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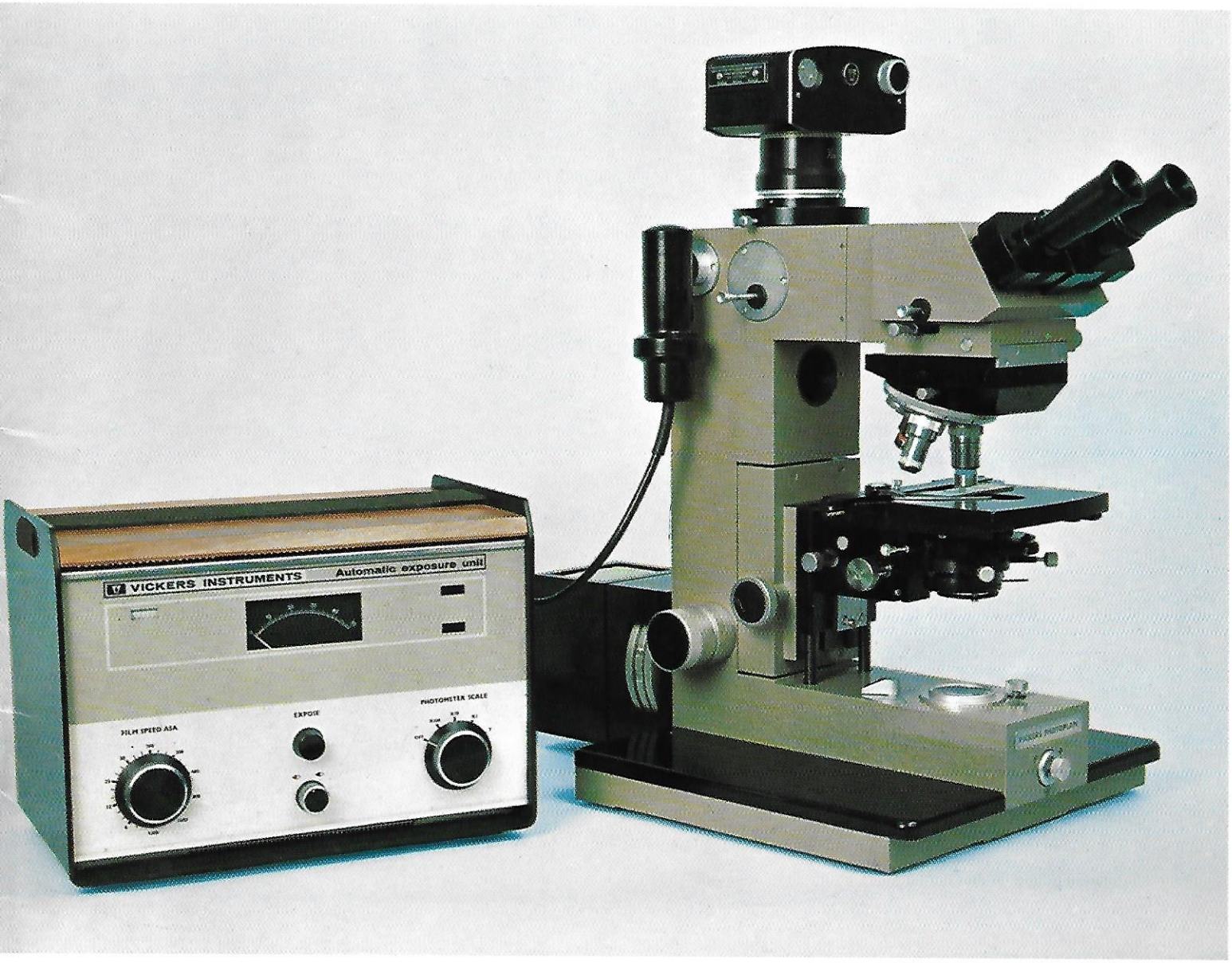
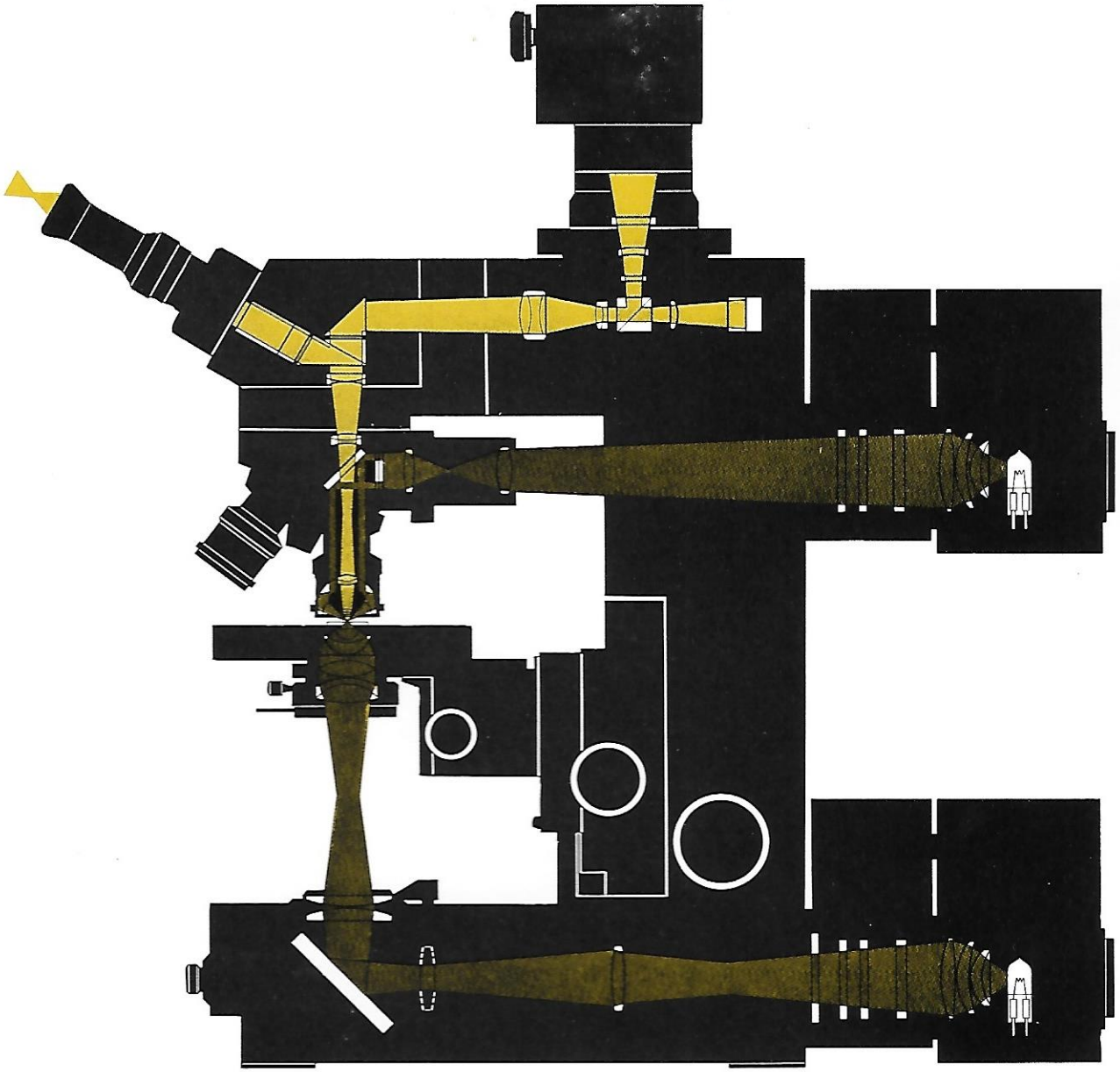


VICKERS M41 PHOTOPLAN

a complete photographic microscope system



Schematic diagram of the M41 Photoplan showing the optical arrangement for incident and transmitted illumination, and incident dark ground. The camera equipment includes the optical system for the J35 photometer with the 35 mm autowind camera body.

The Vickers M41 Photoplan is a sophisticated instrument satisfying all the stringent requirements of a universal photographic microscope in the modern research laboratory.

Ergonomically designed universal stand.
Fatigue free operation throughout even the most extended working sessions.

Extremely rigid construction, the camera unit being positioned at the point of greatest strength.
Providing freedom from external vibration.

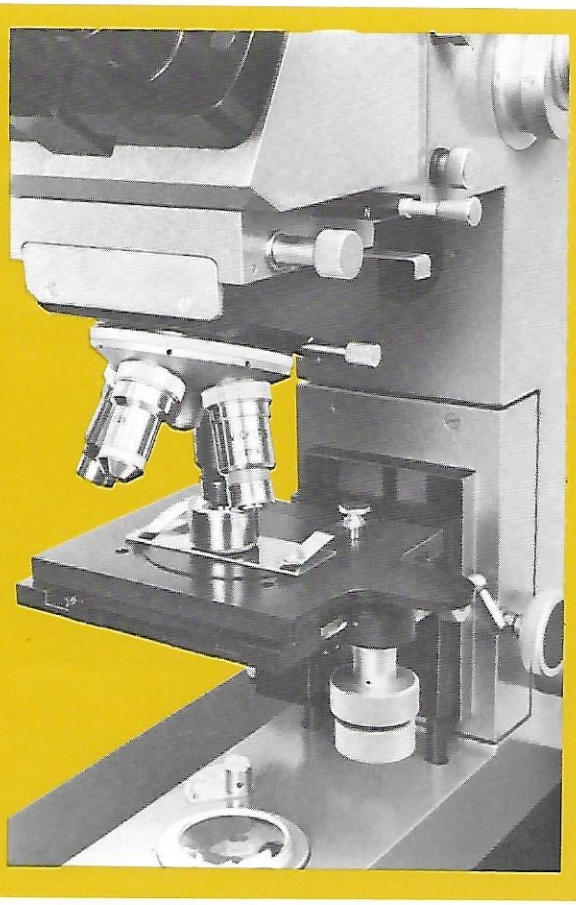
Built-in camera optics.
Allowing monitoring of the image during exposure and enhancing the excellent photographic stability.

Automatic tube length compensation.
Ensuring exact parfocality of the microscope image with the film plane, regardless of the set interpupillary distance.

Automatic photomicrography on all camera formats from 35 mm to 4″ × 5″.
Great flexibility in format and exposure.

High sensitivity partial field photometer timer.
Enabling consistent and predictable exposures to be undertaken of dark ground, fluorescent or similarly widely contrasted subjects.

Photography at standard A.S.T.M. magnifications on Polaroid ® or 4″ × 5″ formats.
The full A.S.T.M. range is covered from 25× to 1250×.



Unit constructional methods have been adopted throughout allowing the simple and convenient interchange of a large number of accessories for transmitted light and incident light work covering many specialist routine and research techniques. The exact positioning of all the controls required during operation and the height and angle of the viewing head have been selected on ergonomic grounds so as to provide the greatest possible comfort in use. A very extensive range of readily interchangeable accessories fit the Photoplan as an unexcelled general purpose instrument for the industrial, research and medical laboratory.

stand

The main component of the Photoplan is the rigid universal stand containing built-in photographic optics and onto which may be attached a very wide range of accessory components. The camera bodies are mounted directly over the sturdy limb on wide cones for maximum stability. The transmission of vibration between the bench and stand is minimised by efficient shock absorbing feet.

The degree of interchangeability is remarkable in that a modest initial outfit may be supplemented by accessory equipment to cover all the possible future microscopic needs of your laboratory.

The broad well balanced microscope base affords excellent stability while acting as a pair of comfortable arm rests within easy reach of the low mounted microscope controls. The separate coarse and fine motion controls, mounted one behind the other, operate on the stage. The coarse motion is spring counter-balanced so that very little effort is required to either raise or lower the stage. The fine movement is very free running allowing easy focusing with no back-lash or slip. One division on the fine motion spindle scale is equivalent to a vertical stage movement of one micron. The stage carrier may be raised or lowered on a dovetail slide, independently of the focusing movement, permitting the accommodation of objects up to 2.5″ in height.

The microscope head optical system is carried on an 'L' shaped bracket which can be very readily removed from the stand on a dovetail slide for replacement with other alternative systems.

Dovetail mounts are provided throughout for the attachment of accessories for both transmitted and incident light work.

A number of substage condenser carriers are available covering specialist applications such as polarized light and double refracting interference.

The condenser focusing control which operates on the condenser carrier is mounted at a convenient height beneath the stage.

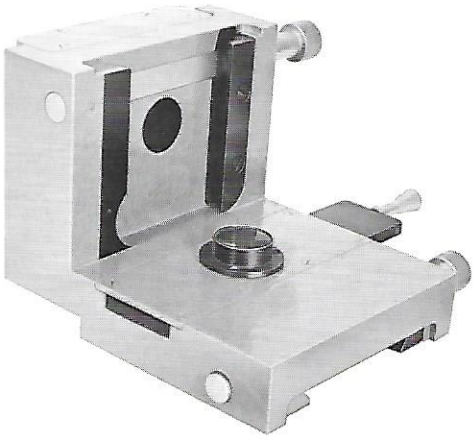
microscope head accessories

All the microscope head components, including viewing heads and objective changers, are mounted with dovetail slides on to interchangeable 'L' shaped carrier brackets. Two basic carrier brackets are available each fitted with a broad dovetail mount.

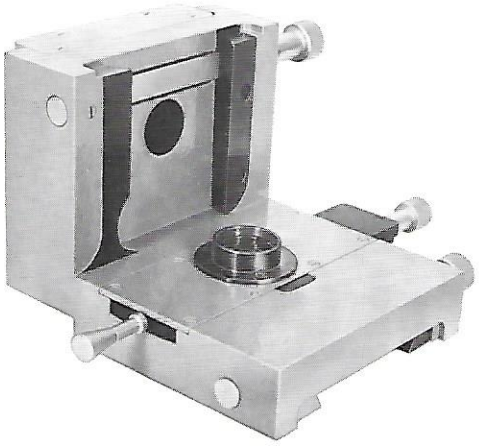
The bracket containing a focusing Bertrand lens which can be inserted into the light path on a slider, is primarily intended for transmitted light work where the ability to inspect the objective back focal plane is of advantage, as in phase contrast for example.

The alternative bracket contains a slot for a quadruple filter slider or for analyser facilities.

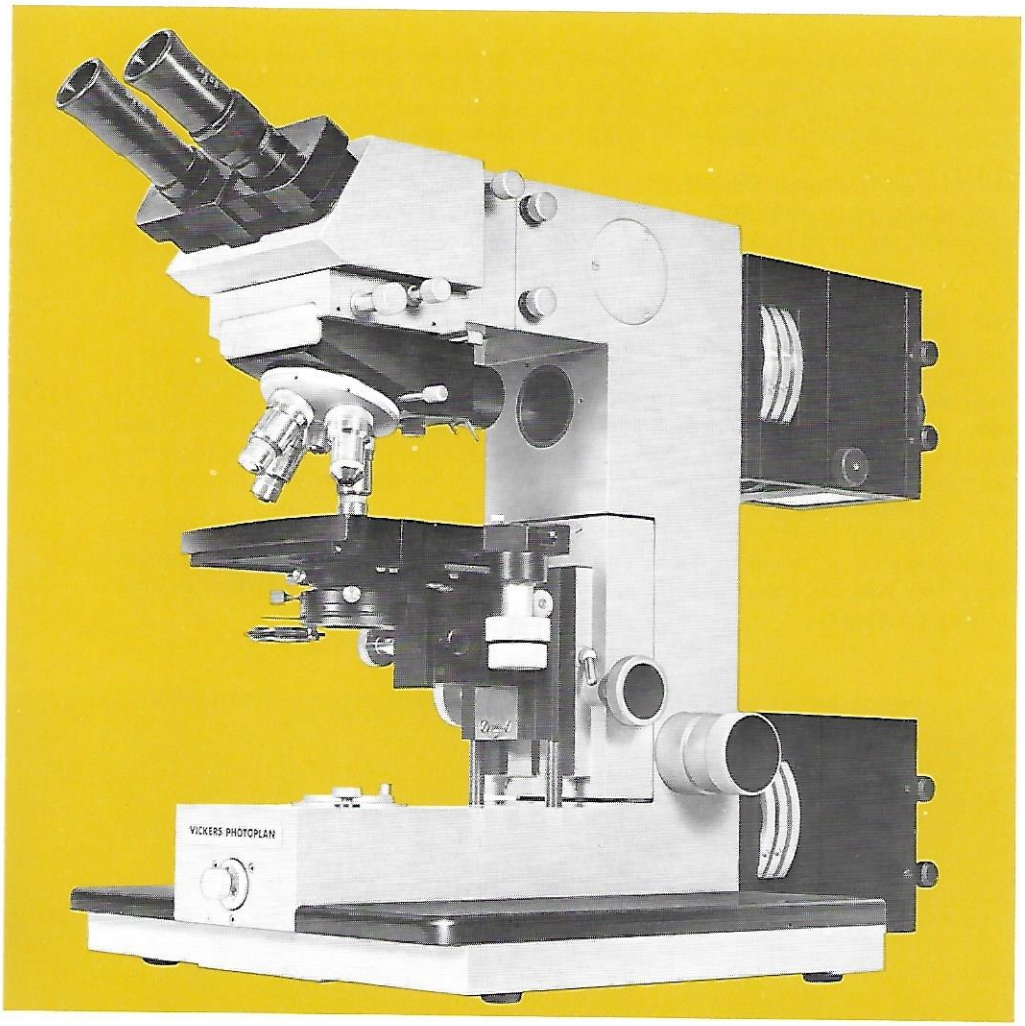
Special carrier brackets for sophisticated techniques such as first order polarized light work or double refracting interference microscopy are available with the appropriate accessory outfits.



Head carrier bracket without Bertrand lens



Head carrier bracket with Bertrand lens



The broad dovetail mounts provided throughout for the attachment of accessories for both transmitted and incident light work have a maximum width of 2.19" tapering at 45 .

The coarse motion rack and pinion operates on the stage and substage independently of the fine motion. A friction adjustment on external bushes and a motion clamp are provided. The total run of 1.5" is accomplished in 1.75 revolutions of the spindle.

The fine motion consists of a worm and sector lifting a single involute tooth. Absolute stability is ensured by mounting the motion on a 2.625" centre to centre track having 30 crossed rollers to each side.

The total run is 3 mm, consisting of 30 revolutions of the spindle which is calibrated to 1 micron.

viewing head

The optical system of the binocular viewing head incorporates a set of beam splitters which may be interchanged on a slider. The beam splitters allow the light to be directed in one of three selected combinations providing maximum comfort and efficiency in observation and photography.

The first position allows all the light to pass to the eyepiece tubes. The second position splits the light between the camera system and the viewing head; 80% to the camera optics and 20% to the binocular head. In this position it is possible to monitor the microscope image during exposure. The third position passes all the available light to the camera system.

An automatic compensator within the binocular head maintains a constant 160 mm tube length regardless of the set interpupillary distance, thus ensuring parfocality of the image with the film plane. The interpupillary distance may be set between 51 and 75 mm. A focusable eyepiece tube makes it possible to compensate any variation between the operator's eyes.

The viewing head has a 1.25 visual magnification factor which must be multiplied by the objective and eyepiece powers when determining overall magnification.

objective changers

The revolving objective changers are fitted with individual centring devices on each aperture for adjustment to exact parcentrality. A marker spot on the changer indicates the position of the lowest power objective from which aperture the objectives should be mounted clockwise in ascending powers. The objective changers for both incident and transmitted light are readily removable on dovetail slides.

The objective changer revolves on a long 0.625″ cone tapering from 0.315″ to 0.286″ providing a very precise movement. Firm location of the image centre is further ensured by accurate click stops.

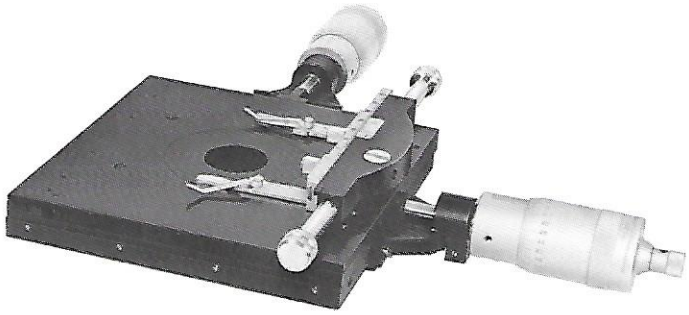


Binocular head



Transmitted light objective changer

Large micrometer stage—see precision length measurements



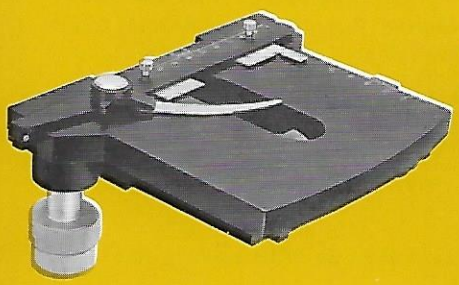
stages

The object stages are each mounted on dovetail slides simply clamped to the stage carrier. Two interchangeable stages are available for normal work.

The square mechanical stage with 50 × 75 mm traverses is fitted with either left or right hand low mounted concentric controls within easy reach of the operator's hand when resting on the base. The slide carrier may be removed in a simple operation to allow the whole of the stage top to be used for the examination of large objects.

The 150 mm diameter precision, rotatable ball bearing stage may be fitted when either polarized or interference work is to be undertaken. The stage can, of course, be usefully employed for many other applications where specimen orientation is desirable. The rotatable stage is provided with a circular graduated scale with verniers reading to 6 minutes of arc. An attachable mechanical stage may be ordered if required.

For metallurgical work a plain mechanical stage with 38 mm × 38 mm traverses operated by low mounted concentric controls may be supplied. With all stages specimens up to 2.50″ high can be accommodated by lowering the stage carrier on a subsidiary slide.



50 × 75 mm square mechanical stage



38 × 38 mm incident light stage



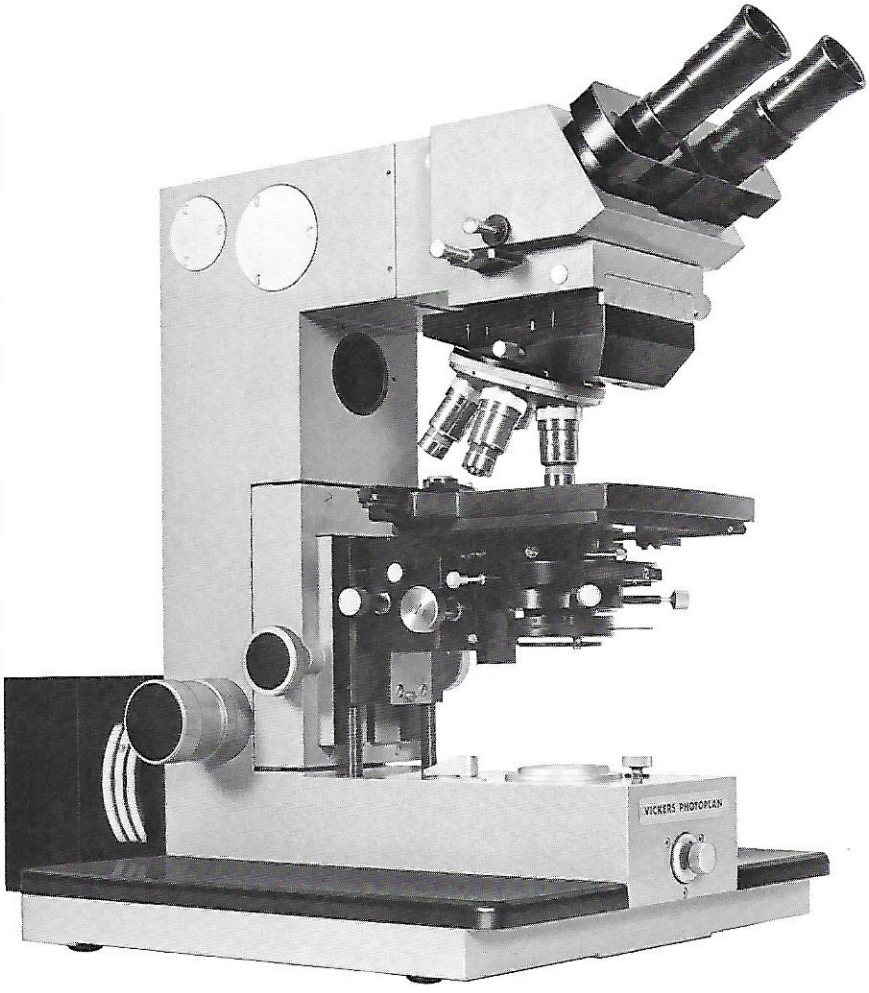
150 mm rotatable stage with attachable mechanical stage

transmitted light

A wide field Köhler illuminator is incorporated in the base of the M41 Photoplan. A pair of field lenses within the base may be interchanged by a single lever suiting the illumination to high or low power objectives. The system is capable of fully filling the field of a 4× objective as well as being able to fully illuminate the aperture of an oil immersion 100× objective when used with the standard achromatic condenser. A substage auxiliary lens broadens the capabilities of the illumination system, so as to cover the field of a 2.5× Microplan objective.

The centrable quintuple transmitted light objective changer is mounted on a dovetail slide to an intermediate carrier which is itself attached on a broad slide to the head carrier bracket.

The transmitted light intermediate carrier contains a slot for a quadruple filter slider or other accessory slides. If required filters should be specified at the time of ordering from the standard list.



M41 Photoplan equipped for transmitted light applications

OBJECTIVES FOR TRANSMITTED LIGHT

The Microplan achromatically corrected objectives provide a flat well defined field of view eliminating the field curvature encountered with conventional objectives.

Microplan for use with coverglass

			Working Distance
31-78-19	2.5×	N.A.0.08	17.0 mm
31-78-26	4×	N.A.0.12	10.0 mm
31-78-27	10×	N.A.0.25	3.0 mm
31-78-28	20×	N.A.0.50	0.31 mm
31-78-29	40×	N.A.0.70	0.18 mm
31-78-30	100× oil	N.A.1.25	0.15 mm

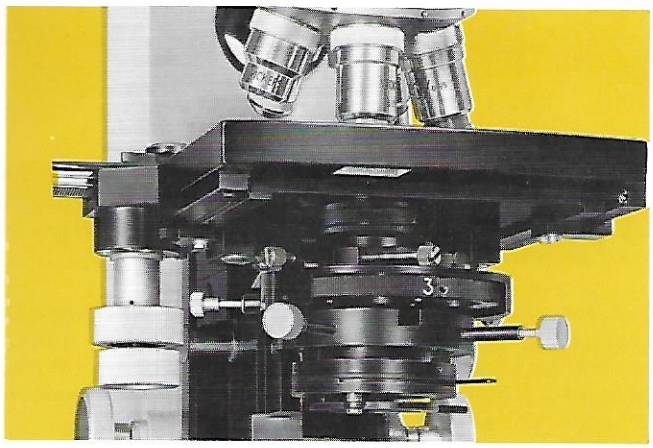
Where a greater aperture or enhanced correction is required fluorite or apochromat objectives are available.

Fluorite for use with coverglass

31-78-12	50× oil	N.A.0.95	0.21 mm
31-78-13	100× oil	N.A.1.30	0.10 mm

Apochromat for use with coverglass

31-78-31	10×	N.A.0.30	3.60 mm
31-78-32	20×	N.A.0.65	0.30 mm
31-78-33	80× oil	N.A.1.32	0.10 mm



The standard achromatic bright field condenser is designed to allow the back aperture of oil immersion objectives to be fully illuminated while being able to fill the field of even the lowest power scanning objectives. The change from high to low power conditions is effected by the operation of a single field lens lever on the Photoplan base. Accurate optical alignment is facilitated by the provision of readily accessible centring controls.

The standard phase contrast condenser

Three revolver mounted phase annuli cover the full range of phase contrast objectives. Two further positions are intended for bright field work with the condenser aperture iris and for use with other accessories.

The annuli are centred to the objective rings by operating a pair of captive spring pins which retract from the annuli mounts after centration. All the rings may thus be accurately centred and cannot then be disturbed by inadvertent operation of the pins.

The dark field oil immersion condenser is suitable for use with medium and high power objectives. An adjustment collar allows the condenser to be precisely corrected for use with object slides from 0.79 to 1.5 mm thick. Oil immersion objectives chosen for use with dark ground should either be of the type fitted with an adjustable iris or be supplied with suitable funnel stops.

Full details of alternative condensers appear in the specification.

The condensers are first attached to an Akehurst dovetail carrier before insertion in the instrument substage. A change of condenser is made very speedily without any disturbance to the specimen.

A full range of positive phase achromats, Microplans and oil immersion fluorite objectives is available. A special high aperture phase 20×apochromat is offered for phase fluorescence work.



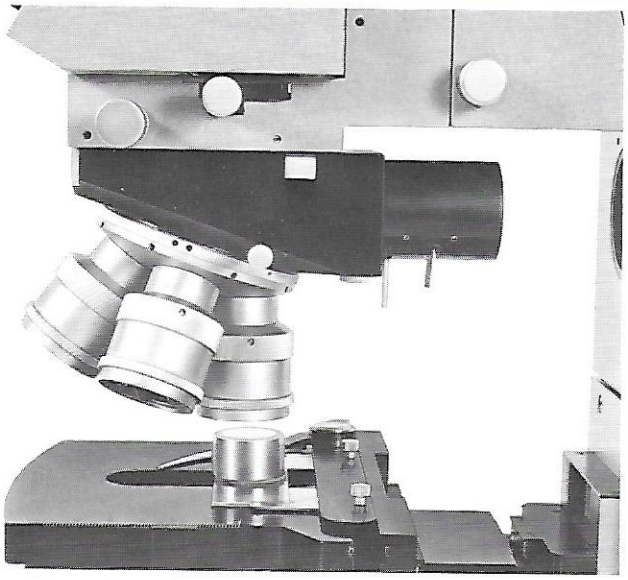
Standard achromatic condenser | **Phase contrast condenser** | **Oil immersion dark ground condenser**

incident light

The incident illuminator designed for both dark ground and bright field is attached to the standard head carrier bracket on a broad dovetail slide.

The incident light bright field objectives are mounted on a quadruple centrable revolving changer attached to the incident illuminator on a dovetail slide. The dark ground objectives fitted with catoptric condensers are mounted on a separate centrable revolving changer. The incident illuminator dark ground stop is moved aside on a slider enabling the special dark ground objectives to be used for bright field work.

A full range of flat field Microplan objectives is augmented by high power oil immersion fluorite objectives and several apochromatically corrected systems, for low power and high power oil immersion.



Incident illuminator with dark ground objectives

Microplan for use without cover glass

31-78-26	4×	N.A.0.12	working distance	10.0 mm
31-78-27	10×	N.A.0.25	working distance	3.0 mm
31-78-23	20×	N.A.0.50	working distance	0.43 mm
31-78-24	40×	N.A.0.65	working distance	0.25 mm
31-78-25	100× oil	N.A.1.25	working distance	0.33 mm

Achromat fitted with catoptric illuminators for incident light dark ground applications

31-78-22	10×	N.A.0.25	working distance	1.7 mm
31-78-21	20×	N.A.0.50	working distance	1.4 mm
31-78-20	40×	N.A.0.65	working distance	0.7 mm

The dark ground objectives must be employed with the quadruple changer 31-75-07.

incident and transmitted light

All Vickers objectives for both incident and transmitted light are parfocal and are corrected for a 160 mm tube length. Where applicable transmitted light objectives are corrected for a coverslip thickness of 0.18 mm.

A spring loaded retracting system is incorporated in all objectives of 20× and higher power which of necessity have a short working distance, thus preventing collision damage to either the objective or specimen.

Because of their complex design the special incident light dark ground objectives are not fitted with spring loading.

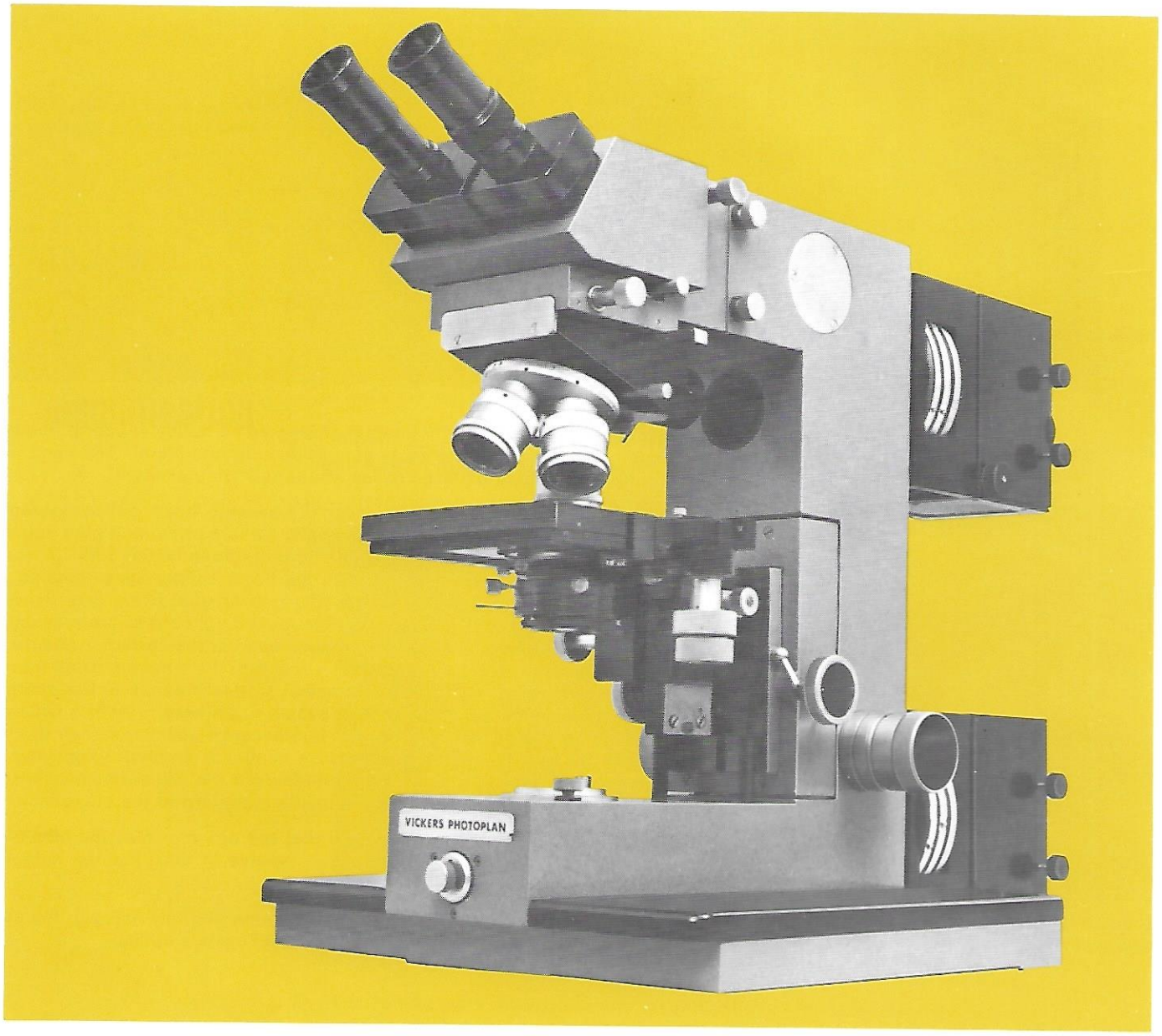
The Photoplan may be used for simultaneous transmitted and incident light work when fitted with a substage unit, an incident illuminator and two lamp units.

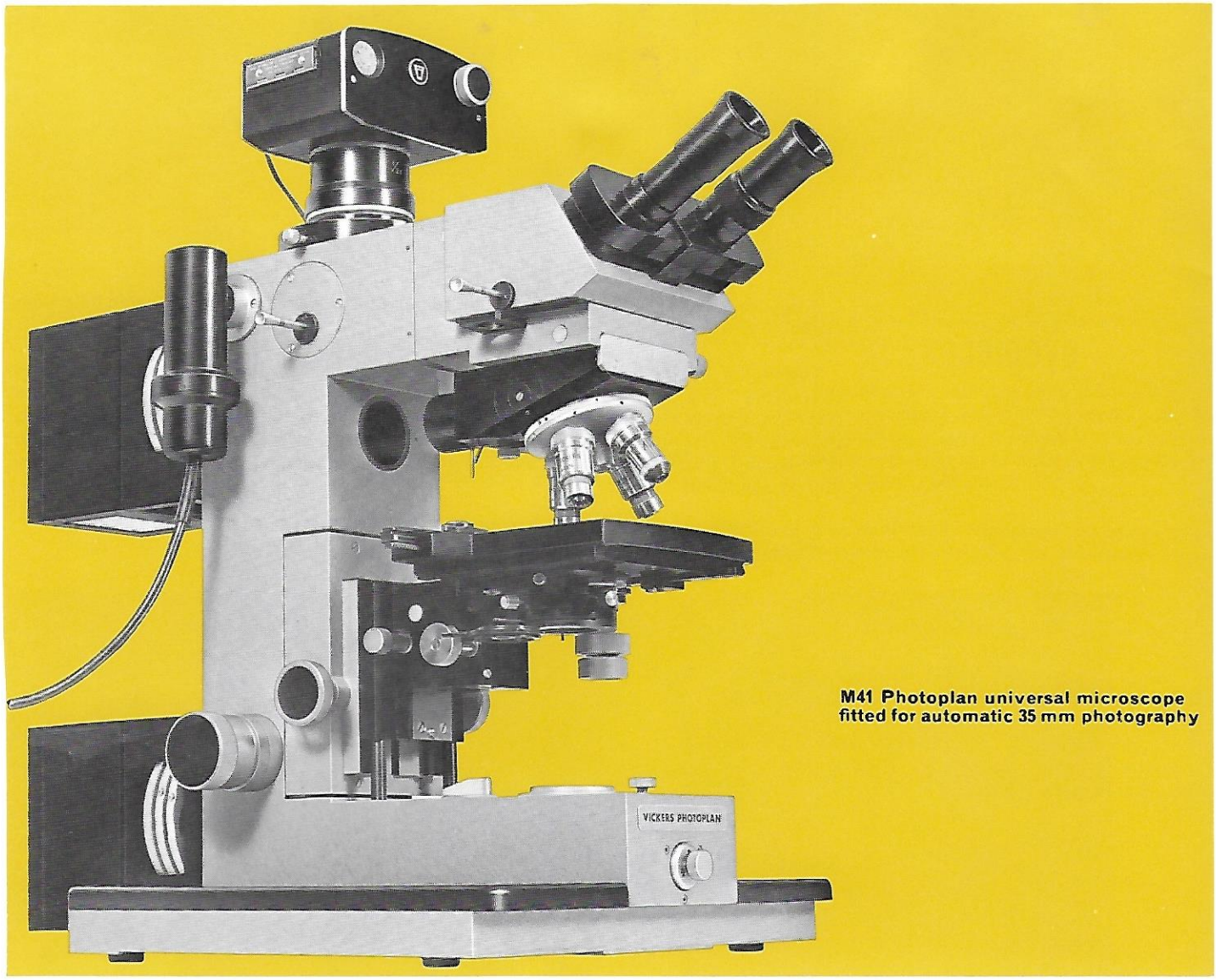
eyepieces

A full range of eyepieces for the Photoplan includes compensating and wide field high eyepoint systems as well as eyepieces for special applications.

The high eyepoint 10× Complan eyepieces are highly suitable for use with or without spectacles. The eyecups are readily removable to increase the clearance between the body of the eyepiece and the exit pupil, if the operator requires to wear spectacles during observation. For camera focusing a set of Kellner eyepieces are provided; one of which is fitted with a camera focusing and framing graticule selected according to the camera format employed.

Kellner 10× eyepiece	Field of View 18 mm
Complan 10× eyepiece	Field of View 18 mm





M41 Photoplan universal microscope fitted for automatic 35 mm photography

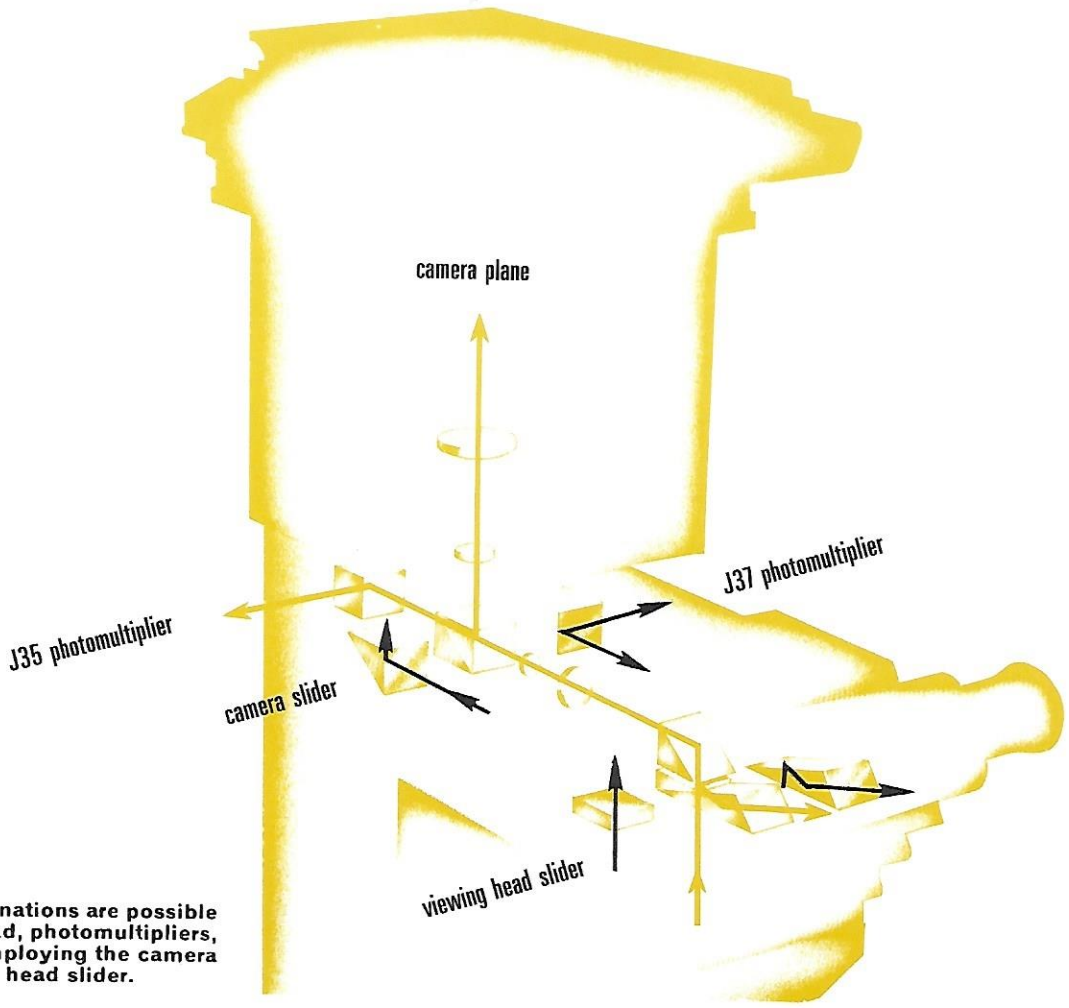
camera equipment

The microscope stand is fitted with integral photographic optics ensuring freedom from external vibration and offers considerable convenience in operation. The camera bodies are fitted directly to the stand on large cones affording high stability.

A beam splitter slider directs the light from the viewing head optical system to the photometers and camera bodies. The J35 automatic camera photomultiplier may be fitted to the left hand side of the stand and the J37 timer photomultiplier with its associated partial field optics to the right hand side. With the beam splitter slider pushed right in, all the available light is directed to the camera (the total amount being determined by the position of the viewing head slider). With the slider pulled right out all the available light is directed to the J37 timer photomultiplier for determination of the correct exposure. These two positions will normally be used consecutively and with the binocular slide transmitting all the light to the camera optics. This combination is ideally suited to the photographic recording of specimens with either a very low overall brightness or with a wide contrast range. Photomicrography of dark ground and fluorescence specimens can therefore be very accurately timed and exposures taken with a minimum duration employing the J37 timer. The central slide position splits the light between the J35 automatic timer photomultiplier and the camera, permitting fully automatic recording of the microscope image.

The beam splitter slides can also be set so that the operator may monitor the image during exposure, there being ample illumination reserve in the tungsten halogen lamp to allow this for the great majority of specimens.

The necessary camera optics for different applications are fully listed in the specification. If required, the instrument can be supplied without camera optics.



A large number of combinations are possible between the viewing head, photomultipliers, and the camera plane employing the camera prism slider and viewing head slider.

camera magnification

Two interchangeable cones inserted between the camera body and the stand camera aperture fitting are provided for the camera projection optics. The first renders a camera factor to the universal camera assembly of 10×. The second produces a camera factor to the universal camera assembly of 12.5×.

The products of these factors with the microscope powers give total magnifications which cover the major part of the A.S.T.M. standard magnification series.

Objectives	Primary Magnification	1× Cone 10× Total Factor	1.25× Cone 12.5× Total Factor
Microplan	2.5	25	31.25
Microplan	4	40	50
Achromat	5	50	62.5
Microplan	10	100	125
Microplan	20	200	250
Microplan	40	400	500
Apochromat	80	800	1000
Microplan	100	1000	1250

The A.S.T.M. magnification series can thus be employed with all the normal camera formats used in metallurgy, mineralogy and allied fields; 4″ × 5″, 3¼″ × 4¼″, 9 × 12 cm and the range of Polaroid backs.

For 35 mm work the appropriate magnifications should be halved.



J35 automatic exposure unit

The J35 exposure unit allows fully automatic photography to be undertaken on most microscope preparations.

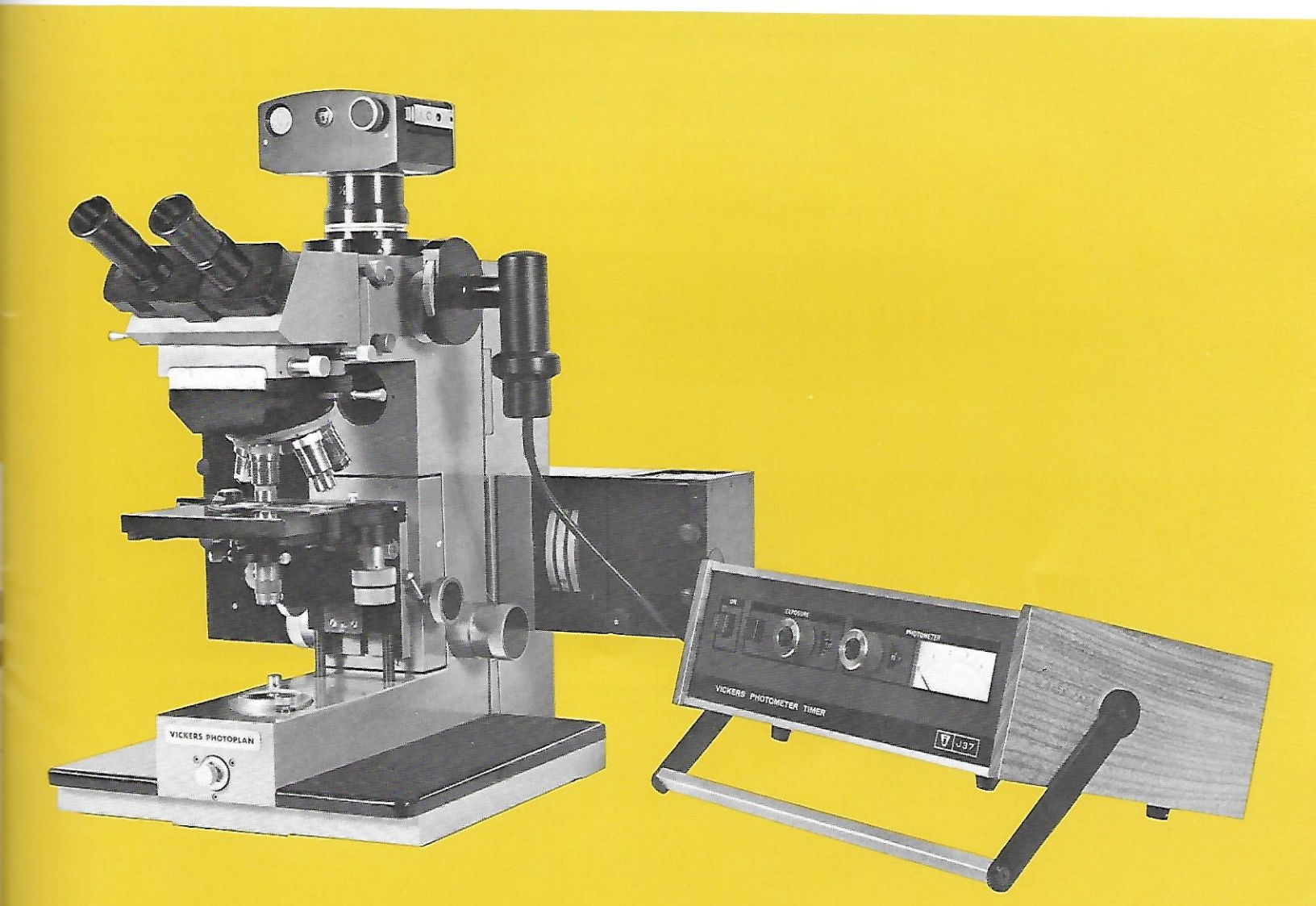
The central camera prism directs a portion of the image forming light onto the photomultiplier of the J35 unit. An electronic circuit controls the exposure time according to the integrated total of light falling on the photomultiplier during the exposure, and the A.S.A. setting on the film speed control.

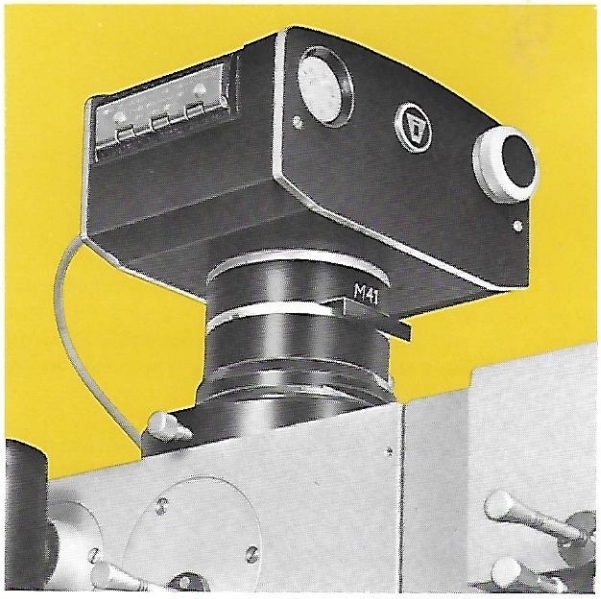
The exposure is given by an electromagnetic shutter having infinitely variable speeds in the range 1/50 second to 15 minutes, and which is vibration free. The exposure can be pre-determined if desired by relating the reading on the front of the instrument to the exposure table in the instruction book. The unit is designed to be as easy to use as possible and it will give excellent results in most circumstances. Manual time exposures may be given if required. The unit is suitable for films in the speed range of 5 to 3,200 A.S.A. being calibrated in 1/3 stops.

J37 high sensitivity exposure timer

The J37 exposure timer and partial field device enables fully predictable exposures to be taken of specimens consisting of isolated illuminated particles on a very dark background or dark on a light background. The J37 thus allows the photographic recording of dark ground fluorescence images which have not in the past been amenable to controlled photography.

When the stand beam splitter slide is pulled right out all the light is directed to the J37 timer photomultiplier. A revolver disc enables the J37 to sample the light from the whole field, 1/10 by area, 1/100 by area or 1/500 by area. The diaphragm sizes are directly related to a graticule in a focusing eyepiece. It is therefore possible to select an area in the specimen for measurement, occupying a space as little as 1/500 of the field by area, determine the required exposure time and set the timer to open and close the shutter. The system is extremely sensitive such that it is possible to measure the amount of light present with the 1/500 stop in place when the image can only just be seen with the well accommodated eye. The timer can be set for a photometric series from 0.05 seconds to 1 hour. Having timed the exposure all the image light may be sent to the camera. With the J37 it is possible to time exposures of even the faintest fluorescence or dark ground image regardless of the light distribution and to accurately record this image on film. The necessary optics ,or use of the various configurations must be ordered together with the exposure unit (for full details please see specification).





Autowind 35 mm camera body

35 mm camera bodies

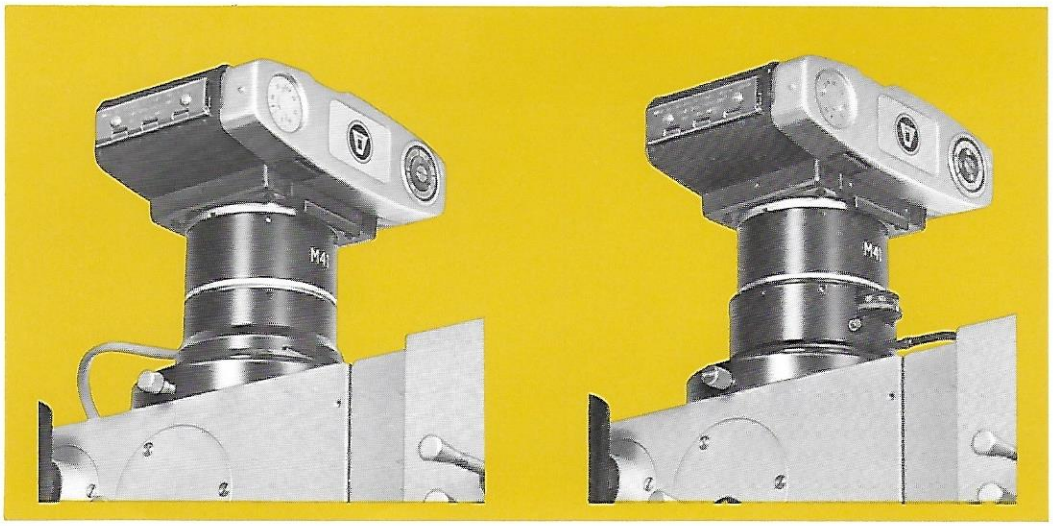
The autowind 35 mm camera has an electromagnetic shutter and operates in conjunction with the J35 or J37 exposure units. After the completion of each exposure the film is automatically wound on, the exposure number being recorded on a frame counter.

The semi-automatic 35 mm camera has an electromagnetic shutter and is used in conjunction with the J35 or J37 exposure units. The film is manually wound on at the end of each exposure by a quick action lever.

The manual 35 mm camera has a quick action lever film wind. The speeded shutter has settings for T, B and speeds from 1 second to 1/125 second, and is operated by a cable release. The camera would be used either without an exposure unit or with a cadmium sulphide photometer placed in an eyepiece tube.

The camera bodies are demountable from the shutter units which are attached to the microscope stand on extra wide cone fittings ensuring excellent stability. Two camera bodies may thereby be used with one shutter unit enabling the operator to change from one film to another without loss of frames. Black and white photography of a specimen can thus be followed immediately by colour reversal recording.

All 35 mm camera bodies have a 1/2× magnification factor.



Semi-automatic 35 mm camera body

Manual 35 mm camera body

universal camera assembly

The large format camera assembly provides the basis for all camera formats other than 35 mm.

The camera assembly is fitted with either an electromagnetic shutter for use with exposure units or a manual speeded shutter. The readily demountable shutter is attached to the stand on a very broad cone fitting.

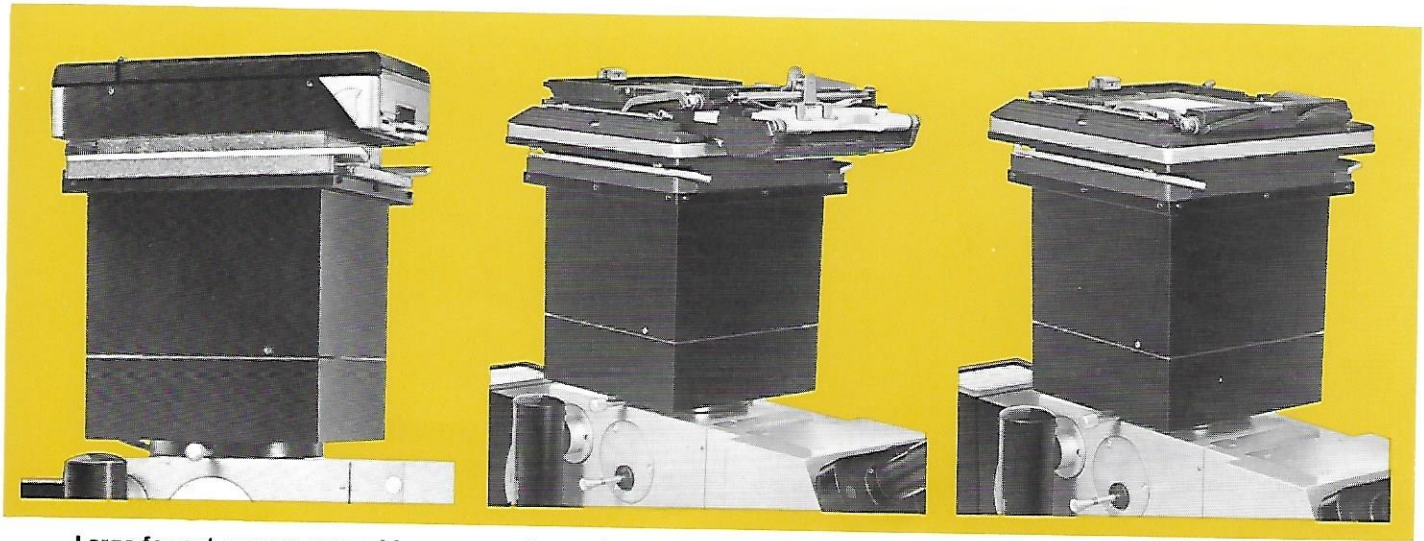
The camera assembly has a 1× camera factor and is fitted with an MPP 4″ × 5″ holder with a simple clip arrangement for the exchange of camera backs or change of format.

The unit will accept a wide range of formats. $3\frac{1}{4}$″ × $4\frac{1}{4}$″, 9 × 12 cm, 4″ × 5″ and the series of Polaroid camera backs including the Polaroid 545 Land back.

Polaroid ® CB.100 Back

The back takes 8 shot Polaroid film packs providing finished prints within seconds of making the exposure. Currently available Polaroid films for the CB.100 are:—

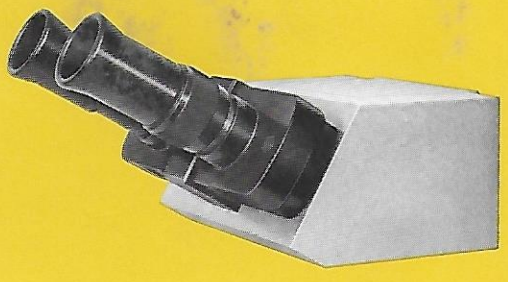
Type 107 at 3000 A.S.A. Black and White
and Type 108 at 75 A.S.A. Colour



Large format camera assembly with Polaroid CB.100 back

Large format camera assembly with Polaroid 545 back

Large format camera assembly with the MPP 4″ × 5″ holder



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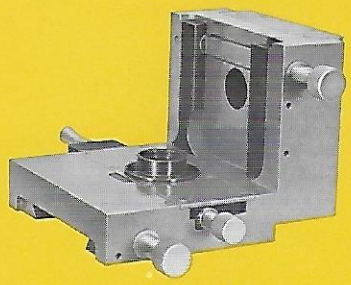


31-75-05

DESCRIPTIONS IN NUMERICAL ORDER

31-75-01	M41 Photoplan basic stand
31-75-04	Head carrier bracket without Bertrand lens
31-75-05	Head carrier bracket with Bertrand lens
31-75-06	Transmitted light objective changer carrier
31-75-07	Quadruple revolving incident light objective changer (dark ground/bright field)
31-75-08	Quintuple revolving transmitted light objective changer
31-75-09	Quadruple revolving incident bright field objective changer (necessary if apochromats are to be used)
31-75-71	Clamp on condenser carrier bracket
31-75-72	Substage focusing unit
31-75-90	50 × 75 mm square mechanical stage
31-75-91	38 × 38 mm square mechanical stage
31-75-92	150mm diameter rotating stage with attachable mechanical stage 31-75-23
31-76-01	Binocular head
31-76-10	Incident illuminator for bright field and dark ground
31-76-50	12 volt 100 watt tungsten halogen lamp
31-76-51	50 watt mercury vapour lamp
31-76-60	Camera magnification cones 1× and 1.25×
31-76-70	Achromatic condenser
31-76-71	Phase contrast condenser
31-76-72	Oil immersion dark ground condenser
31-77-10 and 31-77-12	Large format camera body with electromagnetic shutter
31-77-13	MPP 4″ × 5″ adaptor
31-77-20	Autowind 35 mm camera



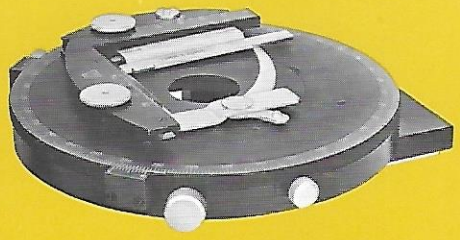
31-75-08



31-75-07



31-75-09



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31-75-91



31-76-71



31-76-72



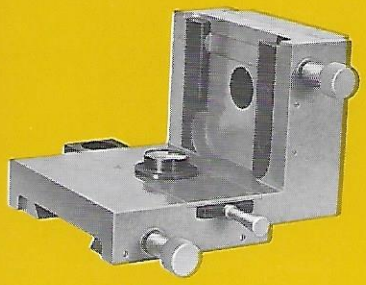
31-77-13



31-77-10
and
31-77-12



31-77-20



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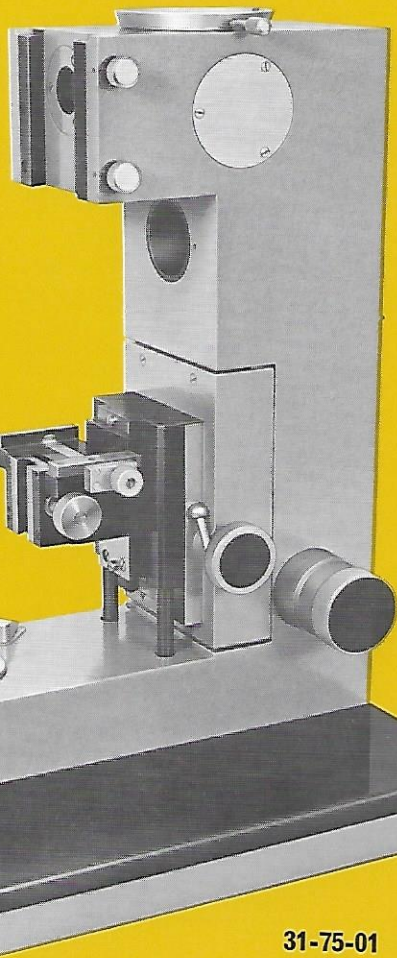
31-76-60



31-75-06



31-76-10



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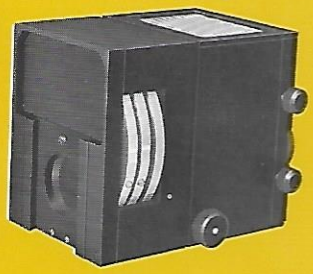

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31-75-90



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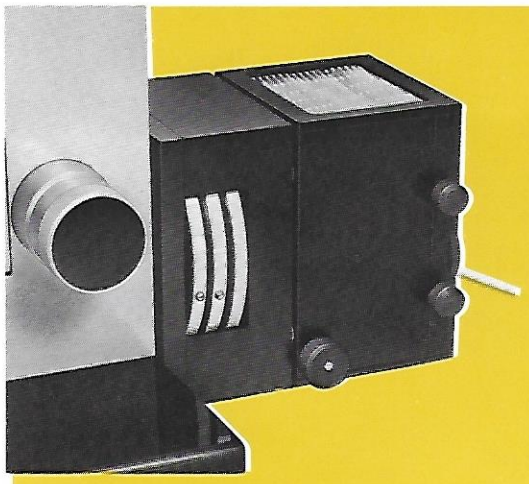
31-76-51



31-76-70



Small housing for tungsten halogen lamp

Standard filters and filters for polarized light for 100 watt tungsten halogen lamp

Disc 1 Nearest Lamp	1 Heat absorbing HA3 or KG1 2 Dark green OGR1 or VG9 3 Daylight blue OB8 or BG34 0 Clear	In addition a heat absorbing filter HA3 or KG1 is mounted permanently in position
Disc 2	1 Heat absorbing HA3 or KG1 2 Neutral ON10 or NG9 3 Light green OY12 or GG10 0 Clear	

illumination

Two broad dovetail slides are fitted at the rear of the Photoplan stand for the attachment of lamp units for incident and transmitted light.

The standard lamphousing is designed to accommodate either a 12 volt 100 watt tungsten halogen lamp or a 50 watt mercury vapour lamp.

The 12 volt 100 watt tungsten halogen lamp provides high intensity white light illumination which meets all the needs of visual and photographic work in both transmitted and incident light. The colour temperature may be set anywhere between 2800°K and 3300°K.

The 50 watt mercury vapour lamp is an ideal source of ultraviolet and blue light illumination for simple fluorescence work or where intense monochromatic light is required.

The large lamphousing accommodates either a high pressure mercury vapour lamp HBO200 or a white light mercury lamp CSI 250W. When used for transmitted light the Photoplan is placed on a special "riser" plate.

The HBO200 mercury vapour lamp is a very high intensity source of ultraviolet and blue light. The HBO200 finds its greatest use in critical fluorescence work when it will normally be used with the reflector housing. The CSI 250 watt lamp provides high intensity colour balanced illumination for photography or projection of very dense or low reflecting specimens.

Filter Box

A filter unit containing two quadruple filter revolvers and a field iris is fitted to each lamphousing. The filter units and lamphousings are separated by special insulating fastenings so that no heat conduction is possible between them, thus ensuring total operator comfort.

fluorescence accessories

A special reflector housing permits the use of three basic fluorescence techniques:—

(a) Transmitted light fluorescence.

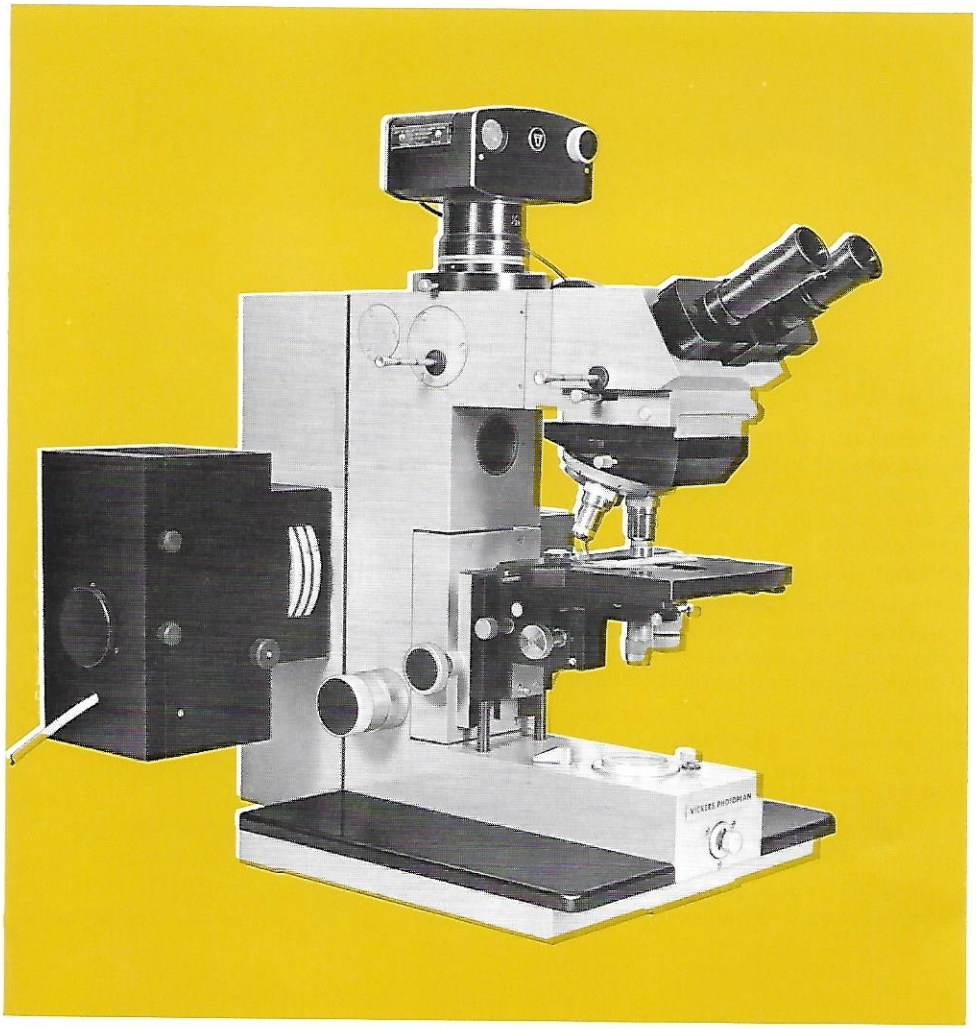
(b) Incident light fluorescence with or without transmitted light phase contrast.

(c) Mixed transmitted light fluorescence/phase contrast illumination.

The reflector housing is attached to the rear of the M41 Photoplan on two dovetail carrier slides. Provision is made on the left hand side of the instrument for the attachment on a dovetail of a large lamphousing containing a high pressure mercury vapour lamp HBO200. The housing is fitted with two quadruple exciter filter revolvers and an iris diaphragm for illumination adjustment. Lower down and to the left hand side is a dovetail for the attachment of a standard 12 volt 100 watt tungsten halogen lamp.

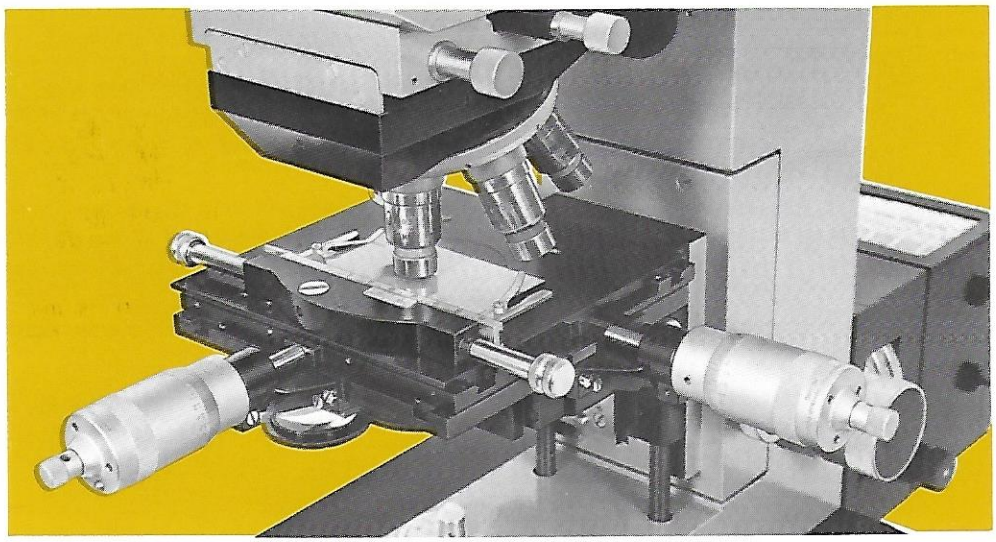
A swivel mirror within the unit allows the operator to direct all the exciting radiation from the mercury vapour lamp either to the transmitted light base or to the upper stand aperture for incident illumination.

Plug-in interchangeable dichroic mirrors may be inserted into the tungsten lamp aperture for mixed transmitted light phase contrast fluorescence with a special condenser.



The barrier filters are contained in a filter slide held in a slot in the head carrier bracket or transmitted light objective changer carrier.

Details of fluorescence equipment and components are in the specification.



precision length measurements

The M41 Photoplan fitted with the detachable large micrometer stage enables very precise length measurements to be undertaken on slides measuring 100 mm × 50 mm or 75 mm × 25 mm to an accuracy of 0.005 mm (5 μ).

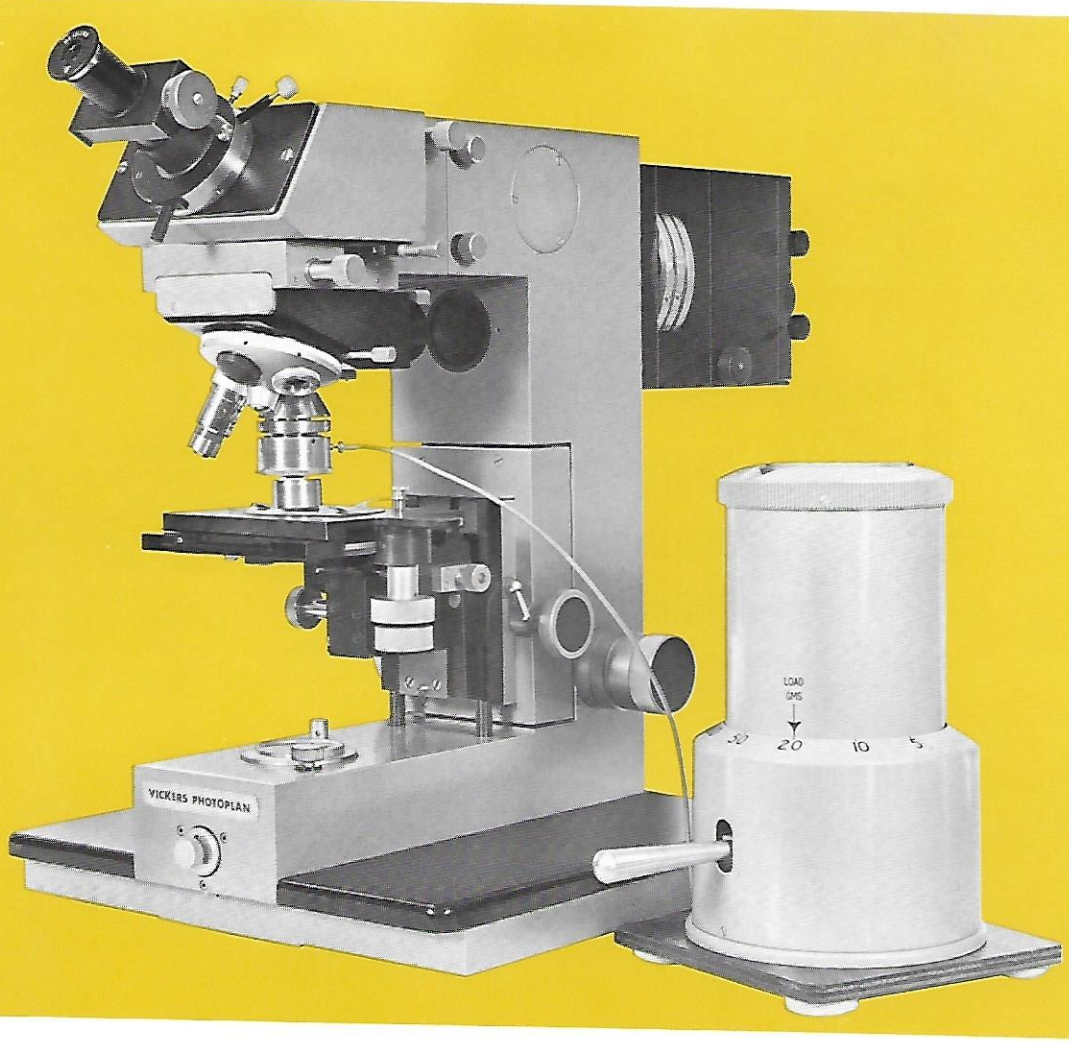
The stage is provided with two movements at right angles to one another operated by large micrometer screws with 25 mm traverses reading to 0.005 mm (5 μ). The attachable slide carrier has a 50 mm lateral scale and can be mounted in three positions each 12.5 mm apart, thus covering 75 mm, the remaining 25 mm being covered by the micrometer screw. In the transverse axis there are two positions 25 mm apart, the micrometer screw covering the remaining 25 mm.

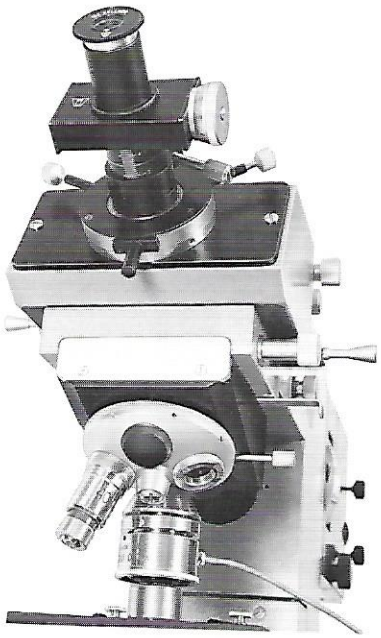
The microscope fine motion spindle may be employed in conjunction with the large micrometer stage providing a third axis of measurement graduated to 0.001 mm (1 μ). The stage is ideally suited to the measurements of photographic plates and in this manner finds application in the fields of X-ray diffraction and nuclear tracking.

The positions of micro hardness indentations and other objects are very readily determined with the stage as are the dimensions of integrated circuits on both transparent and opaque substrates.

The equipment was originally evolved in consultation with physicists engaged upon nuclear research in Great Britain, and considerable numbers have been supplied to laboratories throughout the world.

micro hardness testing





Micro-hardness testing can be efficiently carried out by non-specialised personnel, the apparatus having been designed to operate automatically under pre-determined loads between 5 gms and 200 gms.

The micro-hardness testing equipment consists of a combined indenter and microscope objective in which the housing for the lens system is fixed, and only the diamond indenter, mounted on a thin rubber diaphragm, moves.

After the selection of the required load, which is read against the index on the cylinder of the transmitter, a lever is depressed, and the correct load at a constant rate for that load is automatically applied to the indenter by pneumatic pressure. When the lever is allowed to return, the pneumatic pressure is released, and the indenter is restored to its original position. The indenting operations are entirely impersonal, and variations in the rate of operation of the lever, which may be expected between different operators, do not influence the final results.

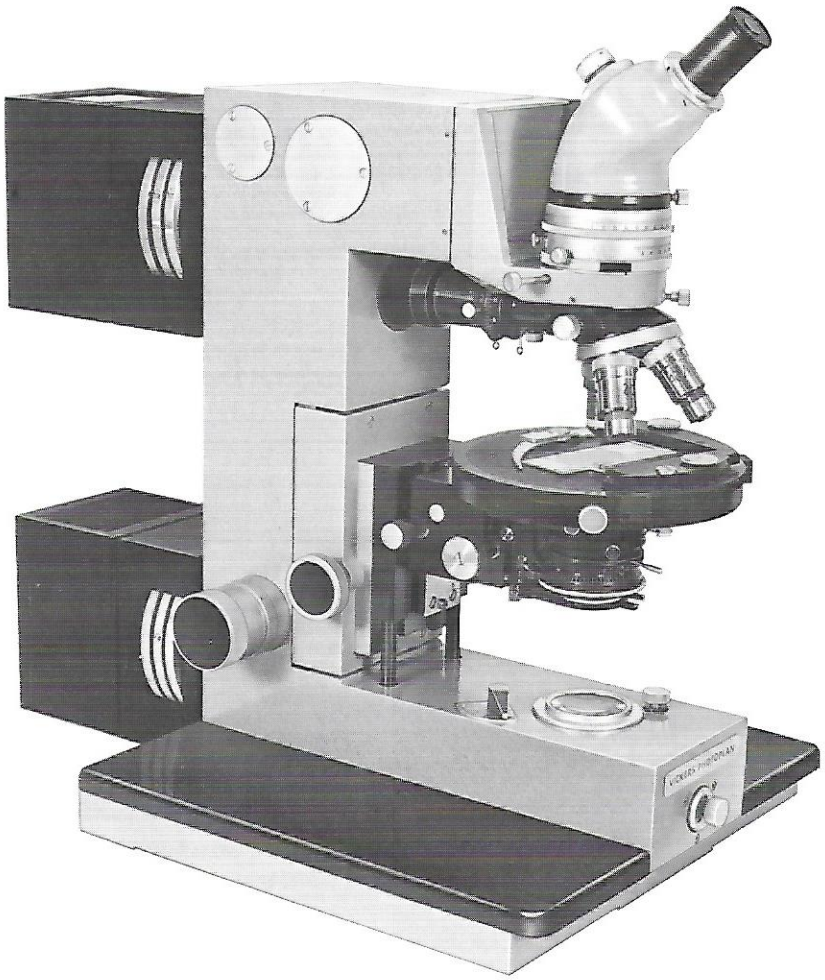
The filar micrometer measuring eyepiece is mounted on a centring device attached by a cone fitting to the monocular head body. This integral arrangement ensures great stability during the measurement of the indentation.

The degree of interchangeability of the M41 Photoplan allows speedy change from micro-hardness testing to other techniques with no disturbance to the specimen.

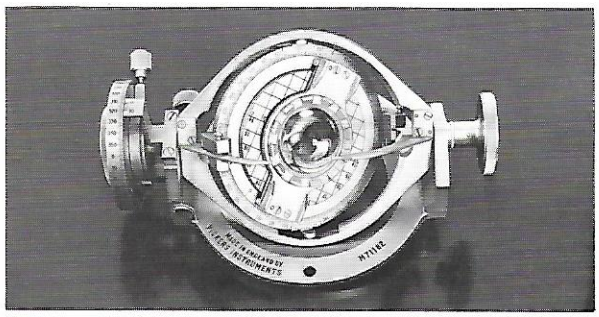
research polarizing equipment

A full range of 1st order polarized light equipment is available for the M41 Photoplan. The modular construction of the microscope stand allows very speedy and convenient exchange against the standard M41 transmitted or incident light components. The polarized light head accessories are fitted to the M41 stand on a readily detachable head carrier bracket.

Details are in the specifications.



Three axis universal stage



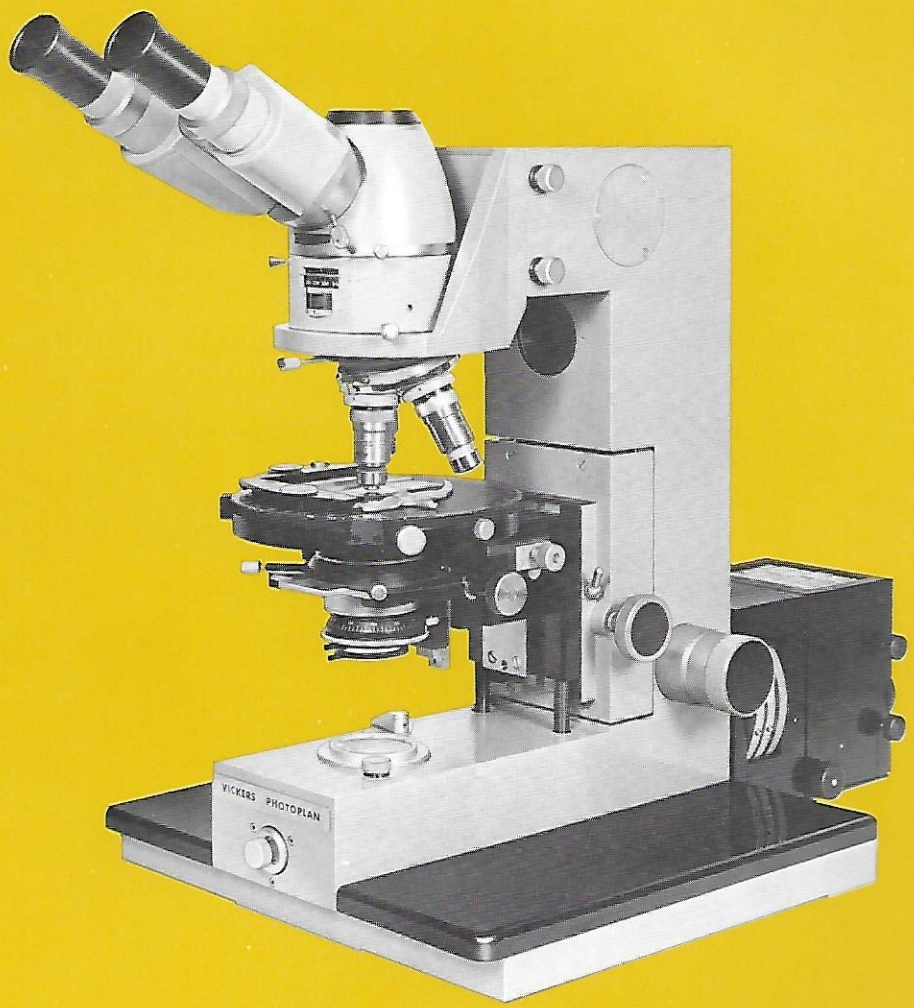


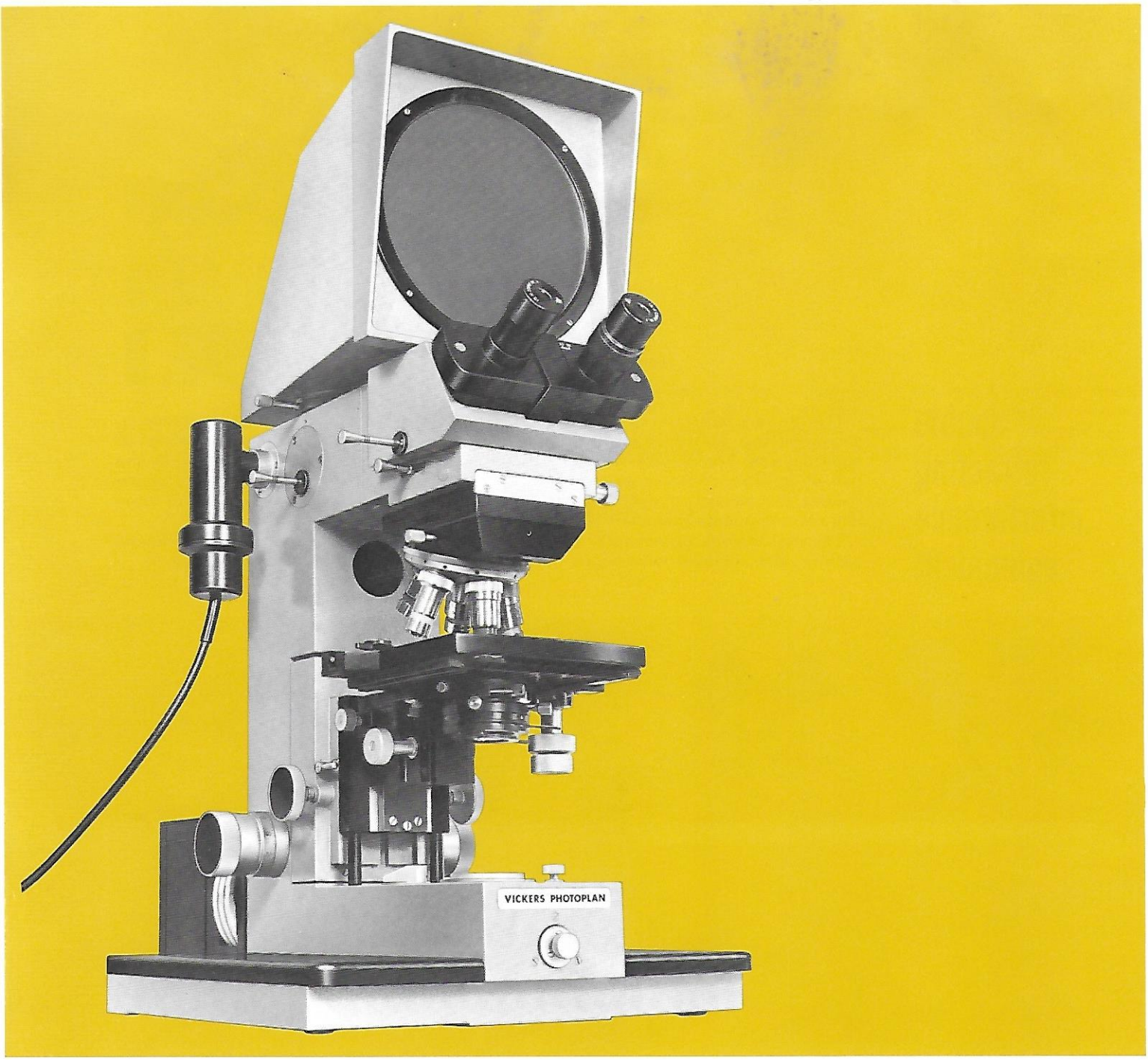
Half shade eyepiece for accurate phase measurement

double refracting interference equipment

The Vickers interference equipment for the M41 Photoplan research microscope, employing two alternative beam dividing phase systems, has a versatility and range of application far beyond that offered by single beam phase contrast microscopes. By the use of suitable phase measuring devices and by observation of the coloured phase images, it is possible to determine the properties, distribution and precise values of many important specimen characteristics.

The high degree of versatility of the M41 Photoplan allows very speedy interchange between the standard microscope components and the interference accessories.





projection head

The 6″ diameter microcrystalline wax projection screen head is fitted directly to the stand camera aperture. The projection screen provides an overall magnification of 10× the objective power.

BAUSCH & LOMB

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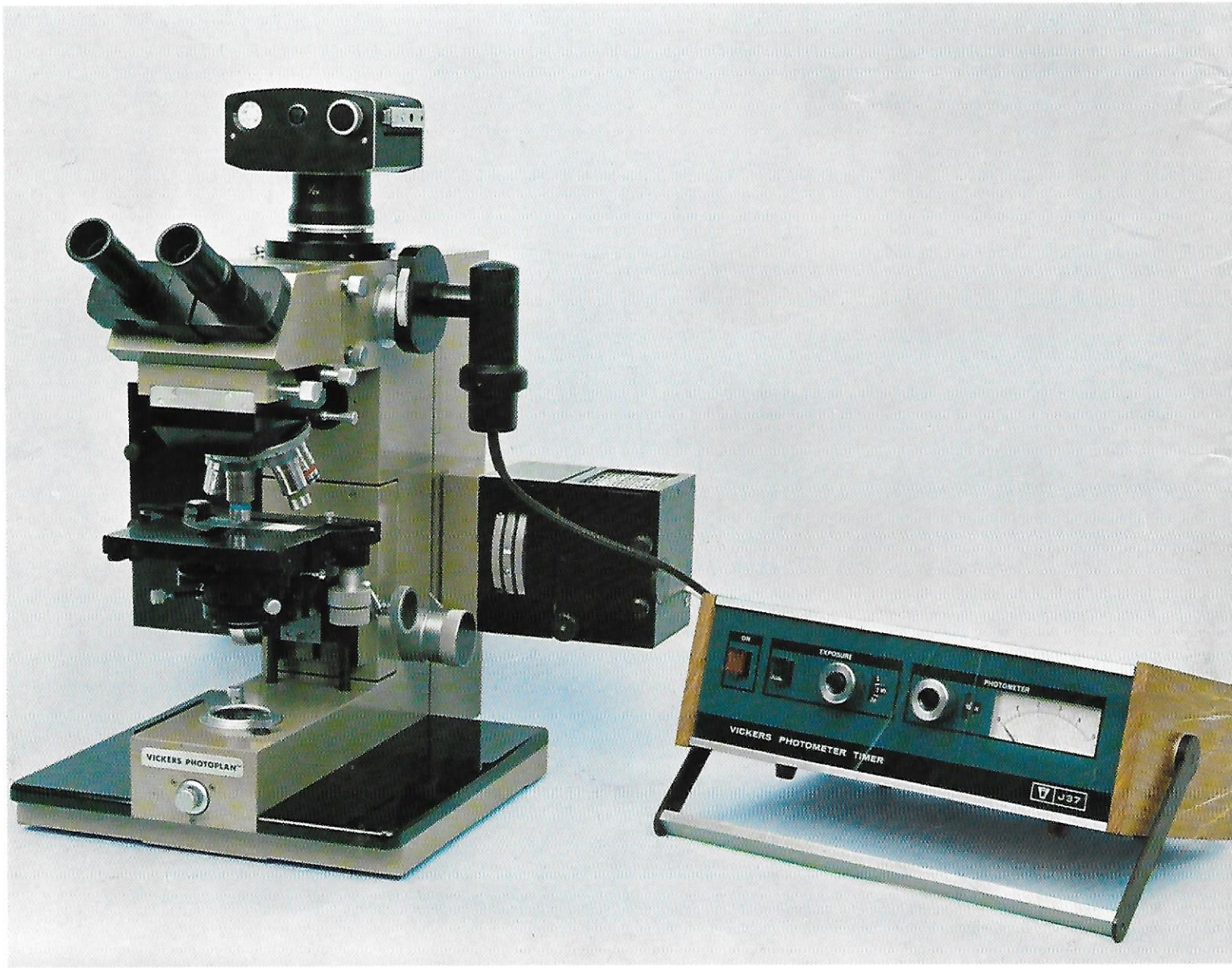
ROCHESTER, NEW YORK, U.S.A. 14602



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