



Vickers

M72 SERIES POLARIZING MICROSCOPE



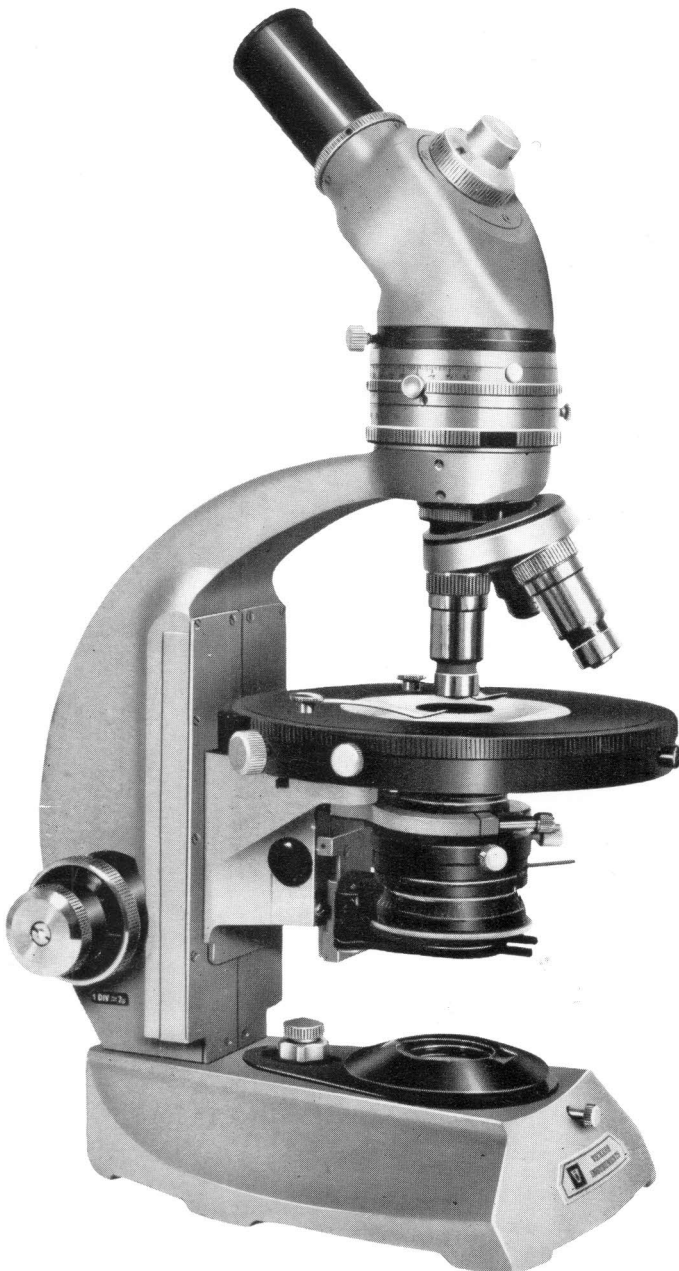
VICKERS INSTRUMENTS



M72 SERIES

POLARIZING MICROSCOPES

The M72 series microscopes have the same limb, base and stage. They form, however, a range of three microscopes, one for transmitted light, one for incident light, and one for transmitted and incident light; each is available in two forms: either with a revolving objective changer, or with a fitting to allow the objective to be mounted on to the microscope in individual centring changers.



M72 for transmitted light illustrated with:

M720225	Monocular head	M720100	Analyser unit
M720190	Polarizer unit	M220290	Illuminator



M73 for incident light illustrated with:

M720225	Monocular head
M720100	Analyser unit

Three basic stands . . .

Stand **M72** is for transmitted polarizing work. The basic microscope contains all the standard features of the polarizing range of instruments and includes a rack and pinion focusing substage which can be fitted with the polarizer shown on page 9. Any of the viewing heads or analysers can be attached.

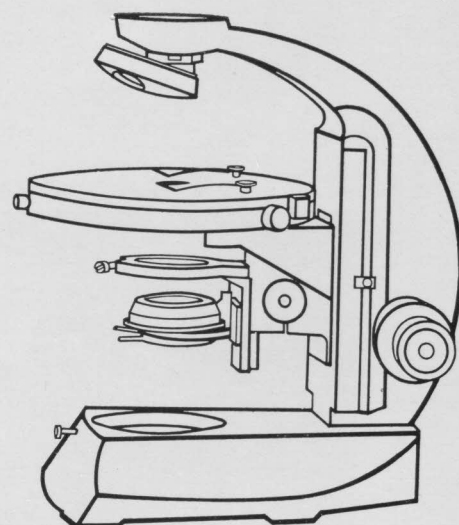
Stand **M73** is for incident polarized light work. It has no substage but has an incident illumination tube built on. A high intensity Köhler illuminator may be supplied as an alternative. The stand can be fitted with any of the viewing heads and analysers.

Stand **M74** is for incident and transmitted polarized light work. It has the rack and pinion substage, the incident illuminator, and the advanced polarizer. It can be fitted with all the available attachments and accessories.

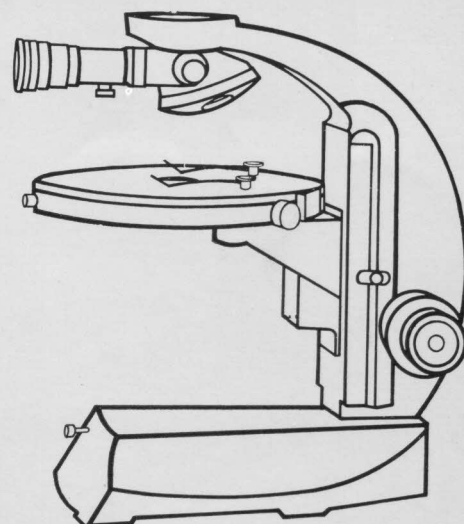


M74 for incident and transmitted light illustrated with:
M720225 Monocular head M720190 Polarizer unit
M720100 Analyser unit M220290 Illuminator

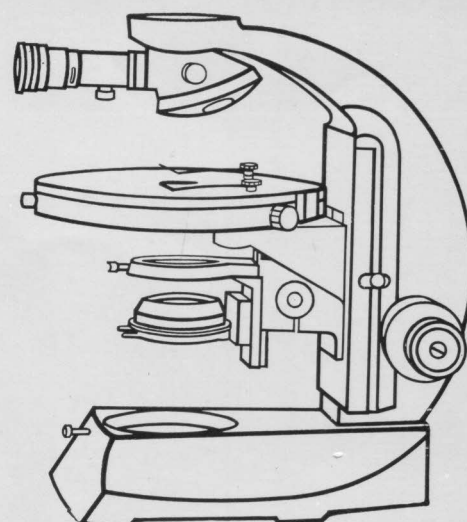
M72



M73



M74

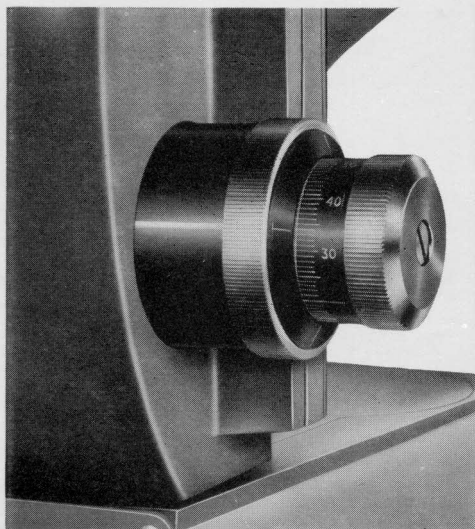




SPECIAL FEATURES

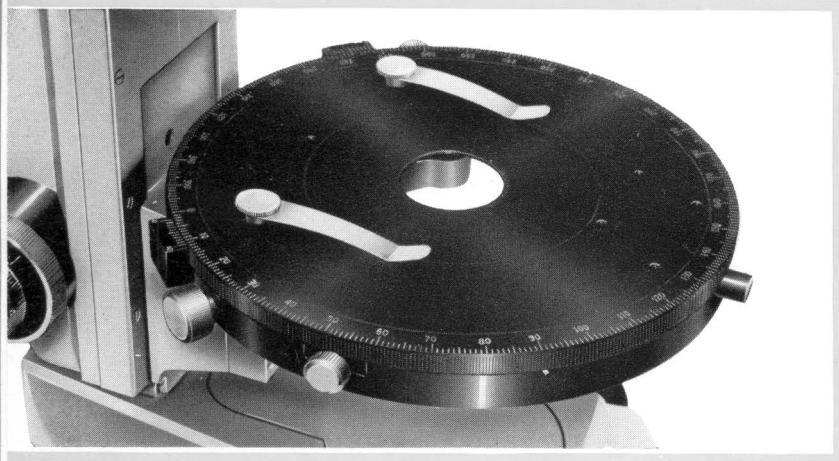
VICKERS POLARIZING MICROSCOPES

the basic stand and attachments have many new and advanced design features



COARSE AND FINE FOCUSING

Concentric coarse and fine focusing control knobs are low placed to give a comfortable working position and the very wide ball bearing focusing slides ensure excellent rigidity. The fine adjustment is graduated every 2 microns.



ROTATING STAGE

The optical precision rotating stage is a novel Vickers Instruments design in which the ball tracks are produced by the same method used in the making of lenses, thereby achieving similar precision. This gives a stage with great accuracy of rotation and a very free movement. Two verniers are fitted, reading to 6 minutes of arc. The stage has centring screws and a lock to the rotation. The centre disc removes for the three axis stage to be fitted.

An attachable mechanical stage, M720300, is available for fitting to the rotating stage.



HEADS AND ANALYSER UNITS

Monocular or binocular heads are easily attached or removed. The range of heads and analyser units which are available, is shown on page 8.



MONOCULAR HEADS

The Bertrand lens is in the monocular head. Rotation of the knob swings the lens in or out and a stop is incorporated to isolate the conoscopic figure from small particles.

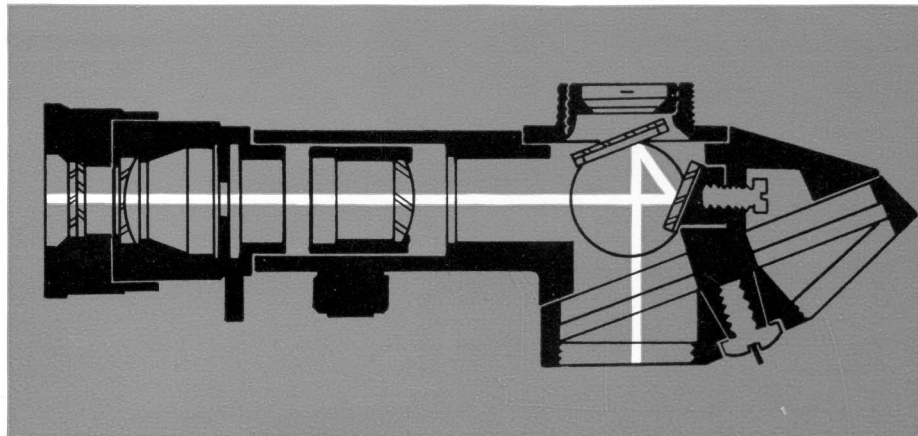
An alternative monocular head has a focusing Bertrand lens. The lens is swung in or out by rotation of the larger knob and focused by the smaller concentric knob.



INCIDENT ILLUMINATOR

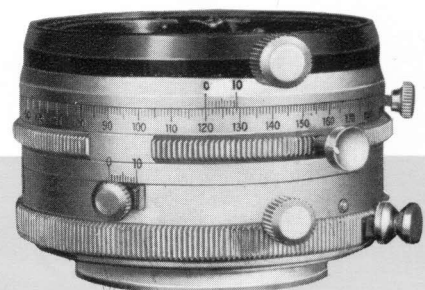
The incident illuminator* is a considerable advance on earlier designs. The light entering the illuminator is reflected by a mirror so that it falls on to the thin glass reflector at a much reduced angle, thus minimising the rotation effects on reflection. The result is a more uniformly polarized field and aperture than is commonly obtained in incident polarized light microscopy.

* Patent No. 1045574



ANALYSER UNIT

The more advanced analyser has the unusual feature that the analyser can be rotated together with the compensator slot, or each can be rotated separately, which allows great flexibility in the use of compensators. All polarizing elements used in Vickers Instruments polarizing microscopes are top grade high extinction polarizing film mounted between specially selected plates of strain free optical glass and edge-sealed against moisture.



VICKERS

MICRO-HARDNESS TESTING EQUIPMENT

Micro-hardness testing can be efficiently carried out by non-specialised personnel, the apparatus having been designed to operate automatically under predetermined 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 optical 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.



M74 polarizing microscope with micro-hardness testing equipment.

POLARIZING MICROSCOPES

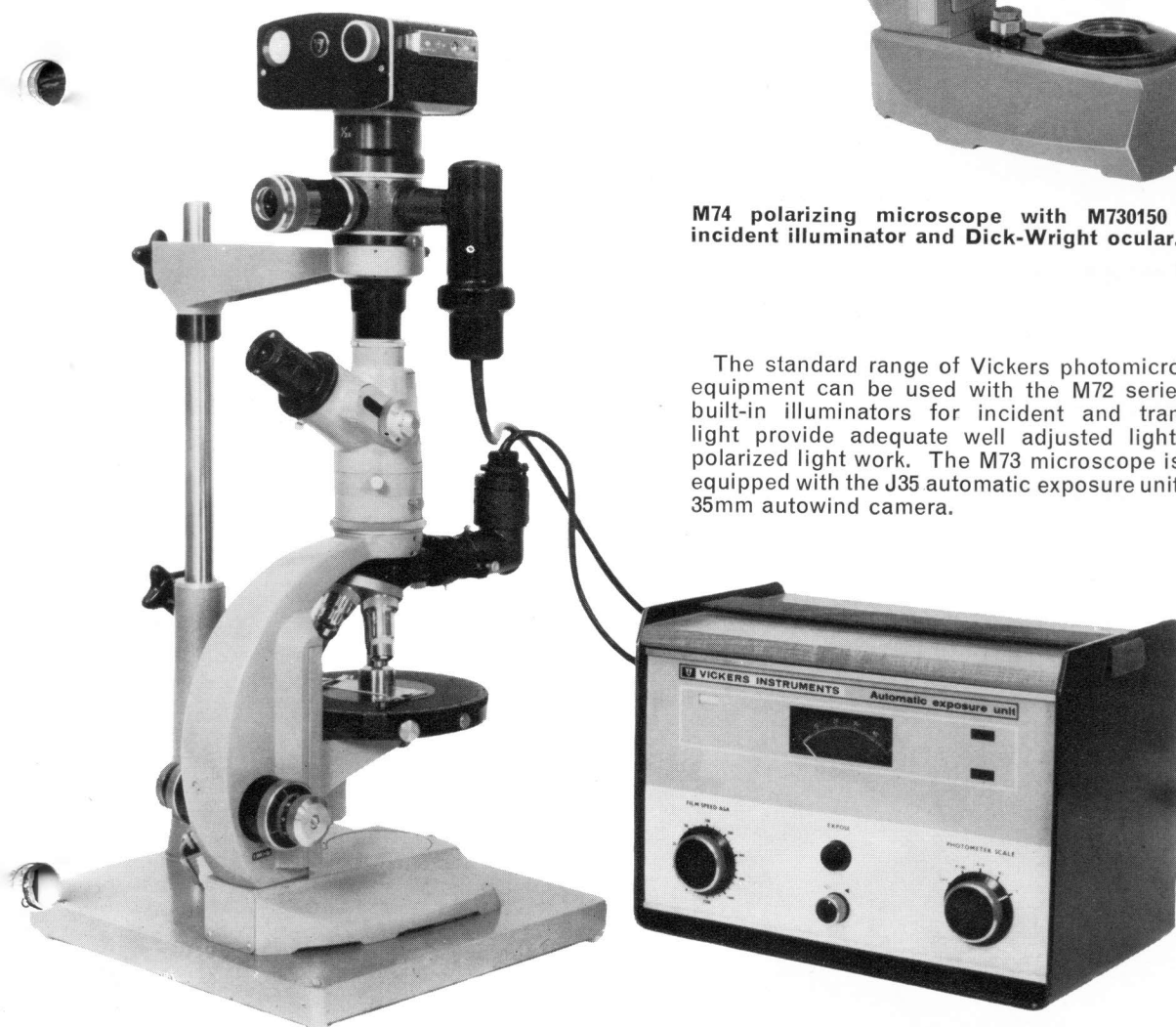
ILLUMINATION

Illumination for incident light work can be obtained with a separate high intensity lamp using the revolving nosepiece system or individual changer system. A more convenient source of illumination using a built-in 6 volt, 15 watt lamp may be supplied as an alternative under the number M730150 with either the revolving or individual changers. The lamp unit itself may be easily detached from the objective carrier so as to allow an external source to be used. The transmitted light microscopes can employ either a built-in high intensity 6 volt, 15 watt lamp M220290 fitted with a condensing and diffusing system, or may be illuminated with a separate lamp via a plano/concave mirror in a gimbal M220325.



M74 polarizing microscope with M730150 built-in incident illuminator and Dick-Wright ocular.

The standard range of Vickers photomicrographic equipment can be used with the M72 series. The built-in illuminators for incident and transmitted light provide adequate well adjusted light for all polarized light work. The M73 microscope is shown equipped with the J35 automatic exposure unit and the 35mm autowind camera.



ACCESSORIES

HEADS

The following viewing heads are available. M720227 for normal tube eyepiece and M720228 for wide tube eyepiece, are monocular heads having a swing-out non-focusing Bertrand lens. M720225 for normal tube eyepiece and M720226 for wide tube eyepiece, are monocular heads having a focusing swing-out Bertrand lens. M720270 is a binocular head for normal tube eyepieces. A fixed focus Bertrand lens unit, M720630 which is placed above the analyser unit is offered for use with the binocular head. M720380 is a photovisual head with swing-out non-focusing Bertrand lens in which the light can be directed up the 30° viewing tube, or vertically through to a camera by withdrawing the Bertrand lens and reflecting prism from the light path, the tube length and magnification remaining unchanged.

INDIVIDUAL OBJECTIVE CHANGERS

Instead of revolving objective changers the microscope can be supplied with individual objective changers. A receiving unit is attached to the microscope and each objective is screwed permanently into an individual changer which has centring screws to bring the objectives exactly paracentral with each other. The objectives, on their individual changers, can then be clipped on to the microscope. The changer is shown fitted to the incident illuminator and reflector unit.

ANALYSER UNITS

The simple Analyser M720135 has a non-rotating pull-out analyser and a 45° slot for compensators.

The advanced Analyser M720100 has a rotating pull-out analyser, the rotational position of which can be read by vernier to 6 minutes of arc, and clamped. It also has a rotating compensator slot, the position of which can be read to 6 minutes of arc and clamped. If required the two can be clamped and rotated together, a feature which can be useful for some compensating techniques.

POLARIZING MICROSCOPES

POLARIZER UNIT

The M720190 unit has a swing-out polarizer graduated every 5° with a click stop every 90° ; a subsidiary lens in a trip-out mount for use with low power objectives, and also a swing-out filter holder and ground glass screen.

EYEPIECES

Eyepieces for polarized light microscopes have a cross-line in the field of view and a focusing adjustment to focus the crossline. The eyepieces are either normal tube 23.2 mm. diameter or the wide tube wide field type 29.2 mm. diameter. Monocular heads are made in both normal and wide tube. The binocular head is only made in the 23.2 mm. tube.

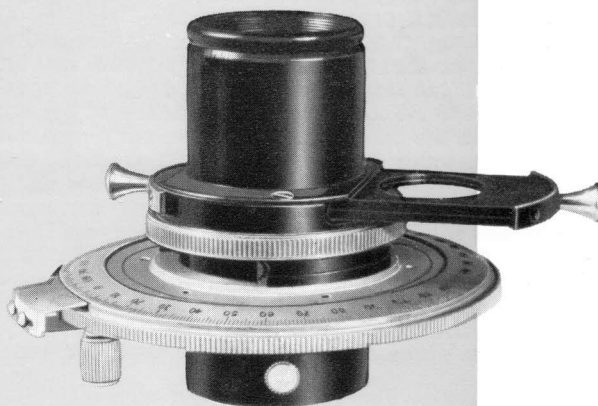
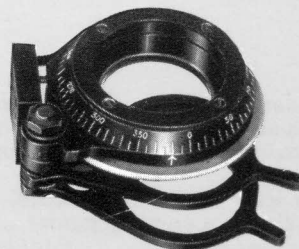
DICK-WRIGHT OCULAR

The graduated rotating slotted ocular, M720570, which can be used with the photovisual head M720380, has been designed to enable the top portion containing the analyser, cross-wires, and slot for compensators, to be rotated with a circular scale graduated in degrees against a fixed vernier reading to 6 minutes of arc. It is fitted with a clamp and iris diaphragm.

ACHROMATIC OBJECTIVES

The range of achromatic objectives for polarizing microscopes extends from $3\times$ to $100\times$ oil immersion. They are all mounted with great care and then selected for strain-free properties. The lower powers up to $10\times$ can be used for transmitted or incident light work, but from $20\times$ upwards objectives must be corrected for use with or without a cover glass over the specimen, and if work with covered and uncovered objects is to be done, two of the higher power objectives will be necessary, one for covered objects and one for uncovered objects.

Flat field achromatic objectives are available in powers $10\times$, $20\times$ and $40\times$.



ACCESSORIES

CONDENSERS

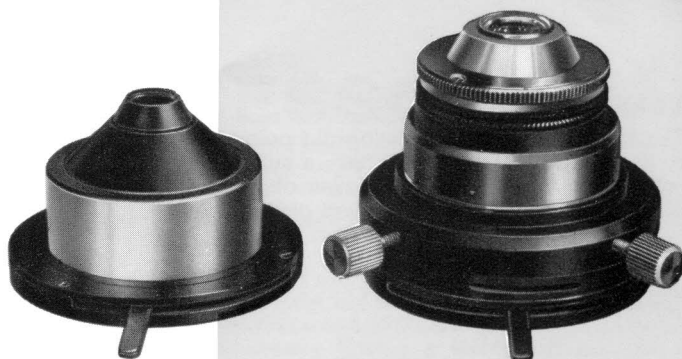
The Abbe condenser M720294 is usually favoured for polarizing microscopes as its simple construction provides a minimum of depolarizing problems. It is supplied in a plain mount.

The swing-out top lens condenser M720496 is of the Abbe type and is supplied in a centring mount.

The aplanatic condenser M720475 in a centring mount is useful where a higher numerical aperture is required.

M720359 is an oil immersion achromatic condenser N.A. 1.3, and is supplied in a centring mount.

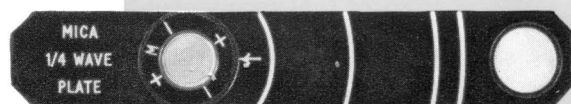
For full details see the specification.



COMPENSATORS

A number of birefringent compensators are available catering for all the qualitative and quantitative requirements likely to be met in polarized light work.

For full details see the specification.



THREE AXIS UNIVERSAL STAGE

The three-axis stage M007745 is used for the determination of the optical properties of crystals. A three axis system has been chosen in preference to four and five axis stages, as the diminished stability and restricted movement of these stages far outweighs the advantages of the seldom used A3 axis and the elimination of graphical procedure with the five axis system. The outfit includes a special 5 \times objective, N.A. 0.15 (N.A. 0.23 when the hemispheres are employed) which contains a removable ring mark in the back focal plane to facilitate conoscopic adjustment of an optical symmetry plane, and the measurement of optic axial angles by means of the interference figure. Hemispheres of $n = 1.54$, $n = 1.70$, $n = 1.62$ are available, a pair of glass hemispheres $n = 1.54$ being included with the basic equipment.

A complete range of further accessories is available.

