This can be fitted with a 12V 100W halogen or gas discharge lamp.



#### Tops for SK and UK system condensers

Condenser-top	Top position in/out	Application
0.90 S 1.1	Out (suppl. lens in)	For objectives with aperture $< 0.25$
0.90 S 1.1	In (suppl. lens out)	For objectives with aperture $> 0.25$
Ö1.32	In (suppl. lens out) Immersion oil on front element of top	For oil 100/1.32 objective, when the objective aperture should be fully illuminated for observation of very fine structures
0.70 S 4	In (suppl. lens out)	Intercept distance 4mm. For study of specimens up to 4mm high
0.55 S 15	In (suppl. lens out)	Intercept distance 15mm. For study of specimens up to 15mm high
D 0.80	In (suppl. lens out)	Dark-field. For objectives with aperture $< 0.75$
D 1.19	In (suppl. lens out)	Dark-field. For objectives with aperture $> 0.75$

#### UK universal condenser

Condenser top	Annular diaphragm	Turret setting	Objective with engraving	Application
0.90 S 1.1	– 1 S 1.1 2 S 1.1 3 S 1.1 4 S 1.1 DF S 1.1	H 1 2 3 4 5	(all objectives) PHACO 1 PHACO 2 PHACO 3 PHACO 4 (all objectives) aperture $< 0.75$	bright-field phase contrast phase contrast phase contrast phase contrast dark-field
0.70 S 4	– 1 S 4 2 S 4 3 S 4 4 S 4	H 1 2 3 4	(all objectives) PHACO 1 PHACO 2 PHACO 3 PHACO 4	bright-field phase contrast phase contrast phase contrast phase contrast
0.55 S 15	– 1 S 15 2 S 15 4 S 15	H 1 2 4	(all objectives) PHACO 1 PHACO 2 PHACO 4	bright-field phase contrast phase contrast phase contrast

#### Slides with annular diaphragms, oblique stop, polarizer and analyser



#### Holder with system condenser SK



# Leitz LABOVERT

## A comprehensive tube range provides adaptability

All observation and photo tubes on the LABOVERT are rotatable through 360° and can be clamped in any position.

The **binocular observation tube S**, with a viewing angle of either 30° or 45°, allows the interpupillary distance to be adjusted between 55 and 75mm.

The **binocular photo tubes FSA** and **FSA-R** combine the functions of both observation and photo tubes. The mechanical tube length is automatically compensated for when the interpupillary distance is adjusted. The combination of FSA tubes and WILD MPS camera system allows the image to be focused at the binocular observation port. The FSA-R tube is, in addition, equipped with a triple mirror which, when used with the LEITZ VARIO ORTHOMAT® 2 camera system, reflects the continuously variable film format indication and the movable exposure-measurement spot onto the image. Outside light is automatically excluded during the exposure.

The FSA-R tube can also be used in microphotometry for reflection of the measuring diaphragm or slit outline into the field of view.

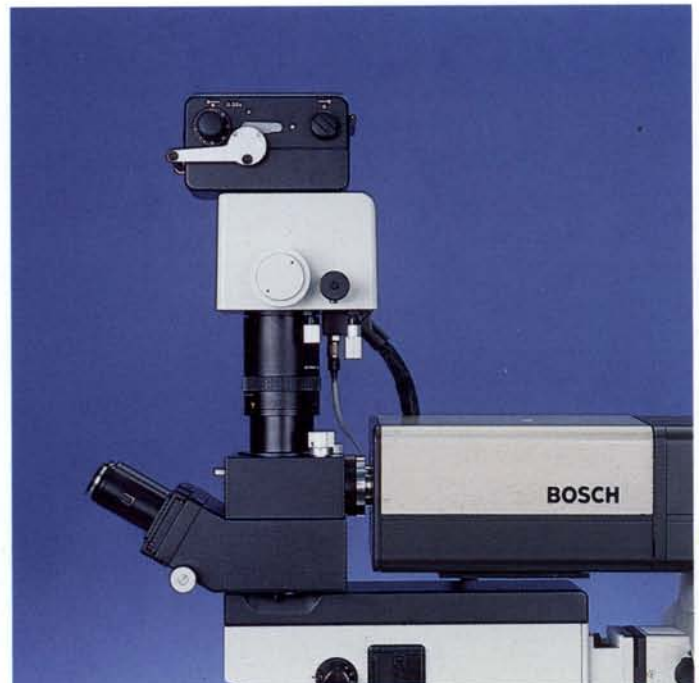
The **binocular FSA-GW-R photo tube** has, furthermore, a second photo port, enabling two image recording devices (i. e. a VARIO ORTHOMAT 2 and a TV camera) to be mounted on the LABOVERT simultaneously. This tube also facilitates field-of-view indices up to 22.5 using the PERIPLAN®-GW 6.3x or 8x eyepieces together with the NPL-FLUOTAR®-L objectives.

If the light conditions are critical for the specimen, the switchable beam splitter system in the FSA, FSA-R and FSA-GW-R tubes ensures sufficient image brightness for observation or photography.

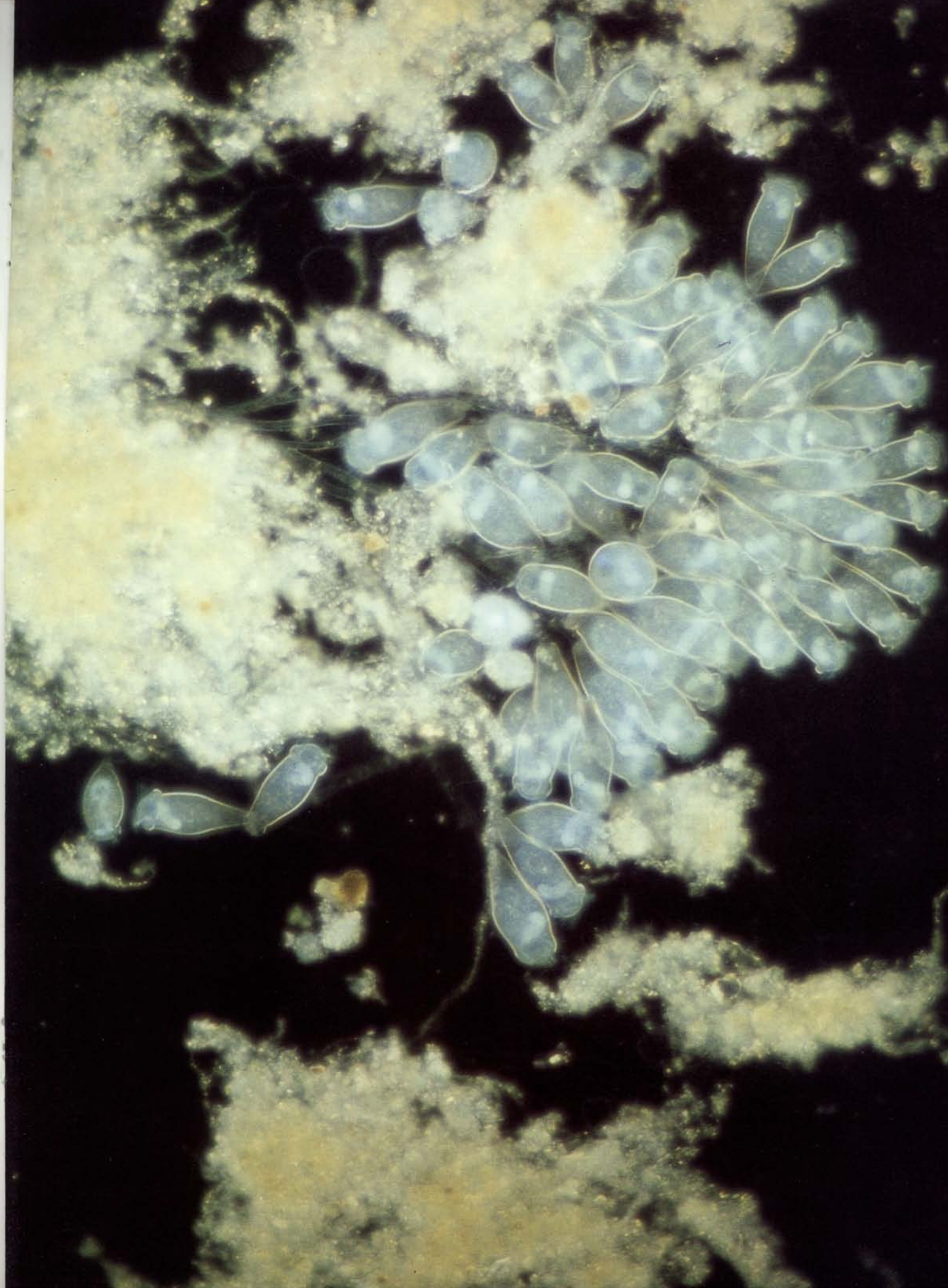
**Monocular tubes P** and **O** are also available if a simple observation or photo alternative is required.

Right:  
Vorticella, dark field. EF 10/0.25 objective.

FSA-GW-R tube with VARIO ORTHOMAT 2 and rear-mounted TV camera









# Leitz LABOVERT

## Rapid and precise interchange of observation modes

Specimens which have not been stained can provide high contrast images through **phase contrast** illumination. With the special S 95 and S 50 condensers, this is accomplished by mounting the Phaco ring aperture in the adjustable holder in a slide, which is then inserted into the slot in the upper part of the stand. The slide also has a bright-field position, so enabling rapid changeover between the two illumination methods without interrupting observation.

In the UK system condenser, the Phaco ring apertures are mounted in a revolver disc, making interchange between illumination methods even easier. The tops of the UK condenser are interchangeable, providing working distances of 1.1mm, 4mm or 15mm. The Phaco ring apertures must also be exchanged if a different top is used.

**Interference contrast T** supplies high-contrast and, unlike phase contrast, relief-effect and halo-free images in transmitted light.

The method is particularly suitable for study of unstained specimens with refractive index and thickness differences, such as cell and tissue cultures, microorganisms or plankton.

A rotatable polarizer is inserted into the upper stand in place of the PHACO slide. The Wollaston prisms are located in the UK condenser turret (numeric aperture 0.55, working distance 15mm) and in a slot below the objective nosepiece, where they are exceptionally accessible. This arrangement allows rapid switchover from interference contrast to other illumination methods. The NPL FLUOTAR L 25/0.35 and NPL FLUOTAR L 40/0.60 Korr. PHACO 2 objectives are also necessary.

The **polarization slides** enable double-refracting specimen structures to be studied. They consist of a polarizer, which can be rotated through 90° and is inserted into the stand in place of the Phaco ring aperture slide, and of an analyser, which is mounted in the slot provided underneath the objective nosepiece. Various lambda- or lambda/4-plates are available for work with the S95/S50 or SK/UK condensers.

The **magnification changer**, with settings of 1.25x, 1.6x and 2x, together with a lens to aid centring of the phase contrast illumination, is inserted between the stand and the observation tube. It enables the overall magnification to be raised, at constant resolution, without an eyepiece change being necessary, which is particularly important during micromanipulations on the specimen.

Right:

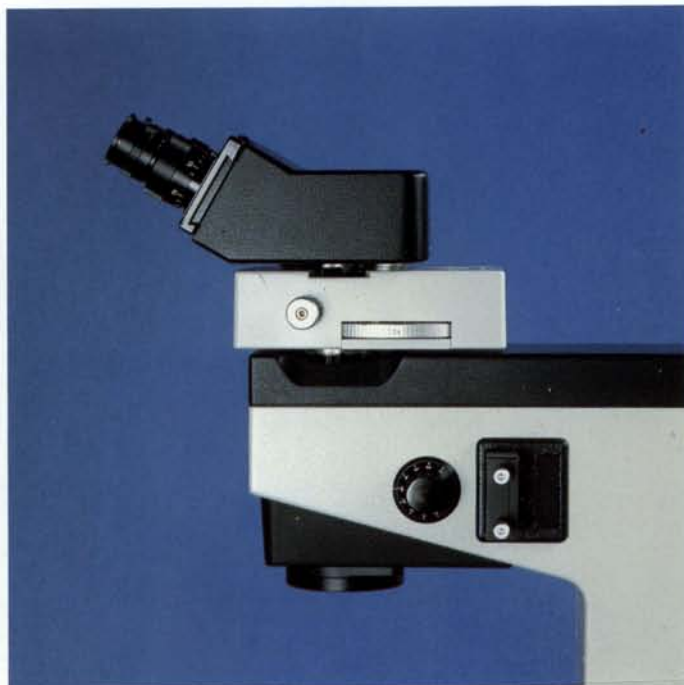
Tissue culture with lung phagocytes interspersed with asbestos fibres.  
NPL FLUOTAR 6.3/0.20 objective.

Right (inset):

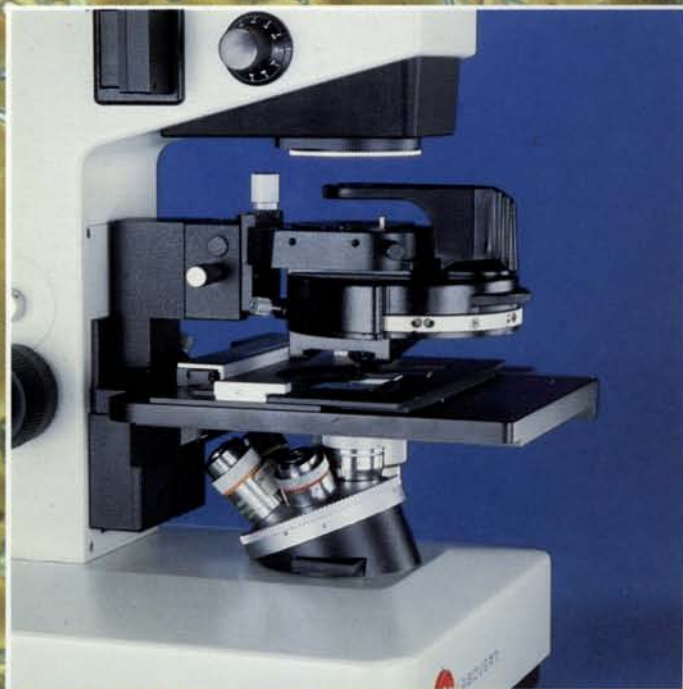
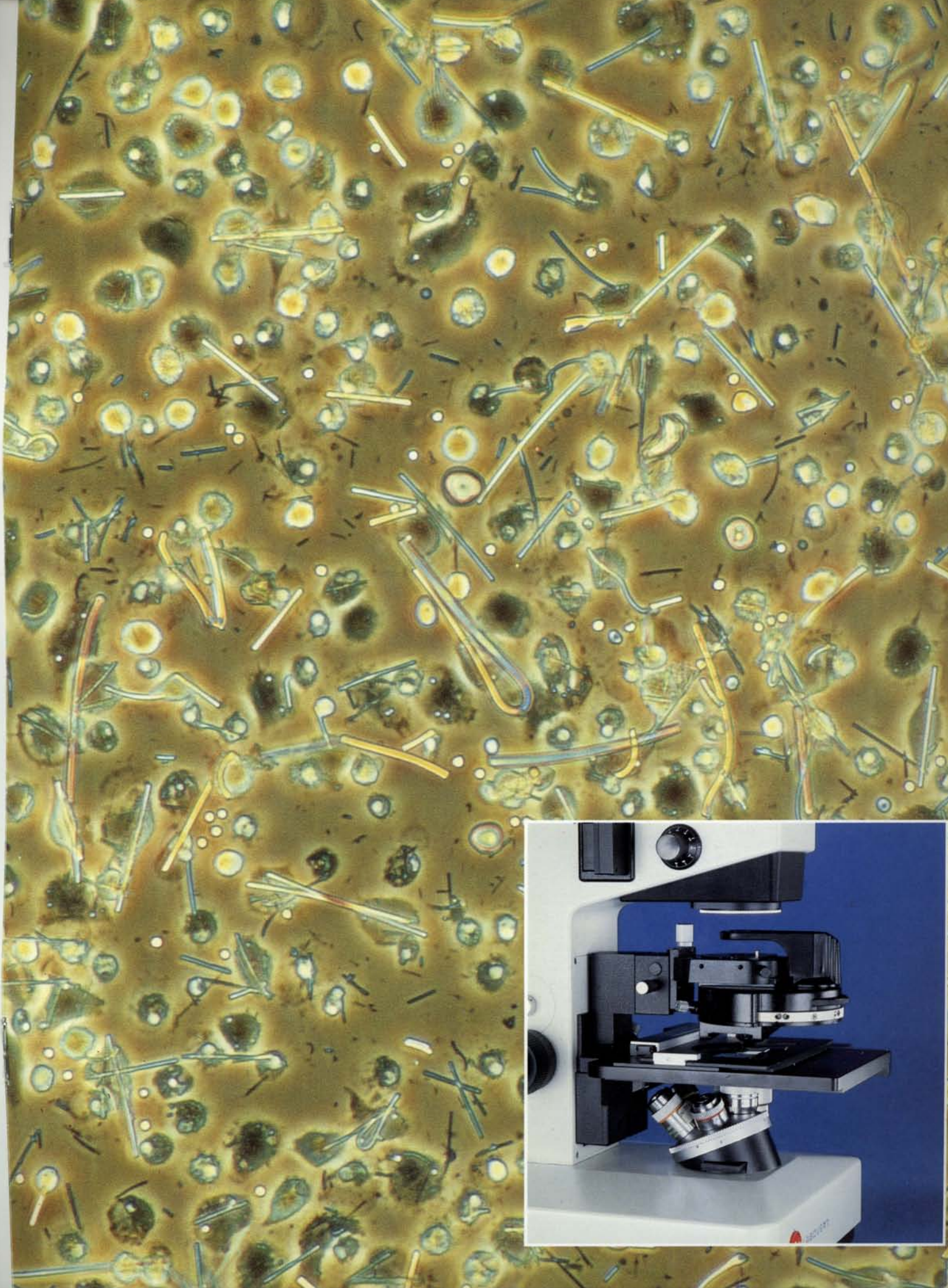
Holder with UK system condenser

Below:

Tube S, magnification changer, aperture diaphragm control, slide with centring device and S 95 condenser









# Leitz LABOVERT

## Excellent optical performance in all inverted microscope applications

All Leitz objectives from 2.5x magnification can be used on the LABOVERT. These are all matched to each other on the revolving nosepiece, so that only a small focus readjustment is necessary after a magnification change.

The **EF objectives** are achromats with good contrast reproduction and high resolving power. They provide a large, flattened field with field-of-view index 18.

The **NPL FLUOTAR objectives** are semi apochromats whose image field planarity allows large-field observation with field-of-view index 22.5; even at 18, they offer a clear improvement in image contrast and resolving power compared to the achromats.

The **PL plan-objectives** are also suitable for large-field work with field-of-view index 22.5.

The Leitz objectives with the label **L** have a long working distances in comparison to normal objectives of the same magnification, which allows study of objects in special laboratory containers. The necessary container base thickness for an optimal image is shown in the table below (under Coverglass correction). These objectives also make it possible to turn the objective nosepiece, even at the highest magnifications, without fear of coming into contact with the object stage at its normal setting.

### Objectives

#### Bright-field

Objective Magnification/ aperture	Free working distance mm	Cover glass correction	Suitab. for field- of-view index		Order No.
			18	22.5	
PL 2.5/0.08	11.80	CO	x	x	519 495
EF 4/0.12	24.00	CO	x		519 759
PL APO 4/0.14	13.40	CO	x	x	519 690
NPL FLUOTAR 6.3/0.20	7.28	CO	x	x	519 851
PL APO 6.3/0.20	9.20	CO	x	x	519 692
EF 10/0.25	6.78	CO	x		519 760
EF L 20/0.32	6.83	0.17/0.7 mm	x		519 434
NPL FLUOTAR L 25/0.35	13.7/14.3	1.10±0.5 mm	x	x	519 679
EF L 32/0.40	6.55	0.17/0.3 mm	x		519 435


### Phase contrast




Objective Magnification/ aperture	Free working distance, mm	Cover glass correction	Suitable for field-of-view index		Order No.
			18	22.5	
EF 10/0.25 PHACO 1	6.78	CO	x		519 767
EF L 20/0.32 PHACO 1	6.83	0.17/0.7 mm	x		519 436
NPL FLUOTAR L 25/0.35					
PHACO 1	13.7/14.3	1.1±0.5 mm	x	x	519 680
EF L 32/0.40 PHACO 1	6.55	0.17/0.3 mm	x		519 437
NPL FLUOTAR L 40/0.60					
Korr. PHACO 2	1.65-2.0	0.6/1.6 mm	x	x	519 795

CO = for use with or without coverglass (thickness of the container base can be neglected).

0.17/0.7mm, e.g. under coverglass correction = for use with coverglass or container base of thickness 0.17 to 0.7mm.

### Eyepieces

Eyepieces labelled **M** are adjustable and serve to compensate for differing vision in each eye. Apart from this, they can be fitted with gratitudes for counting and measuring, or with film format guide lines for photomicrography. Eyepieces with the symbol  have a high exit pupil to enable spectacle wearers to view the entire image.

Eyepiece	Outside diameter		Field-of-view index, mm	Order No.	
	23.2mm	30mm		Single	Pair
6.3x/18	x		18	519 625	519 627
6.3x/18 M	x		18	519 626	519 629
GW 6.3x M		x	(28)	519 597	519 596
GW 6.3x 		x	(28)	519 291	519 290
GW 8x M		x	(28)	519 400	519 399
GW 8x M 		x	(24)	519 442	519 445
GF 10x/18	x		18	519 620	519 622
GF 10x/18 M	x		18	519 621	519 624
GW 10x M		x	(24)	519 234	519 235
GW 10x M 		x	(25)	519 682	519 681
GF 12.5x/18	x		18	519 838	519 834
GF 12.5x/18 M	x		18	519 839	519 836
GW 12.5x M		x	(21)	519 499	519 498

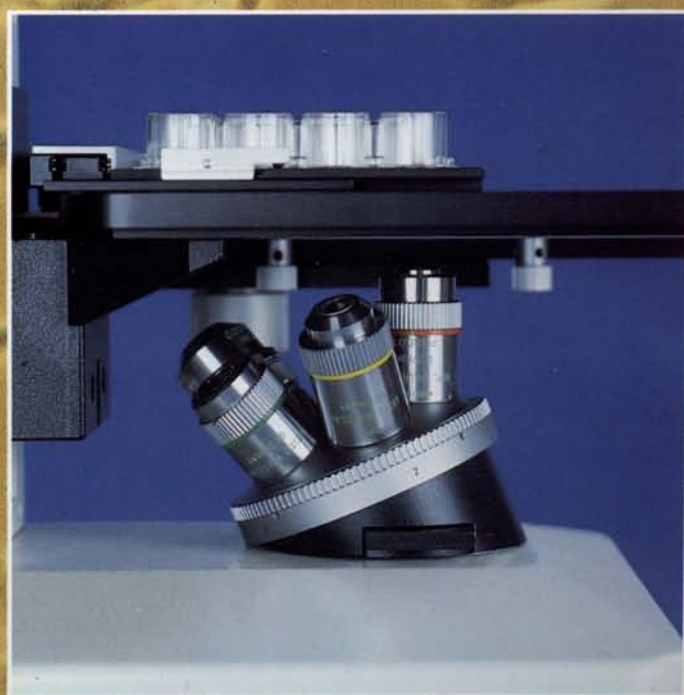
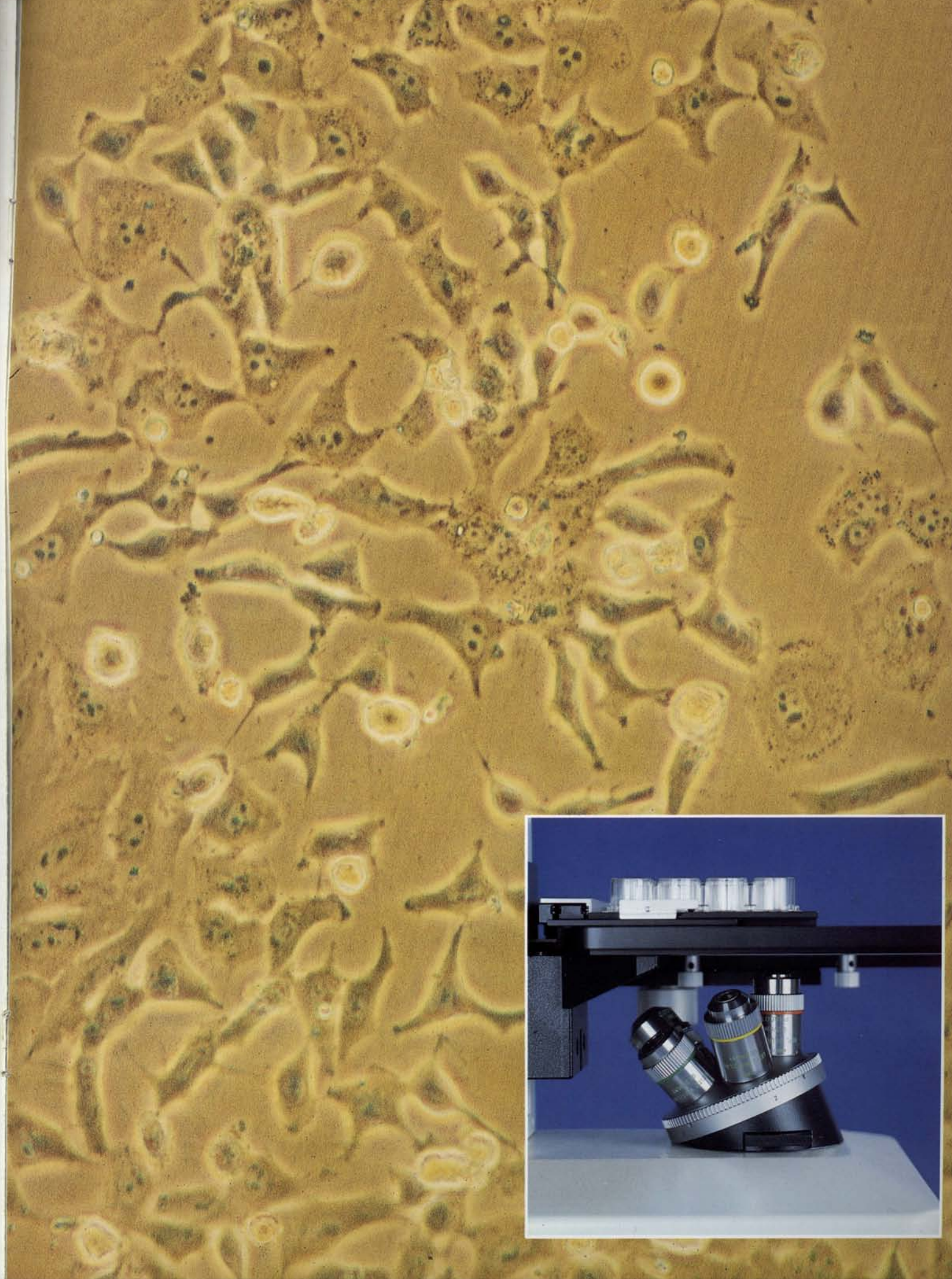
Right:

Ovarian tumour, phase contrast, NPL FLUOTAR L 25/0.35 objective

Inset:

Phase contrast objectives







# Leitz LABOVERT

## The inverted microscope for really convenient photomicrography

The LABOVERT with FSA-R or FSA-GW-R photo tubes is suitable for photomicrography using the **VARIO ORTHOMAT 2** automatic camera system.

Depending upon the lighting and contrast in the image, the exposure can be measured either integrally over the entire format (which is variable from 24 x 36mm to 9 x 12cm) or, with a movable metering spot, from any desired object detail.

The following functions of the VARIO ORTHOMAT 2 are also fully automatic:

matching of the size of the film format indication outlines to the magnification set on the zoom eyepiece.

shutter operation,

metering during the exposure,

matching of the shutter speed to the film format,

reciprocity failure compensation in 6 steps,

exclusion of outside light (i.e. through the observation tube) during the exposure,

film transport for 35mm film,

pre-selection of the exposure frequency.

The VARIO ORTHOMAT 2 brochure gives a detailed description of the instrument.

The **WILD MPS** micro camera system also offers a choice of various outfits for the normal film formats from 24 x 36mm to 101.6 x 127mm (4 x 5").

### **MPS 12**

Micro camera without built-in exposure metering. Shutter speeds from  $\frac{1}{125}$  to 1 sec., plus B and T.

### **MPS 05/12 Mikrophot**

Consists of MPS 12 micro camera with or without telescopic focusing. Optionally with integrated or spot exposure metering. Shutter speeds from  $\frac{1}{125}$  sec. to 30 mins. Dark-field compensation and film speed range 12–3200 ASA.

### **MPS 15/12 Semiphotomat**

With MPS 12 micro camera and MPS 15 exposure meter for shutter-speeds from  $\frac{1}{125}$  sec. to 4 hours, with darkfield and reciprocity-failure compensation. Film speeds from 2–6400 ASA.

### **MPS 55/51 Photoautomat**

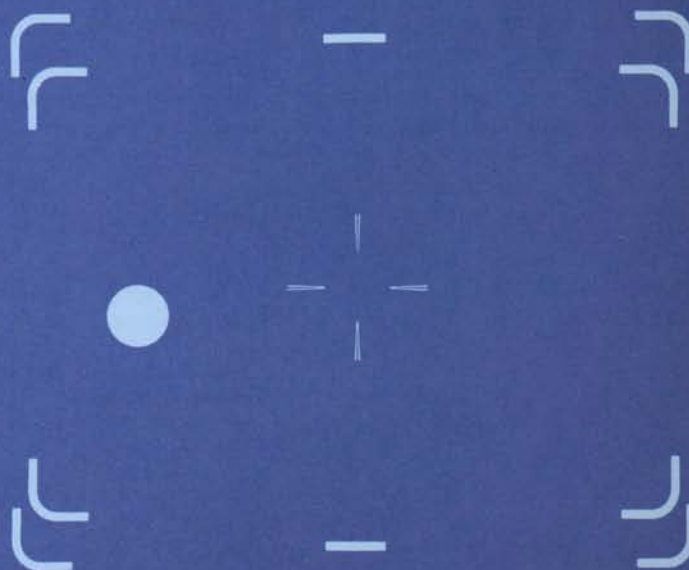
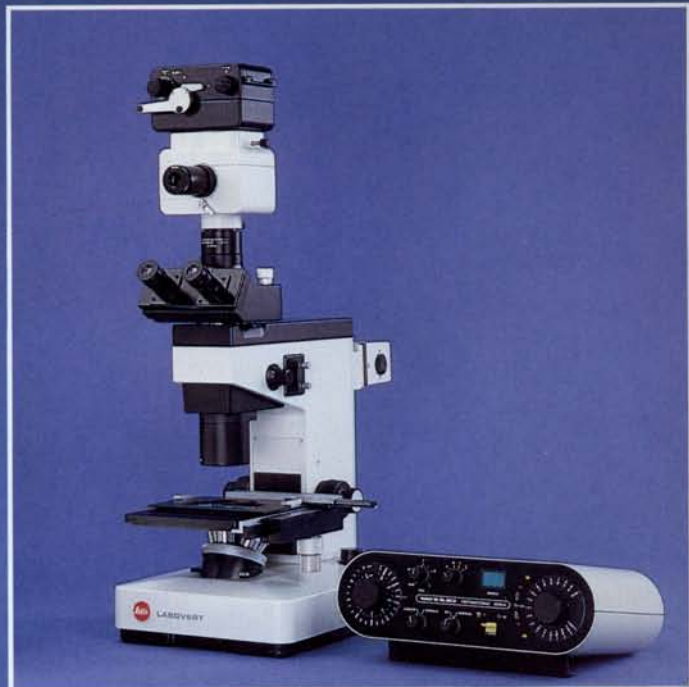
With MPS 51 micro camera for integrated exposure metering, either manually or fully automatic. Electronically-controlled shutter and automatic 35mm film transport. Dark-field and reciprocity failure compensation, film speed range 2.5–16000 ASA. Shutter speeds from  $\frac{1}{100}$  sec. to several hours, with compensation by a factor of 0.25–4, if necessary.

### **MPS 45/51 Photoautomat**

With MPS 51 or 51S camera for integral or spot metering respectively. Specifications as for 55/51, but with narrower film speed range from 12–4000 ASA.

Further details on WILD photomicrographic systems are available from WILD brochures M1-302, M1-303, M1-305 and M1-315.





VARIO ORTHOMAT 2 and inset WILD MPS camera systems  
with 24mm x 36mm film magazine.

# Leitz LABOVERT

## An extensive accessory range for versatility

**Micromanipulators** can be attached to the object stage and facilitate, for example, the isolation of single cells from cultures, microsurgery on cells and tissues, and controlled injection or extraction of the smallest amounts of substances.

A swivel device with mechanical z-axis movement enables the micromanipulator to be tilted up to 45° so that work steeply from above is possible. Mechanical adjustment of the tool mount along the x-axis facilitates rapid specimen changing. The mount can also be adjusted via a ball joint.

After initial mechanical coarse positioning, the tool mount is electronically adjustable over a range of  $\pm 5\text{mm}$  in the x-, y- and z-axes. The micromanipulator is precisely controlled by 2 joysticks on a control panel, which can be placed next to the microscope within easy reach of the operator. The further the joystick is moved, the faster the movement.

The micromanipulators can also be used on all upright Leitz microscopes with suitable object stages. An accessory capillary/needle drawing unit is available.

The **discussion tubes** enable several people to observe the microscope image simultaneously. The operator can indicate any desired specimen detail using a built-in pointer.

The **symmetric** discussion tube accepts three observation tubes; the central port is intended for the microscopist, whilst the outer two can be used by co-observers.

The **asymmetric** discussion tube takes two observation tubes. The co-observer tube can be situated on the right or left of the operator, or behind the microscope stand if the co-observer wishes to sit opposite the microscopist. An adjustable mechanical support on the free end of the discussion tube ensures stability. If both ports are fitted with photo tubes, then, as well as co-observation, two image-recording devices can be attached.

For larger groups, or for more comfortable study, the **projection attachment** is available, which displays the image on a 155mm Ø screen. The 12V 100W halogen lamp in the 102 Z lamphousing is recommended for this unit.

**Closed-circuit television microscopy** and **microcinematography** are also possible with the help of adapters for various makes of camera.

The **image comparator** allows two microscope images to be observed simultaneously. An image-splitting method combines the halves of the images from two microscopes or, alternatively, superimposes the two complete images.

A **tracing attachment** can be inserted between the stand and the observation tube. This provides a convenient method for tracing the specimen contours and features whilst viewing through the microscope. The magnification of the reflected tracing surface can be varied by a factor of two.





LABOVERT with FSA-GW-R tube, S 50 condenser  
and micromanipulator

# Technical Details

## Function and Illumination:

Inverted transmitted light microscope for bright- and dark-field, oblique illumination, phase contrast, interference contrast and polarized light. Light path according to the REINHEIMER principle and the design features of an upright Leitz microscope. This provides ergonomically favourable operating conditions on an inverted microscope.

## Application:

Examination of transparent specimens, in particular immunological reactions, cell or tissue growth processes in biotechnology/gene technology/genetics, plankton and other small organisms, pharmacological processes, chemical reactions, drinking water, components in polluted air or water, foodstuffs, toxicology, etc.

## Stand:

Corresponds in appearance and operation to the upright Leitz microscopes. The image is vertically and laterally correct.

## Specimen space:

Vertically – maximum of 96mm from stage to S95 condenser. Horizontally – maximum of 115mm from optical axis to stand.

## Object stage:

Outside measurements 160 x 193mm. Central aperture diameter 64mm. Two inserts with 55 and 30mm apertures. Two M4 screw holes on both left and right edges enable the object guide or micromanipulators to be attached.

## Object guide:

Accepts holders for microscope slides or various laboratory containers. Adjustment range 83 x 127mm. Scales matched to the various holders can be affixed for reproducing settings on the x- and y-axes.

## Focusing:

Coarse and fine coaxial focusing controls operate the object stage. Mounted on both sides of the stand for left- or right-handed use. Conveniently positioned for hands when on hand/arm rests. Scale with divisions at 2µm. Adjustable focus stop; range 28.5mm. The stage can be lowered by a further 15mm for special containers.

## Revolving objective nosepiece:

Quintuple nosepiece with objective numbering. The object stage need not be raised when changing objectives.

## Objectives:

All objectives from the current Leitz range from magnification 2.5x are suitable. 9 special objectives with long working distances for brightfield and phase contrast are also available, in addition to the NPL-FLUOTAR-L 6.3/0.20 PHACO 0 phase contrast objective.

## Tube mount:

42mm Ø. Rotation possible through 360°.

## Tubes and field-of-view numbers:

FSA-GW-R photo tube with second port (tube factor 1.25x) with PERIPLAN GW 6.3x or 8x eyepieces gives field-of-view indices 22.5 or 28 resp.

All other tubes in the current range give a field-of-view index of 18 with the corresponding eyepieces.

## Eyepieces:

All eyepieces in the current range are suitable.

## Condenser mount:

For special condensers: screw.

For system condensers: toothed drive with adjustable sliding changer and height stop.

## Condensers:

Special condensers: S 95 A 0.20  
S 50 A 0.30

System condensers: SK and UK with S1.1, S4, S15,  
D 0.80–0.95 and D 1.19–1.44 tops

Height adjustment for special S 95 and S 50 condensers is built into stand, control by rotary knob with scale for reproducing settings. Phaco ring apertures matching to the objective phase rings possible for liquid layers up to 45mm.

## Aperture diaphragm:

Built into stand, controlled by rotary knob with scale for reproducible settings, Works as field diaphragm (Koehler illumination) when system condensers are used.



### **Transformer:**

Integrated into the stand base. Illumination intensity steplessly varied by rotary control. Separate mains switch and indicator lamp. Power supply to lamphousing 20 built in.

### **Lamps:**

6V 20W halogen lamp in lamphousing 20 is standard. Separate variable transformer for 12V 100W halogen lamp or gas discharge lamps up to 100W in lamphousing 102Z is available.

### **Accessories:**

#### **Photography:**

All LEITZ and WILD microscope camera systems are suitable.

#### **Television and cinematography:**

Adapters for various makes of camera and connections for all photo tubes are available.

Electronically controlled micromanipulators  
Controlled environment chamber (in preparation)  
Discussion tubes  
Comparator  
Projection attachment  
Tracing attachment  
Magnification changer

### **Voltages:**

Primary: 110, 120, 130, 220, 230, 240, 250V; 50 or 60Hz  
Secondary:  $5.8 \pm 0.3V$  at 3.4A

### **Weight:**

Basic outfit ca. 17kg.

### **Advisory, maintenance and repair service:**

Worldwide, through 120 agencies, with workshops, owned or under contract to LEITZ.



# Ernst Leitz Wetzlar GmbH

D-6330 Wetzlar, Telephone (064 41) 29-0,  
Telex 483849 leiz d

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