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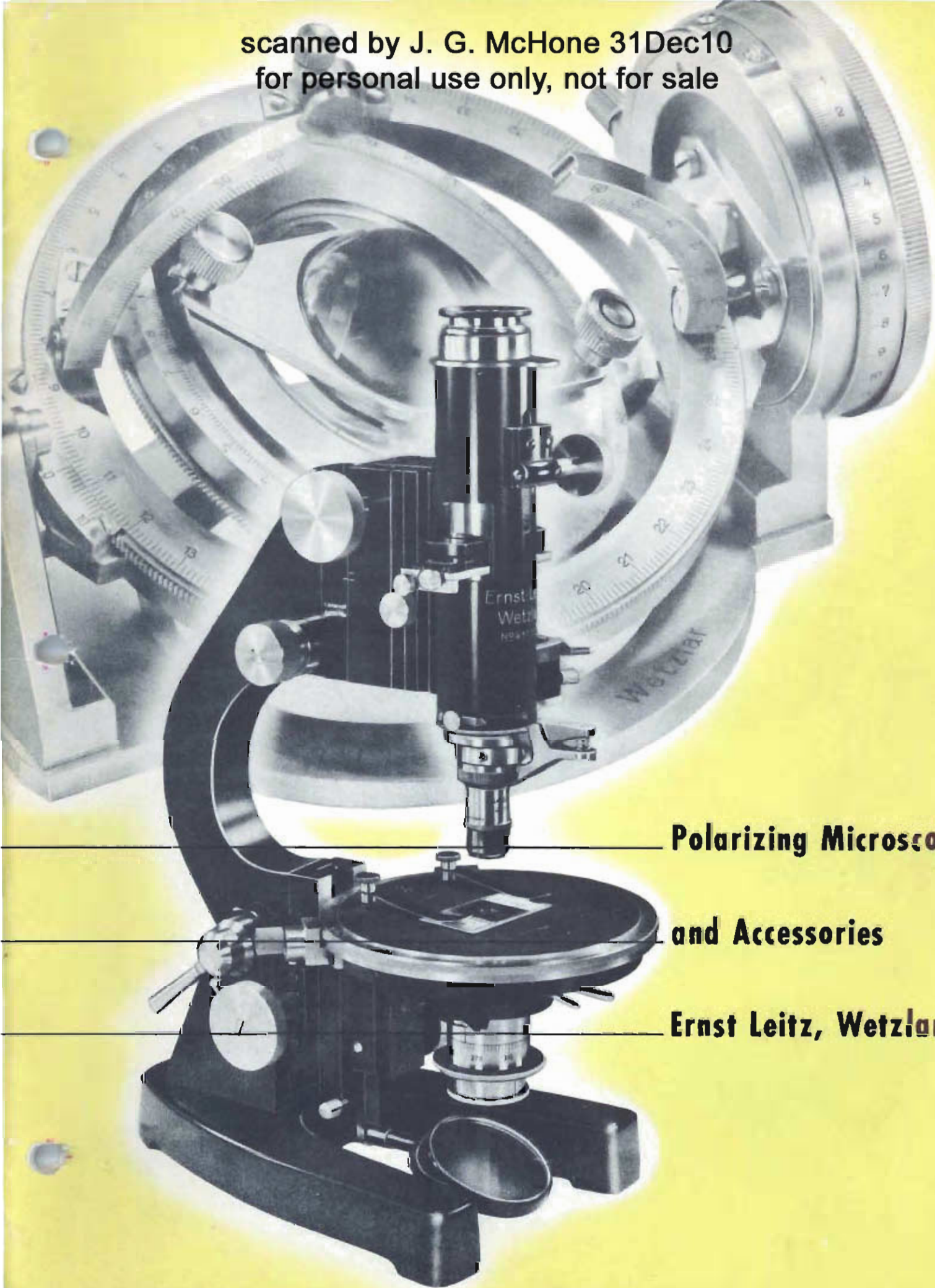

Polarizing Microscopes

and Accessories

Ernst Leitz, Wetzlar

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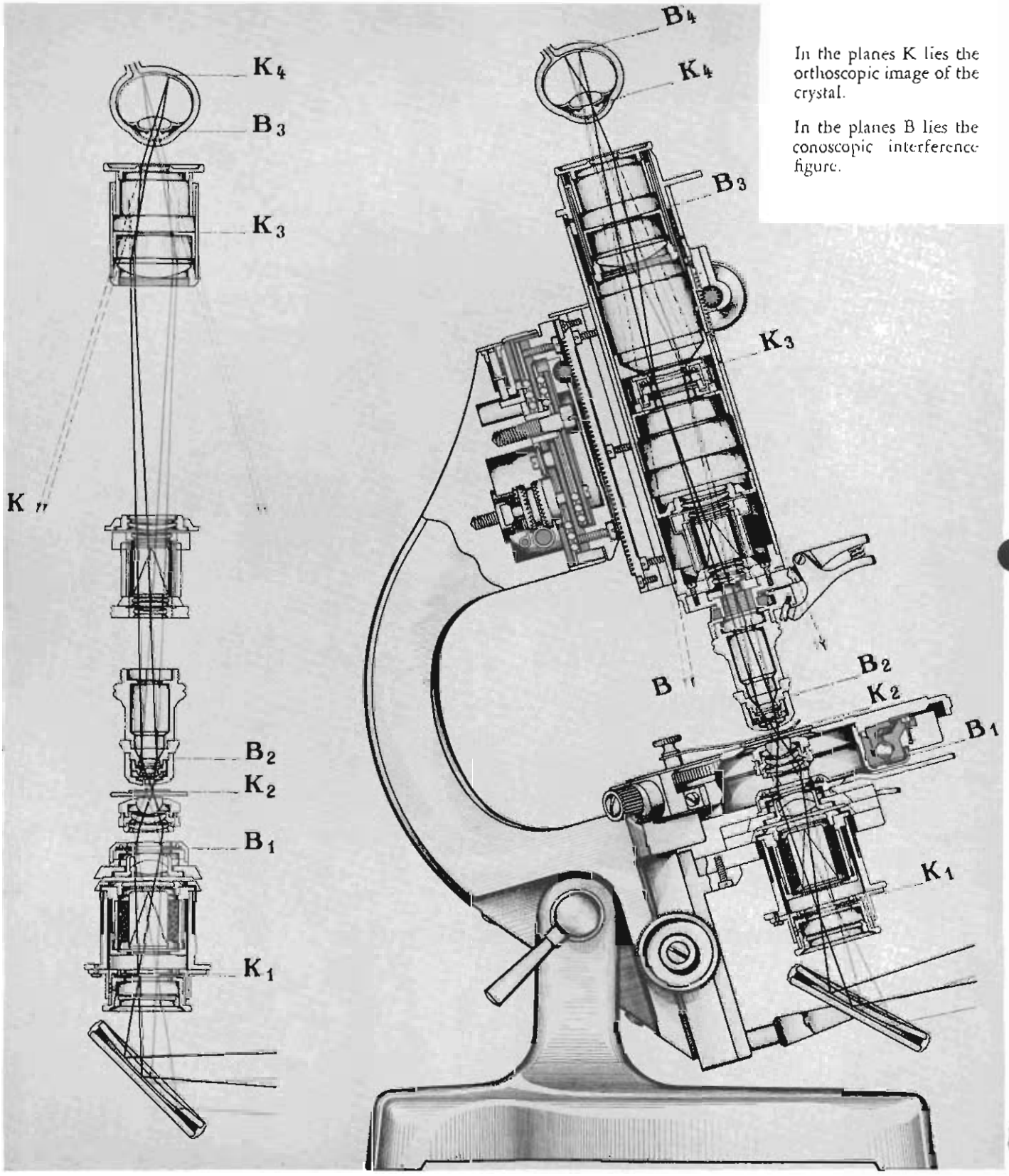
The illustrations contained in this catalog do not necessarily agree in every detail with the actual design; it is our practice to continually improve our products and to include these latest features in the design of our equipment.

E. LEITZ, INC.

New York, N. Y.

Path of rays through polarizing microscope



In the planes K lies the orthoscopic image of the crystal.

In the planes B lies the conoscopic interference figure.

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Introduction

Leitz Polarizing Microscopes are recognized by leading authorities in the fields of geology, mineralogy, petrography, paleontology, chemistry and bio-chemistry, as the foremost instruments optical science has to offer. This is not surprising; no other manufacturer has ever developed this specialized microscope field to such perfection and broadness of application. Scientific investigators all over the world contributed greatly with suggestions; demanded new and better design for improved accessories to cope with the specialized types of investigation. The Leitz Works have thus made available the greatest variety of polarizing microscopes and accessories to fill the most diversified needs. This development is in no small part due to the late Max Berek, for many years the scientific director of the Leitz Works, and a mineralogist of world repute.

Scientific advancement and the unchallenged technical skill for which Leitz is justly famous, have brought Leitz polarizing microscopes into a position of leadership and quality aimed at, but never quite attained, by other manufacturers. A polarizing microscope requires, perhaps more so than any other mechanical optical instrument, the ultimate in technical skill and craftsmanship. You can be sure that Leitz polarizing microscopes meet this challenge at every step of manufacture. This is evidenced by the performance of thousands of instruments, in use for many decades throughout the world.

The polarizing microscope has considerably extended its usefulness during recent years. Petroleum, plastic, synthetic fiber and metal industries are recognizing its increased importance in basic research as well as production control. Also in the fields of biology, micro-chemistry, etc., the optical characteristics of material as seen through polarizing microscopes are prime factors for better understanding and evaluation.

The various types of stands

Leitz Polarizing Microscope Model AM is designed to meet the most exacting requirements as well as the most diversified applications. Its stage focuses up and down and accommodates all types of universal stages. For ore microscopy of opaque mineralogical specimens, a polarizing vertical illuminator with special objectives is attachable.

The Model SY is a research type stand with facilities for the synchronous rotation of polarizer and analyzer through 240°.

The Model CMU is considered "standard equipment" in industrial laboratories, universities, research and development companies, etc. It accepts all universal stages.

The Model HM is well known as a chemical microscope and finds wide application in laboratory, student and classroom work.

The Model MOP is an ore microscope with facilities for raising and lowering the stage. An attachable substage with polarizer is available for transmitted polarized light.

Important details of construction

All Leitz Polarizing Microscopes are supplied with object srages on ball bearings which guarantee easy and accurate rotation for an indefinite period of time without being subject to temperature changes or lubrication. Each stage has a device to arrest the rotation, which introduces friction to rotate the stage freely or somewhat tightly as required.

The micrometer fine adjustment on double ball bearings permits the motion of the tube to be entirely independent of lubrication, and backlash has been completely eliminated.

The anastigmatic tube analyzer is a feature long recognized to be easy on the eyes, eliminating the tiring changes of accommodation of the eyes when non-anastigmatic tube analyzers are used. It further markedly improves the quality of the microscopic image and avoids eye strain.

The objective changing clutch and centering device permits the convenient and rapid change of the various objectives, which remain permanently in center after changing. Each lens is provided with its own centering collar.

The Microscopes Models AM, SY and CMU include a focusable Bertrand Auxiliary Lens, permitting the use of all eyepieces for conoscopic observation. The iris diaphragm on the Bertrand auxiliary lens serves to increase the sharpness of the conoscopic image as well as to isolate conoscopic interference figures of very small mineral particles. On microscope models where the Bertrand auxiliary lens is stationary, only eyepieces of 6x and 8x magnification can be used.

All Leitz polarizing microscopes are supplied with Ahrens type optical calcite prisms for both the polarizer and analyzer.

The vibration direction of the polarizer in zero position is parallel to the vertical crosshair in the eyepiece. This orientation is, for technical reasons, the most suitable. Compensators, such as gypsum first order red, ¼ λ mica plate as well as quartz wedges are so arranged that their vibration direction n_γ runs from the lower left-hand corner to the upper right-hand corner in the field of view.

Preparatory to working with polarizing microscopes, it is important that the instrument has become fully acclimated to the room temperature, otherwise strain will appear which tends to produce undesirable appearances of double refraction in the optical elements.

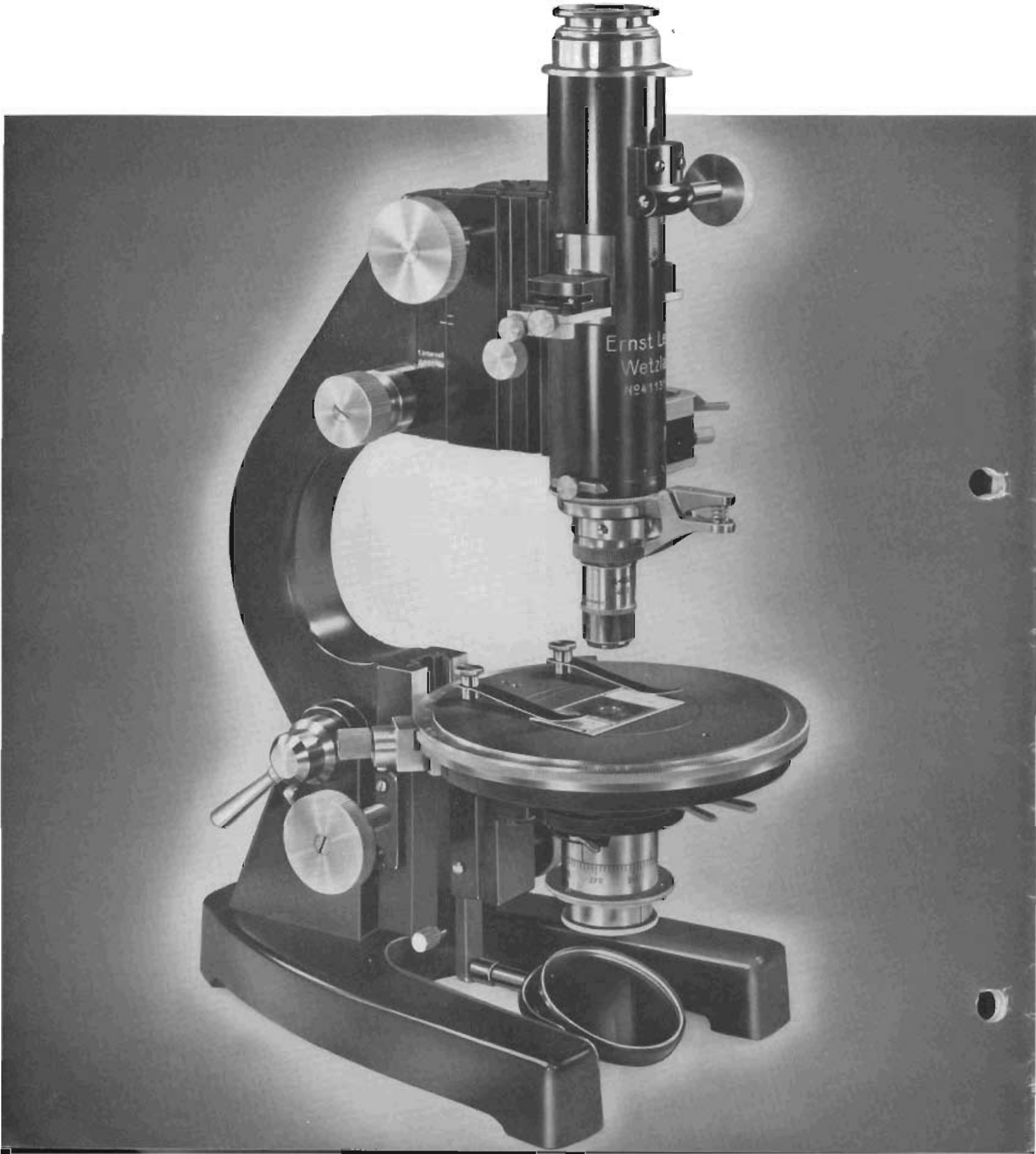
Upon special request, we also supply our polarizing microscopes, Models CMU and IIIM, with polarizing filters instead of calcite prisms. We wish to point out that these filters are *entirely new* and not to be compared with the so-called polaroid filters. The various shortcomings of polaroid filters have been entirely eliminated. So-called polaroid filters exhibit a residue of color in the crossed position and they also are deficient in their light transmission. The new Leitz polarizing filters, on the other hand, show a deeply black field in crossed position and when their vibration direction is parallel, the light transmission is almost equal to calcite prisms. The new Leitz polarizing filters have been thoroughly tested by leading geologists such as Drs. Schneiderhoehn, Karl-Richard Mehnert, H. O. Daniel, S. Matthes, A. Neuhaus, all of whom came to the conclusion that Leitz microscopes with the new polarizing filters are almost equally suitable for the most exacting requirements as are those with calcite prisms.

POLARISING MICROSCOPES . . . Synopsis of the types of stands

Stand	Main Features	Suitable or otherwise for Fedorow method	Suitable or otherwise for use as Ore Microscope	Slow motion to tube	Bertrand auxiliary lens	Field of view
Sy	Synchronous rotation of Nicols	Suitable	Stem stage necessary	Micrometer screw and ball bearing slide motion	Centering, focusing and with iris diaphragm	Wide
AM	Focusing stage	Suitable	No adaptation required			
* BM	Built-in mechanical stage	Suitable				
CMU	Large working stands	Suitable	Stem stage necessary			
* GM						
* KM					Fixed	
IIIM	Laboratory stand	Suitable up to UT 4	Only if equipped with substage "b"	Micrometer screw and dovetail slide motion	Fixed	
* VIM	Simple stands	Not suitable		Coarse motion by rack and pinion only	Fixed	Normal
* VIMa						
* VIMb					None	
MOP	Ore microscope	Suitable	No adaptation required	Micrometer screw and ball bearing slide motion	None	
* CBMP	For biological investigations	Not suitable	Stem stage necessary	Micrometer screw and ball bearing slide motion	None	

* Not in production

AM large research polarizing microscope



AM

with rack and pinion motion for raising and lowering the stage

with fine adjustment (0.001mm.) on double ball bearings

Microscope stand of exceptionally large dimensions, with inclination joint.

Interchangeable, monocular polarizing tube to accommodate eyepieces of large field of view, including centerable-focusing Bertrand auxiliary lens with iris-diaphragm on slider, adjustable in height by rack and pinion motion, with rotating, anastigmatic tube analyzer, which can be switched in and out, graduated in intervals of 5°, with cap analyzer support and index mark as well as eyepiece adaptor for eyepieces of standard diameter, with tube slit at an angle of 45° for the reception of compensators, etc., with three-point objective changing clutch.

Rotating object stage, on ball bearings, 130mm. diameter graduated, with friction and arresting device, and double vernier, reading to 0.1°, with removable ring plate, two object clamps, one spring clamp, with rack and pinion focusing motion for raising and lowering the stage.

Large substage illuminating apparatus model "a" with two-diaphragm condenser and Ahrens polarizer.

Three objective centering collars.

	Code Word
Microscope AM as described above, complete in mahogany cabinet	"iiolh"
Optical Equipment No. 1:	
Achromat, 3.2:1, A 0.12, P1, free from polarization	"petta"
Achromat, 10:1, A 0.25, P3, free from polarization	"petri"
Achromat, 45:1, A 0.65, P6L, free from polarization	"iazyi"
Huyghens eyepiece P5x, large diameter, with crosshairs and adjustable eyelens..	"iiaws"
Huyghens eyepiece P8x, large diameter, with crosshairs and adjustable eyelens.	"iiaxu"
Huyghens micrometer eyepiece P6x, large diameter, with adjustable eyelens and micrometer disc 10mm:100 parts.	"iiayw"
Net micrometer disc for insertion in above eyepiece, 1 sq. cm.:400 squares...	"ickri"
Stage micrometer, 2mm:200 parts (0.01mm.)	"obmer"
Gypsum plate, first order red, and mica plate, ¼ λ	"iemti"
Quartz wedge, 1-4th order	"koraz"
Optical equipment No. 1, complete	"Inhij"
Optical Equipment No. 2:	
Achromat, 3.2:1, A 0.12, P1, free from polarization	"petta"
Achromat, 10:1, A 0.25, P3, free from polarization	"petri"
Achromat, 45:1, A 0.65, P6L, free from polarization	"iazyi"
Achromatic oil immersion 100:1, A 1.30, P 1/12th, free from polarization..	"pelim"
Huyghens eyepiece P5x, large diameter with crosshairs and adjustable eyelens..	"iiaws"
Huyghens eyepiece P8x, large diameter with crosshairs and adjustable eyelens..	"iiaxu"
Huyghens micrometer eyepiece P6x, large diameter, with adjustable eyelens and micrometer disc 10mm:100 parts..	"iiayw"
Net micrometer disc for insertion in above eyepiece, 1 sq. cm.: 400 squares.	"ickri"
Stage Micrometer, 2mm:200 parts (0.01mm.)	"obmer"
Immersion condenser cap N.A. 1.40	"pukap"
Gypsum plate, first order red, and mica plate ¼ λ	"iemti"
Extra objective centering collar	"pizut"
Quartz wedge 1-4th order	"koraz"
Optical Equipment No. 2 complete	"Inklm"
Polarizing Microscope Model AM as described, complete with Optical Equipment No. 1	"iiolh-Inhij"
Polarizing Microscope Model AM as described, complete with Optical Equipment No. 2	"iiolh-Inklm"
Mechanical Stage for conveniently traversing the specimen area	"pirux"
Polished mahogany case, only, with fittings	

SY large research polarizing microscope

SY

with synchronous rotation of polarizer and analyzer

with fine adjustment (0.001) on double ball bearings

Microscope stand of especially large dimensions, with inclination joint.

Polarizing tube to accommodate eyepieces of large field of view, with centerable-focusing Bertrand auxiliary lens with iris-diaphragm on slider, adjustable in height, with anastigmatic tube analyzer, which can be switched in and out, with support for the cap analyzer, with index mark, intermediate adaptor for eyepieces of standard diameter, with tube slit at an angle of 45°, for the reception of compensators, with three-point objective changing clutch, with synchronous rotation of the Abrens prisms for any desired position of the tube and the substage illuminating apparatus.

Rotating object stage, on ball bearings, 130mm. diameter, graduated, with friction and arresting device, double vernier for reading the rotation to 0.1°, with removeable ring plate, two object clamps and one spring clamp.

Large substage illuminating apparatus model "a" with two-diaphragm condenser and Ahrens polarizer.

Gypsum plate 1st order red, mica plate ¼ λ, in metal mount.

	Code Word
Microscope SY as described, complete in mahogany cabinet	"iiogz"
Polished mahogany case, only, with fittings	

	Code Word
Optical Equipment No. 2:	
Achromat 3.2:1, A 0.12, P1, free from polarization	"petta"
Achromat 10:1, A 0.25, P3, free from polarization	"petri"
Achromat 45:1, A 0.65, P6L, free from polarization	"iazyi"
Achromatic oil immersion 100:1, A 1.30, P 1/12th, free from polarization	"pelim"
Huyghens eyepiece P5x, large diameter, with crosshairs and adjustable eyelens	"iiaws"
Huyghens eyepiece P8x, large diameter, with crosshairs and adjustable eyelens	"iiaxu"
Huyghens micrometer eyepiece P6x, large diameter, with adjustable eyelens and micrometer disc 10mm:100 parts	"iiayw"
Net micrometer disc for insertion in above eyepiece, 1 sq. cm: 100 squares	"ickri"
Stage micrometer, 2mm:200 parts (0.01mm.)	"obmet"
Immersion condenser cap N.A. 1.40	"pukap"
Quartz wedge 1-4th order	"koraz"
Four objective centering collars @ 7.50 each	"pizut"
Optical Equipment No. 2, complete	"lnqrs"
Polarizing Microscope Model SY as described with substage illuminating apparatus "a", complete with Optical Equipment No. 2	"iiogz-lnqrs"

CMU large research polarizing microscope

for eyepieces with large field of view
with fine adjustment (0.001) on double ball bearings.

CMU

Microscope stand of large dimensions, with inclination joint.

Monocular polarizing tube to accommodate eyepieces of large field of view, including centerable-focusing Bertrand auxiliary lens with iris-diaphragm on slider, adjustable in height by rack and pinion motion, with rotating anastigmatic tube analyzer, which can be switched in and out, graduated at intervals of 5°, with cap analyzer support and index mark as well as eyepiece adaptor, for eyepieces of standard diameter, with tube slit at an angle of 45° for the reception of compensators, etc., with three-point objective changing clutch.

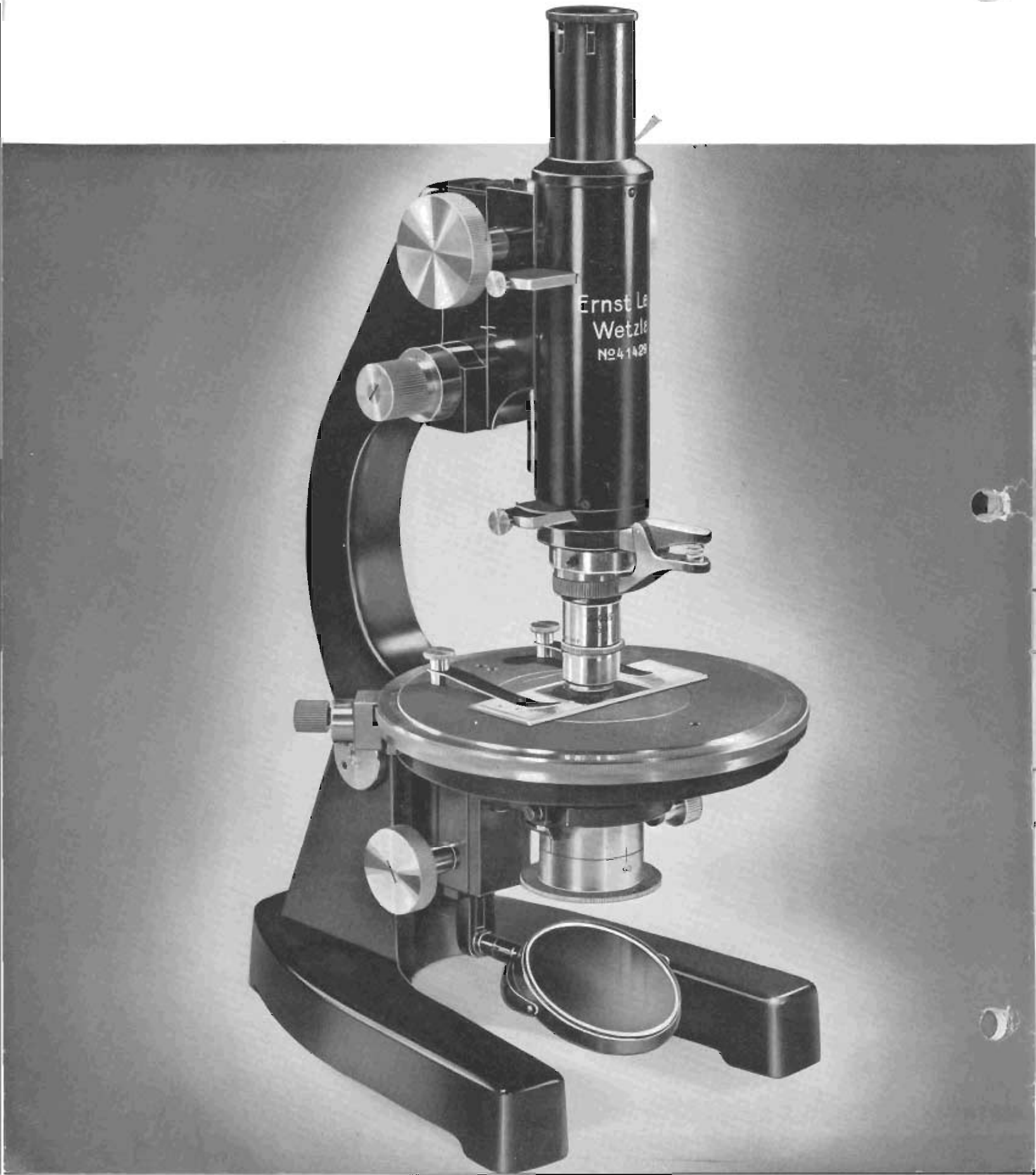
Rotating object stage, on ball bearings, 130mm. diameter, graduated, with friction and arresting device, double vernier reading to 0.1°, with removeable ring plate.

Large substage illuminating apparatus model "a" with two-diaphragm condenser and Ahrens polarizer.

Gypsum plate 1st order red, mica plate ¼ λ.

	Code Word
Microscope CMU as described above, complete in mahogany cabinet	"iioru"
Microscope CMU, as above, but *with new Leitz polarizing filters*	"iivwx-iibcp"
Microscope CMU as described above, however, with substage illuminating apparatus "b"	"iiosw"
Microscope CMU, as above, but *with new Leitz polarizing filters*	"iiwen-iibcp"
Optical Equipment No. 1:	
Achromat 3.2:1, A 0.12, P1, free from polarization	"petta"
Achromat 10:1, A 0.25, P3, free from polarization	"petri"
Achromat 45:1, A 0.65, P6L, free from polarization	"iazyi"
Huyghens eyepiece P5x, large diameter with crosshairs and adjustable eyelens	"iiaws"
Huyghens eyepiece P8x, large diameter with crosshairs and adjustable eyelens	"iiaxu"
Huyghens micrometer eyepiece P6x, large diameter, with adjustable eyelens and micrometer disc 10mm:100 parts	"iiayw"
Net micrometer disc for insertion in above eyepiece, 1 sq. cm:400 squares	"ickci"
Stage micrometer, 2mm:200 parts (0.01mm.)	"obmer"
Quartz wedge 1-4th order	"koraz"
Three objective centering collars @ 7.50 each	"pizut"
Optical Equipment No. 1 complete	"lnnop"
Optical Equipment No. 2:	
Achromat 3.2:1, A 0.12, P1, free from polarization	"petta"
Achromat 10:1, A 0.25, P3, free from polarization	"petri"
Achromat 45:1, A 0.65, P6L, free from polarization	"iazyi"
Achromat oil immersion 100:1, A 1.30, P 1/12th, free from polarization	"pelim"
Huyghens eyepiece P5x, large diameter, with crosshairs and adjustable eyelens	"iiaws"
Huyghens eyepiece P8x, large diameter, with crosshairs and adjustable eyelens	"iiaxu"
Huyghens micrometer eyepiece P6x, large diameter, with adjustable eyelens and micrometer disc 10mm:100 parts	"iiayw"
Net micrometer disc for insertion in above eyepiece, 1 sq. cm:400 squares	"ickci"
Stage Micrometer, 2mm:200 parts (0.01mm.)	"obmer"
Immersion condenser cap N.A. 1.40	"pukap"
Quartz wedge 1-4th order	"kraz"
Four objective centering collars @ 7.50 each	"pizut"
Optical Equipment No. 2 complete	"lnqrs"
Polarizing Microscope Model CMU as described, with substage illuminatiog apparatus "a", complete with Optical Equipment No. 1	"iioru-lnnop"
Polarizing Mieroscope Model CMU as described, with *new Leitz Polarizing filters*, with substage illuminating apparatus "a", complete with Optical Equipment No. 1	"iivwx-iibcp-lnnop"
Polarizing Microscope Model CMU as described, with substage illuminating apparatus "b", complete with Optical Equipment No. 1	"iiosw-lnnop"
Polarizing Microscope Model CMU as described, with *new Leitz Polarizing filters*, with substage illuminating apparatus "b", complete with Optical Equipment No. 1	"iiwen-iibcp-lnoop"
Polarizing Microscope Model CMU as described, with substage illuminating apparatus "a", complete with Optical Equipment No. 2	"iioru-lnqrs"
Polarizing Microscope Model CMU as described, with *new Leitz Polarizing filters*, with substage illuminating apparatus "a", complete with Optical Equipment No. 2	"iivwx-iibcp-lnqrs"
Polarizing Microscope Model CMU as described, with substage illuminating apparatus "b", complete with Optical Equipment No. 2	"iiosw-lnqrs"
Polarizing Microscope Model CMU as described, with *new Leitz Polarizing filters*, with substage illuminating apparatus "b", complete with Optical Equipment No. 2	"iiwen-iibcp-lnqrs"
Polished mahogany case, only, with fittings	

IIIM polarizing microscope



laboratory stand with standard field of view

with fine adjustment (0.004mm.)

Microscope stand of standard dimensions, with inclination joint.

Polarizing tube for the reception of eyepieces of standard field of view, with Bertrand auxiliary lens on slider, with anastigmatic tube analyzer on dovetail slider, with tube slit at an angle of 45° for the reception of compensators, etc., with three-point objective changing clutch.

Rotating object stage, on ball bearings, 130mm. diameter, graduated, with arresting screw and vernier reading, two object clamps, one spring clamp, gypsum plate 1st order red, mica plate ¼ λ.

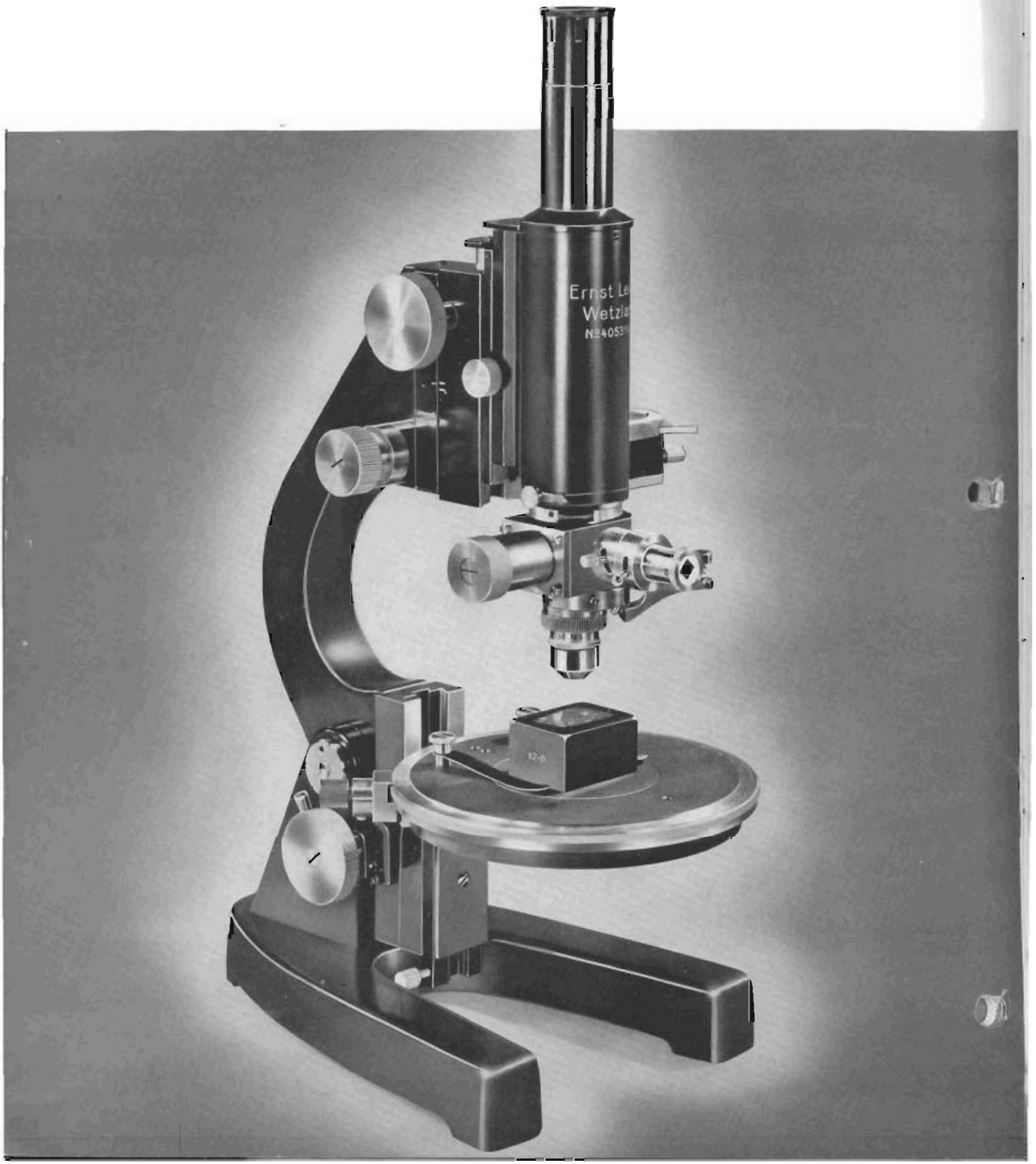
Substage illuminating apparatus model "c".

	Code Word
Microscope IIIM as described above, complete in wooden cabinet	"iivog"
Microscope IIIM as described above, but *with new Leitz polarizing filters*	"iivut"
Microscope IIIM as described above, however, with substage illuminating apparatus "b"	"iivne"
Microscope IIIM as described above, but *with new Leitz polarizing filters*, with illuminating apparatus "b"	"iivtr"
Optical Equipment No. 1-s:	
Achromat 3.2:1, A 0.12, P1, free from polarization	"petta"
Achromat 10:1, A 0.25, P3, free from polarization	"petri"
Achromat 45:1, A 0.65, P6L, free from polarization	"iazyi"
Huyghens eyepiece P8x, standard diameter, with crosshairs and adjustable eyelens	"piifw"
Three objective centering collars @ 7.50 each	"pizut"
Attachable iris-diaphragm with filter holder for substage "c"	"purii"
Optical Equipment No. 1-s complete	"Intuv"
Optical Equipment No. 2-s:	
Achromat 3.2:1, A 0.12, P1, free from polarization	"petta"
Achromat 10:1, A 0.25, P3, free from polarization	"petri"
Achromat 45:1, A 0.65, P6L, free from polarization	"iazyi"
Huyghens eyepiece P8x, standard diameter with crosshairs and adjustable eyelens	"piifw"
Three objective centering collars @ 7.50 each	"pizut"
Optical Equipment No. 2-s complete	"Inwxy"
Polarizing Microscope Model IIIM with illuminating apparatus "c" complete with optical equipment No. 1-s	"iivog-Intuv"
Polarizing Microscope Model IIIM, but with illuminating apparatus "b", complete with optical equipment No. 2-s	"iivne-Inwxy"
Polarizing Microscope Model IIIM *with new Leitz polarizing filters*, with illuminating apparatus "c" complete with Optical Equipment No. 1-s	"iivut-Intuv"
Polarizing Microscope Model IIIM *with new Leitz polarizing filters*, with illuminating apparatus "b" complete with Optical Equipment No. 2-s	"iivtr-Inwxy"
Recommended Accessories:	
Huyghens eyepiece P5x, standard diameter, with crosshairs and adjustable eyelens	"piivs"
Quartz wedge, 1-4th order	"koraz"
If this microscope is to be used with a Universal Stage, add the following:	
Removable ring plate for the object stage as well as second vernier	"zinga"
(The above cannot be ordered separately)	

The substage illumination apparatus "a" cannot be used on this microscope.

Polished mahogany case, only, with fittings

MOP polarizing-ore microscope



MOP

with standard field of view

with interchangeable tube

with fine adjustment (0.001mm.) on double ball bearings

with rack and pinion motion for raising and lowering the stage

Microscope stand of large dimensions, with inclination joint, new design.

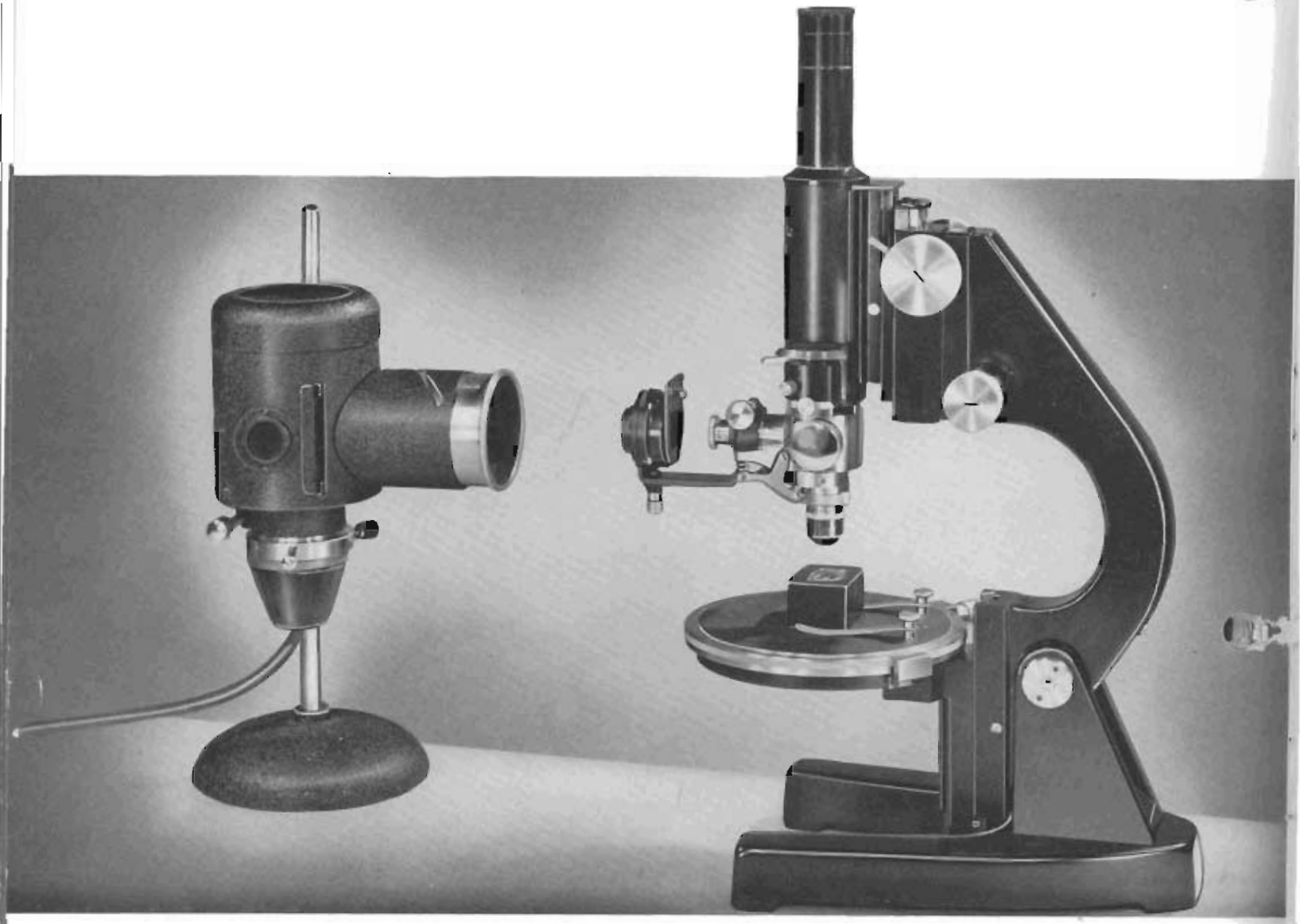
Fine adjustment on double ball bearings, facilities for changing the tube, rotating object stage on ball bearings, 130mm. diameter, graduated, with dual verniers, reading to 0.1°, with friction and arresting device.

The stage provided with rack and pinion focusing motion for raising and lowering.

Interchangeable polarizing tube for eyepieces of standard field of view, with anastigmatic tube analyzer with readings calibrated in single degrees. Built-in vertical illuminator with *coated* compensating prism and plane glass plate in changing device, iris diaphragm, adjustable illuminating lens and rotatable polarizer inserted in the entrance tube of the vertical illuminator, with three-point objective changing clutch, including four centering collars, two object clamps, without substage illuminating apparatus and without substage mirror.

	Code Word
Microscope MOP as described above, complete in mahogany cabinet	"pokep"
Optical Equipment No. 3 for polarized reflected light:	
Achromat, 5.5:1, A 0.13, P1b-C, anti-reflection coated	"iicvo-B"
Achromat, 16.5:1, A 0.40, P3b-C, anti-reflection coated	"iicwq-B"
Fluorite, 45:1, A 0.85, P6a-C, anti-reflection coated	"ücxs-B"
Fluorite oil immersion, 80:1, A 1.30, P 1/10a-C, anti-reflection coated	"iidbz-B"
Huyghens eyepiece P5x, standard diameter, with crosshairs and adjustable eyelens	"piivs"
Huyghens eyepiece P8x, standard diameter, with crosshairs and adjustable eyelens	"piiwf"
Huyghens micrometer eyepiece P6x, standard diameter, with adjustable eyelens and micrometer disc 10mm:100 parts	"giikn"
Optical Equipment No. 3, complete	"lnzab"
Ore Microscope MOP as described, complete with Optical Equipment No. 3	"pokep-lnzab"
Light Source and Recommended Electrical Accessories:	
Universal Microscope lamp "Monla" with aspherical illuminating lens, 6 volts 5 amps	"dcbee"
Attachable collecting lens with iris-diaphragm, and half-stop on spring clip	"iqpoi"
Six metal object slides	"jwmbi"
Hand press for leveling specimens in plasticine	"mepux"
Regulating transformer, with amperemeter, for A.C., 110 volts primary, 6-8 volts, secondary	"lnyza"
Ore Microscope MOP as described including Optical Equipment No. 3 and illuminating accessories	"lncde"

MOP polarizing ore microscope (*continued*)



The ore microscope MOP can also be used as a full-fledged polarizing microscope for observation in transmitted polarized light. For this purpose, the glass plate in the vertical illuminator has to be put into position and by rotating it through 45° it is set at right angles to the optical axis of the microscope.

The following accessories for polarized transmitted light are recommended:

	Code Word
Large substage illuminating apparatus model "b" with rack and pinion focusing motion, with three-lens condenser, built-in iris diaphragm, including Abrens polarizer in rotating mount	"iekpi"
Plane and concave mirror attachable to illuminating apparatus	"iehli"
Gypsum plate first order red, and mica plate ¼ λ in mount	"iemti"
Bertrand Auxiliary lens for conoscopic observation	"ienvi"

All objectives contained in Optical Equipment No. 3 can also be used for transmitted light with the exception of Fluorite 15:1.

Achromat, 45:1, A 0.65, P6L, short-mounted, for transmitted light	"ieoxi"
Mechanical stage for conveniently traversing the specimen area	"pirux"

Optical data of microscope objectives and eyepieces for polarized transmitted light

OBJECTIVES

All Leitz objectives which are used for polarized light have been especially selected to be free from polarization. They should be used with care and be protected from shock or temperature fluctuations. In order to prevent misunderstanding, it should be noted that high power lenses always tend to light up the field of view under crossed nicols which is due to a rotation of the plane of polarization of the light. This is caused by the increased curvatures of the lens surfaces on these objectives as well as the condenser under conoscopic observations. The impression may be gained of an optically uniaxial interference figure as it appears in a slightly positive, doubly refracting mineral.

For measurements in polarized light, the Achromats should be used exclusively. For observations and photomicrography, Fluorite lenses as well as Apochromats may be used. Optical fluorite, which is contained in Fluorite lenses as well as Apochromats, is seldom entirely free from double refraction, but the improved spherical and chromatic correction of Fluorite and Apochromat lenses become apparent if observations are made under high apertures. These objectives are corrected for a mechanical tube length of 170mm., upon which the construction of all polarizing microscopes is based when used in transmitted light. For polarized reflected light with vertical illuminator, it is necessary to choose objectives without cover glass correction and designed for a mechanical tube length of 215mm.

ACHROMATIC OBJECTIVES

(Corrected for a mechanical tube length of 170mm.)

Designation and Initial Magnification	*Numerical Aperture*	*Old Designation*	*Free Working Distance (mm.)*	*Conoscopic Angle*	*Influence of Departure from cover glass thickness of 0.16mm. to 0.18mm.*	*Remarks*	*Code Word*
3.2:1	A 0.12	P1	34.5	14°	none	survey lens	"petta"
6:1	A 0.20	P2	16	23°	none	survey lens	"petme"
10:1	A 0.25	P3	5.8	29°	none	most excellently used lenses for orthoscopic observations	"petri"
25:1	A 0.50	P4b	2.0	60°	very little		"peaps"
30:1	A 0.75	P5	0.7	81°	very little		"petoy"
45:1	A 0.65	P6L	0.60	81°	very little		"iazyi"
62:1	A 0.85	P7	0.28	116°	pronounced		"petis"
100:1	A 1.30	P1/12	0.11	118°	none		"pelim"

MICROSCOPE OBJECTIVES FOR ORE MICROSCOPY IN POLARIZED REFLECTED LIGHT

(Designed for use without cover glass and corrected for a tube length of 215mm.)

Designation and Initial Magnification		*Numerical Aperture*	*Old Designation*	*Coated*	*Code Word*
Achromat	5.5:1	A 0.15	P1b	C	"iicvo-B"
Achromat	16.5:1	A 0.40	P3b	C	"iicwq-B"
Fluorite	45:1	A 0.85	P6FL	C	"iicxs-B"
Oil Immersion—Oil	12.5:1	A 0 25	P16	C	"iicyu-B"
Oil Immersion—Oil	25:1	A 0.65	P8	C	"iiczw-B"
Fluorite Oil Immersion FL Oil	60:1	A 0.95	P 1/7FL	C	"iidax-B"
Fluorite Oil Immersion FL Oil	80:1	A 1.30	P 1/10FL	C	"iidbz-B"

The total magnification of a microscope is determined by multiplying the initial magnification of the objective with that of the eyepiece. The effective initial magnification of the objectives is smaller by 20% when the microscope is equipped with an anastigmatic tube analyzer.

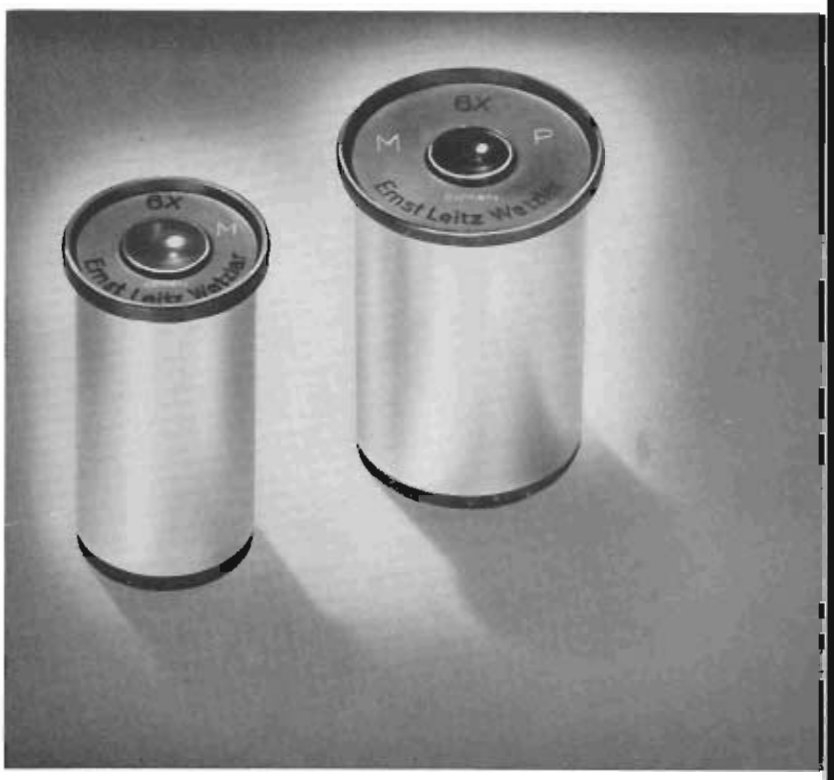
Each lens should be supplied with an objective centering collar.

	Code Word
Objective centering collar, as an extra...	"pizul"

EYEPIECES

The eyepieces used are generally of the Huyghenian type. For all eyepieces which serve for the reception of crosshairs or micrometers, the eyelens is adjustable for focusing on the crosshairs or the micrometers respectively. When using high power lenses, the image quality can be improved by applying Periplanatic eyepieces. They are used in conjunction with the intermediate adaptor which is provided with all microscopes with large diameter tube. For low power lenses, only Huyghens eyepieces should be used.

Optical data *(continued)*



Huyghens eyepieces with large field of view for Polarizing Microscopes AM, SY, CMU:

	Code Word
Huyghens eyepiece P5x, with crosshairs and adjustable eyelens	"iiaws"
Huyghens eyepiece P8x, with crosshairs and adjustable eyelens	"iiaxq"

Huyghens eyepieces for standard field of view:

Huyghens eyepiece 4x	"hykul"
Huyghens eyepiece 5x	"hygen"
Huyghens eyepiece 6x	"hyzwa"
Huyghens eyepiece 8x	"hydre"
Huyghens eyepiece 10x	"hyvir"
Huyghens eyepiece 12x	"hyfun"
Huyghens eyepiece 16x	"hypee"

Periplan eyepieces for standard field of view:

Periplan eyepiece 4x	"periv"
Periplan eyepiece 5x	"perfu"
Periplan eyepiece 6x	"perse"
Periplan eyepiece 8x	"perot"
Periplan eyepiece 10x	"pexen"
Periplan eyepiece 12x	"pezwo"
Periplan eyepiece 15x	"pezur"
Periplan eyepiece 25x	"pezic"

These eyepieces do not have crosshairs nor adjustable eyelenses.

Huyghens eyepieces for standard field of view for Polarizing Microscopes IIIM, MOP, Panphot:

Huyghens eyepiece P5x, with crosshairs and adjustable eyelens	"piivs"
Huyghens eyepiece P8x, with crosshairs and adjustable eyelens	"piifw"

MICROMETER EYEPIECES

For Microscopes AM, SY, CMU, with large field of view:

	Code Word
Huyghens micrometer eyepiece 6x, with adjustable eyelens and micrometer disc 10mm:100 parts	"iiayw"
Net micrometer disc for use in above eyepiece, 1 sq. cm:400 parts, length of square 0.5mm	"iekri"
same as above, but length of square 1mm	"iclti"
same as above, but length of square 2mm	"icmvi"

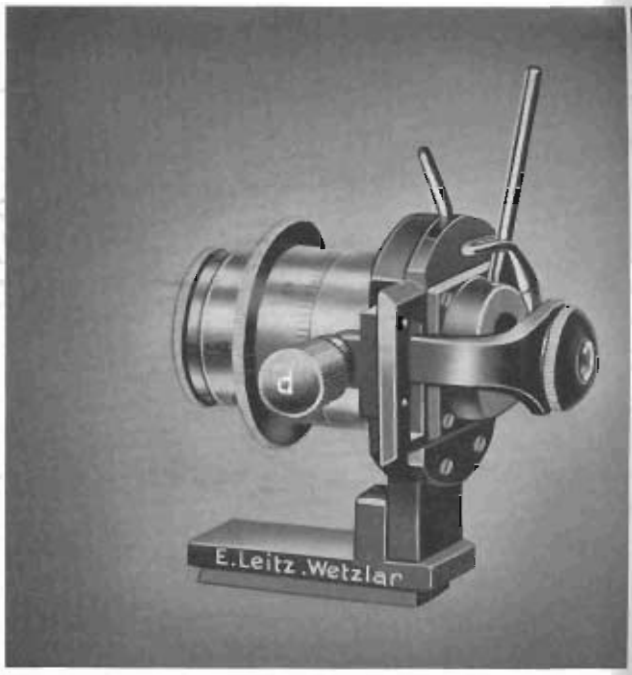
For Microscopes MOP, IIIM, Panphot, standard diameter:

Huyghens micrometer eyepiece P6x, with adjustable eyelens and micrometer disc 10mm:100 parts	"giikn"

For the calibration of micrometer eyepieces:

Stage micrometer 1mm:100 parts	"obter"
Stage micrometer 2mm:200 parts	"nbmer"
Stage micrometer for reflected light, 1mm:100 parts ruled on metal	"iidmu"

Substage Illuminating Apparatus for the various microscope models



Illuminating Apparatus "a"

The illuminating apparatus of our polarizing microscopes are so constructed that the changeover of illumination from low magnifications to that for medium and high magnifications can be accomplished by a simple lever action. The condenser which is closest to the polarizer is designed to supply an illuminating aperture N.A. 0.22. This is also used for the universal stage methods. In order to achieve higher illuminating apertures, a swing-out condenser element is included which provides an aperture of N.A. 0.90. Where still higher illuminating apertures are desired, we supply an interchangeable immersion condenser with an N.A. of 1.40. It should be remembered, however, that the slide thickness must be between 0.9mm. and 1mm. in order to achieve that aperture and the top of the condenser has to be connected with the slide by a film of oil. A rack and pinion motion is provided for raising or lowering the condenser as it may be desired.

Illuminating Apparatus Model "a", with two-diaphragm condenser:

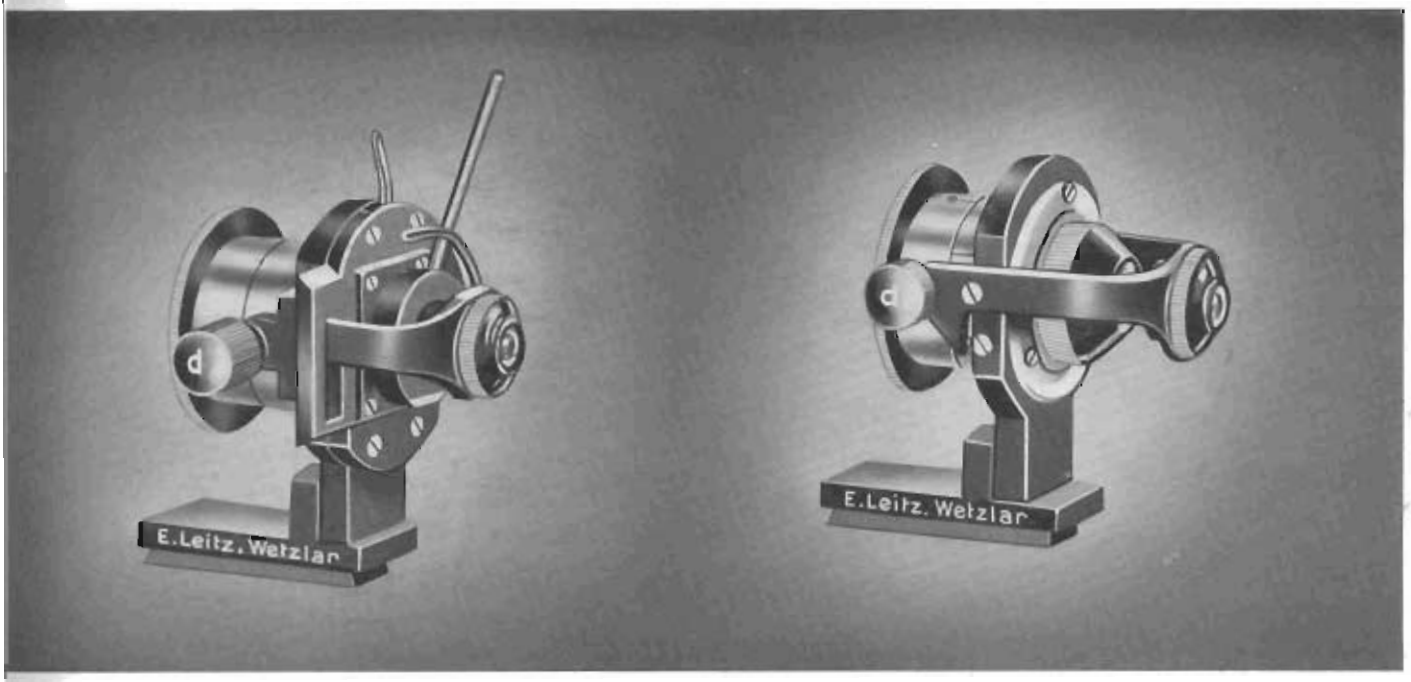
This illuminating apparatus has a five-element condenser which is highly corrected and provides for an evenly polarized field. The polarizer mount includes a clamping device. The iris-diaphragm located between the two-condenser elements serves as aperture diaphragm when the upper condenser unit is in position and acts similar to the iris-diaphragm of the so-called Abbe condenser. When observing at low powers, the upper element of the condenser should be swung out and then the lower iris-diaphragm serves as aperture diaphragm.

	Code Word
Illuminating Apparatus Model "a" with two-diaphragm condenser	"pumax"
Same as above, but with new Leitz polarizing filter	"pumax-F"

Medium Illuminating Apparatus Model "b":

The entire condenser element can be removed by means of a dovetail slider and clamped into position by means of an eccentric lever. The condenser consists of three elements and is highly corrected. It has a built-in iris-diaphragm which serves as an aperture diaphragm. The upper condenser element can be swung out in the same manner as condenser "a".

	Code Word
Illuminating Apparatus Model "b"	"puhar"
Same as above, but with new Leitz polarizing filter	"puhar-F"



Illuminating Apparatus "b" *Illuminating Apparatus "c"*

Illuminating Apparatus Model "c":

This substage has a condenser system with three elements and is well corrected. The polarizer is, however, permanently connected to the condenser. The variation in the illuminating aperture is accomplished by raising and lowering the condenser by means of a rack and pinion motion.

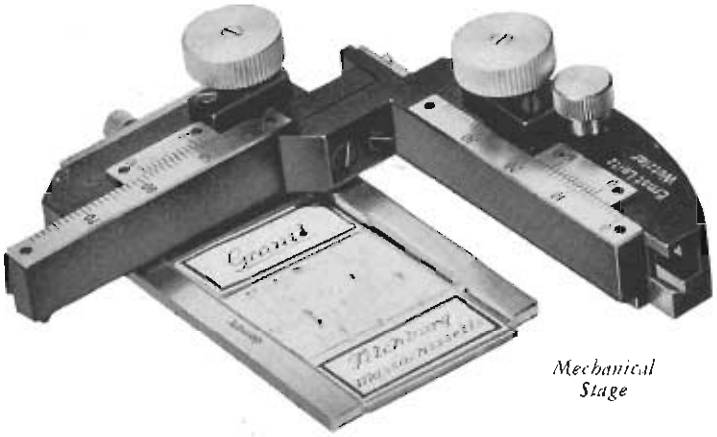
	Code Word
Illuminating apparatus model "c"	"pures"
Same as above, but with new Leitz polarizing filter	"pures-F"
Attachable iris diaphragm for illuminating apparatus "c"	"puiri"
Immersion condenser N.A. 1.40, interchangeable, for use with Illuminating Apparatus "a", "b", "c" when it is desirable to use apertures above 0.90	"pukap"

Attachable Collimating Lens

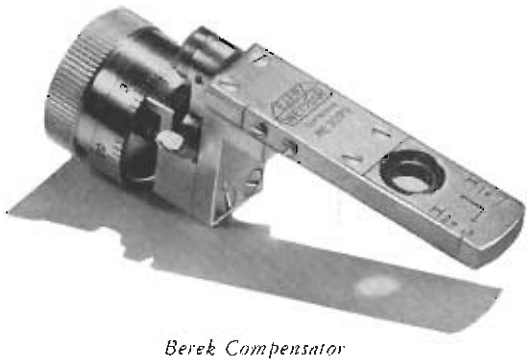
In order to be certain that the illumination of the polarizing microscope is perfect, it should be noted that after the object has been focused and with the analyzer out of the path of rays, the field of view is entirely even and the back lens of the objective is evenly filled with light. We recommend an attachable collimating lens as well as the Leitz "Monla" lamp with aspherical condenser. This lamp ought to be placed at a distance of approximately ten inches from the mirror with the concave side facing the lamp.

	Code Word
Attachable collimating lens for Substage "a"	"iitvk"
Attachable collimating lens for Substages "b" and "c"	"iitcn"

Mechanical Stage and Auxiliary Equipment:



Mechanical Stage



Berek Compensator

Mechanical Stage

This mechanical stage is attached by means of a thumb screw to the rotating stage of the microscope. It has a traversing area of 30mm. in both directions. It is provided with scales and vernier for readings to 0.1mm. The slide holder is so arranged that various sizes of objects are firmly held in place.

	Code Word
Attachable mechanical stage for all polarizing microscopes with the exception of Model BM	"pirux"
Object marker with diamond point to describe a circle on the cover slip to identify an area of particular interest in the object.	"marki"
Stage clips for the object stage per pair....	"pikle"
Spring clamp, in place of the stage clips....	"ibsvi"

Berek Compensator

For the determination of the optical character of double refraction and for measuring phase differences.

For insertion into the tube slit above the objective.

This compensator has a large measuring range, namely four orders. It is very simple to use, and the results can be readily evaluated. Its sensitivity for small and medium phase differences is considerably greater than that of the Babinet compensator. A plate of calcite 0.1mm. thick is cut normal to the optic axis and mounted in a rotating axis. The Berek compensator is also recommended for determination of the optic sign. It may be used effectively to determine the direction of vibration of the fast and slow rays in crystals.

Also used in biology to determine the optic sign of fibres.

	Code Word
Berek compensator with table, directions for use and calibration for three wave lengths of conventional white lights.....	"berek"
Quartz wedge 1—4th order in metal mount	"koraz"
Gypsum plate, first order red, in metal mount	"kogip"
Mica plate, $\frac{1}{4}\lambda$, in metal mount.....	"komer"

Elliptical Compensator

$\frac{\lambda}{10}$	to	$\frac{\lambda}{30}$	"elipt"

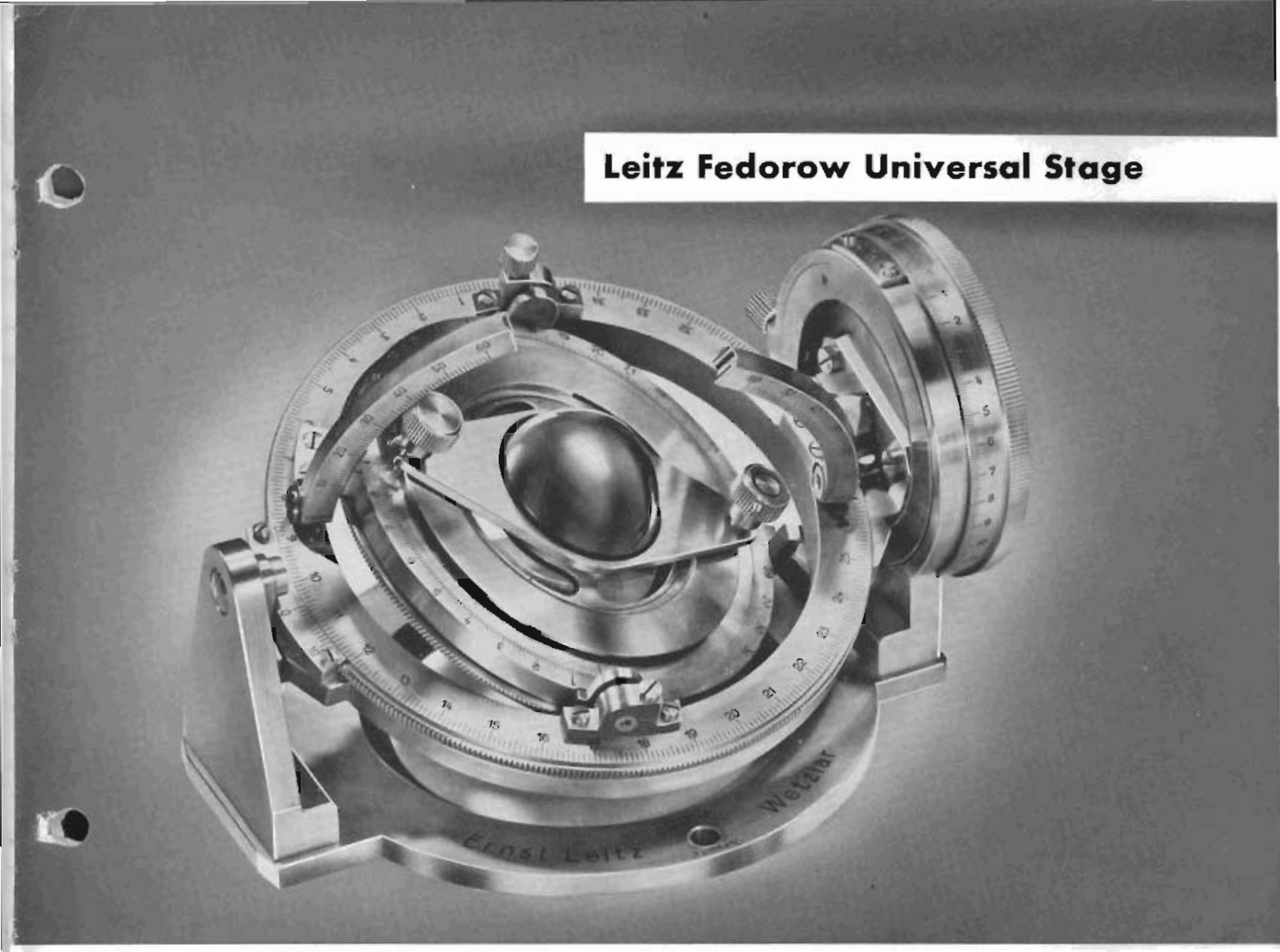
For Conoscopic Observations

Auxiliary magnifier for observation of conoscopic interference figures of minute mineral particles for microscopes AM, SY and CMU:

This auxiliary magnifier can only be used with eyepieces 5x, 6x and 8x. The auxiliary magnifier is used in connection with the Bertrand auxiliary lens with built-in iris diaphragm. The latter serves to single out the small mineral grains to be examined.

	Code Word
Aplanatic auxiliary magnifier 12x with hinge, attachable to the eyepiece.....	"kohil"
Cap analyzer in metal mount, graduated in 360° for use with polarizing microscopes with large diameter tubes.....	"antop"
Pinhole diaphragm for microscopes with large field of view.....	"lnfgh"
Pinhole diaphragm for microscopes with standard field of view.....	"lnijk"

Leitz Fedorow Universal Stage



The Universal Stage with several axes of rotation permits accurate and rapid determination of the optical properties and orientation of crystal plates or fragments. The Leitz Universal Stage embodies a number of improvements which enable the user to rapidly exchange the slide, and to orient it easily onto the point of junction of the rotating axes.

Of particular importance are four new objectives. They are special UM objectives for universal stage methods, all of which are equipped with iris diaphragm, and are corrected for the same free working distance with respect to the segments. The relatively high numerical aperture of the high power lenses of this group permits the measurement of crystallographic reference directions, and for this purpose a new special condenser is screwed into the illuminating apparatus.

For petrofabric analysis we provide for an improved parallel guide slide after Schmidt.

In addition to the Universal Stage Model UT 4 with four axes of rotation, we now also supply a Universal Stage UT 5, with five axes of rotation. The latter permits the setting of the second plane of symmetry without experimentation after the first plane of symmetry has been found. This constitutes a simplification and shortening of the measuring process.

The Leitz Universal Stage Model UT 4 can be used on the following types of microscopes:

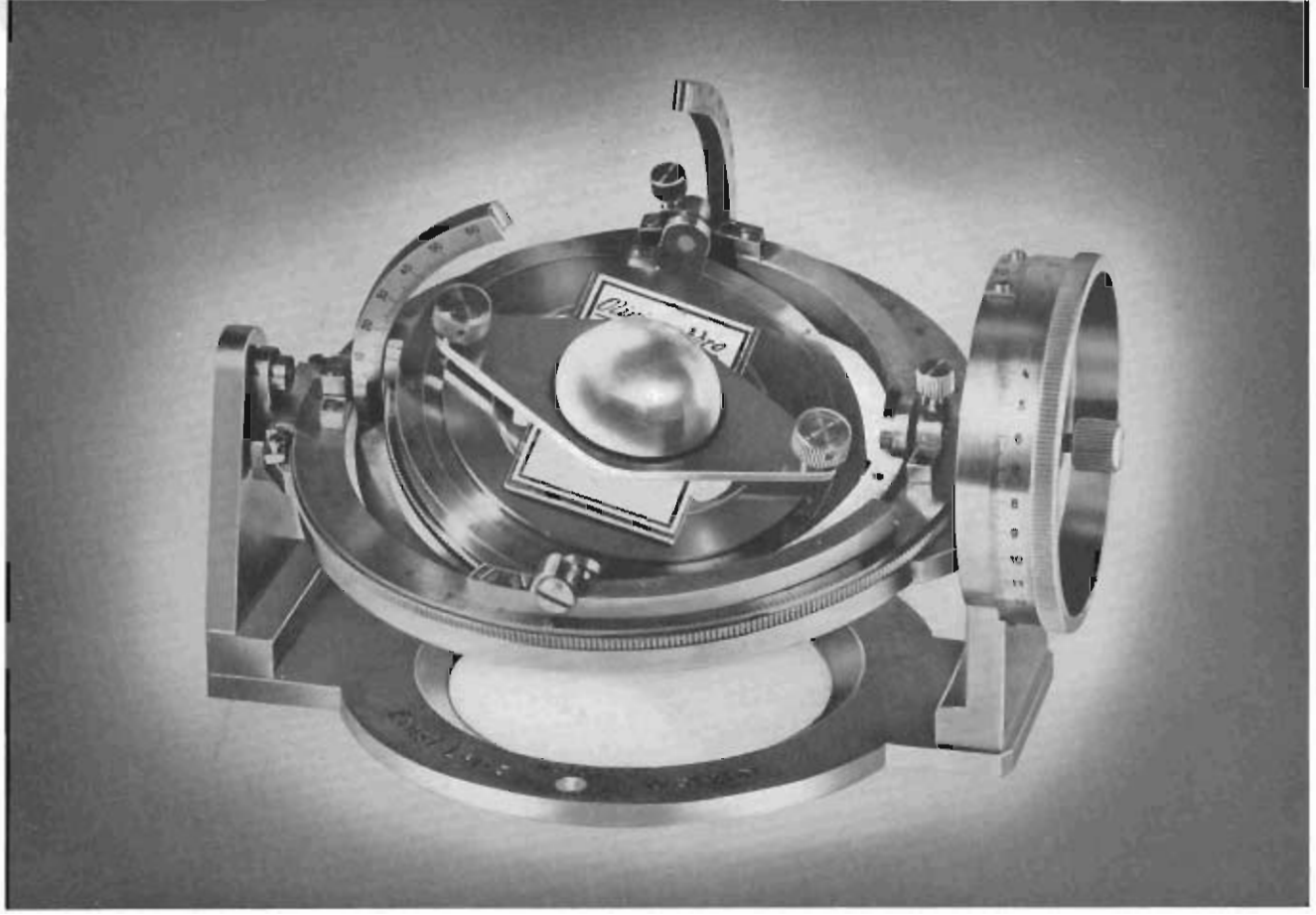
Models AM, SY, CMU, IIIM, MOP, and Panphot.

The Leitz Universal Stage Model UT 5 can be used on the following types of microscopes:

Models AM, SY, CMU, MOP and Panphot.

Leitz Universal Stages are designed for thin sections on object slides of standard size (28 x 48mm.), and are used with the cover glass facing the objective.

The Universal Stage was first introduced by E. V. Fedorow and is extensively used to diagnose the indicatrix in bi-axial crystals. The slide to be examined is placed on top of the glass plate which fits into the ring of the Universal Stage after a drop of immersion fluid (preferably glycerin) has



been placed on the circular glass plate. Another drop of immersion fluid is placed on top of the cover glass of the slide and then the upper hemisphere is placed on the slide and clamped into position by means of two thumb screws. The lower segment is attached to the underside of the circular glass plate by means of a drop of immersion fluid. It is the purpose of the segments to avoid any refraction of the light rays when they enter or leave the crystal. The refractive index of the segments, therefore, should be approximately equal to that of the crystal to be examined. The purpose of the liquid is to avoid total refraction. In order to avoid centering errors, it is important to regulate the effective aperture during the observation on the objective itself rather than by means of the diaphragm in the illuminating apparatus. The special UM objectives are selected for this purpose and are equipped with an iris diaphragm. The magnification and numerical aperture of the UM objectives depend upon the refractive index of the segments used and vary proportionally. In order to make full use of the numerical aperture of the objectives UM 3 and UM 4, it is necessary to use a special condenser cap which is screwed into the illuminating apparatus. This is particularly important when measuring cleavage planes and twinning planes. Investigations with the Universal Stage aim at finding planes of symmetry. These are recognized by the variation in the observation direction of an optical symmetry plane where the vibration directions are always parallel and at right angles to the symmetry plane. In other words, the extinction position always remains constant.

	Code Word
Universal Stage UT 4 with pair of segments n D = 1.55, two clamping screws, complete in case	"fedro"
Universal Stage UT 5, with pair of segments, n D = 1.55, two clamping screws, complete in case	"icgli"
Universal Stage UT 2, with pair of segments, n D = 1.55, two clamping screws, complete in case	"ichni"

Accessories

Paired segments n D = 1.648	"fegno"
Paired segments n D = 1.516	"fegna"

For Petrofabric Analysis with the Universal Stage

Parallel guide slide, after Schmidt, graduated in millimeters for the planimetric displacement of the object slide under the segments	"fegfu"
In order to use the parallel guide slide, the upper segments have to be modified. When ordering new segments price increase per segment	"fegse"
When subsequent alteration of segments is requested per segment	"icvoi"

Universal stage accessories *(continued)*

	Code Word
Universal Stage UT 4 with *modified* segments n D = 1.55, and parallel guide slide, after Schmidt	"fedro-fegse-fegfu"
Universal Stage UT 5, with *modified* segments n D = 1.55, and parallel guide slide, after Schmidt	"icgli-fegse-fegfu"
Stereographic net in rotating mount complete with graph paper	"ivwxi"
Surface true net in rotating mount	"ivxzi"

Objectives for UT Methods

While the standard Achromats 3.2:1 and 6:1 can be used for UT methods, we, however, recommend the following special lenses. They have been designed in a special mount and are corrected for uniform working distance with the segments. Each objective is furthermore provided with a built-in iris diaphragm.

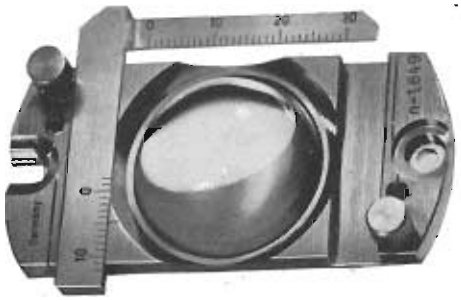
For measurements of cleavage planes and twinning planes, we recommend particularly objectives UM 3 and 4 with the following supplementary condensers which screw into the illuminating apparatus:

	Code Word
Supplementary condenser for UT 5	"iitlc"
Supplementary condenser for UT 4	"iitng"

Accessories for Emmons Method

Accessories for the determination of the refractive index of minerals, according to the method of R. C. Emmons, in conjunction with our Universal Stages:

After the approximate refractive index value has been roughly determined, in accordance with one of the usual embedding methods, a more exact determination can be made with the aid of liquids specified by Professor R. C. Emmons (obtainable from the Eastman Kodak Company) by using temperature variations. This device can be used on microscope stands AM and CMU. The Model IIIM requires a centering device for the Bertrand lens which is listed below and which must be ordered with the microscope and cannot be supplied subsequently.



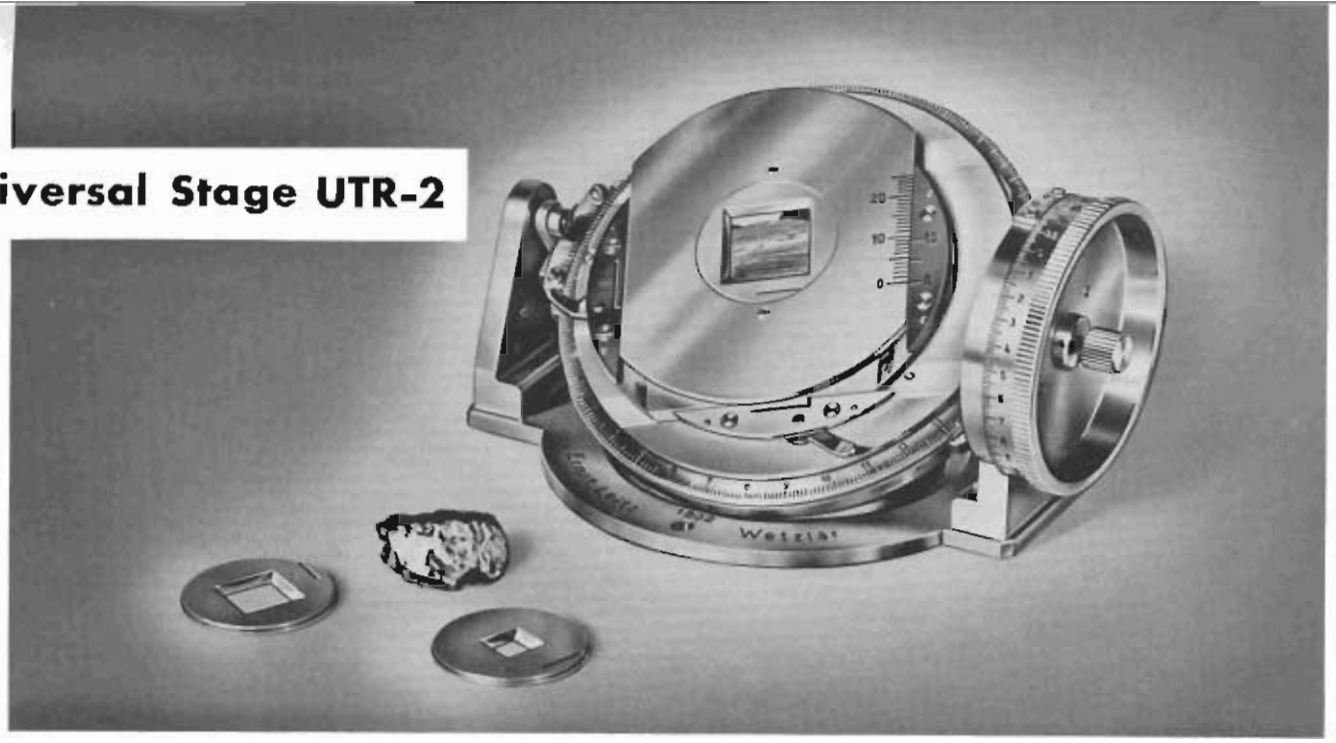
Guide slide after Schmidt

	Code Word
Supplementary device "index," consisting of lower segment, upper hemisphere hollowed out, with three plano-parallel glass plates, heating ring for the hemisphere with connection, regulating resistance 110-220 V with ammeter and safety lamp	"idcbi"
Special eyepiece "index" 8x for microscopes with large diameter tube	"idefi"
Same as above but for microscope with standard diameter tube	"idfhj"
Centering, auxiliary Bertrand lens for Polarizing Microscope Model IIIM (Must be ordered with microscope)	"idbzi"
Attachable top analyzer for special eyepiece "index"	"idaxi"
Illuminating stand with one ground glass disc and one opal disc, each vertically displaceable	"idhmi"
Universal eyepiece after F. E. Wright (for use with top analyzer only) Wright's eyepiece with iris diaphragm, guide slit and flange with index, for the top analyzer, for standard field of view, in case	"icumi"

SPECIAL OBJECTIVES FOR UT METHODS

Designation	*Initial Magnification with segments 1.55*	*Numerical Aperture*	*Free working distance from top of segment*	*Code Word*
UM 1	5x	0.10	1.5mm.	"icnxi"
UM 2	10x	0.22	1.5mm.	"icozi"
UM 3	20x	0.33	1.5mm.	"icpbi"
UM 4	30x	0.30	1.5mm.	"icqdi"

Universal Stage UTR-2



For the examination of polished metallurgical specimens in reflected light

The new Leitz Universal Stage UTR-2 was designed at the suggestion of Dr. Ehrenberg for Leitz Microscopes AM, MOP and PANPHOT. It is used for the examination and petro-fabric analysis of ores and metals and for the measurements of the degree of reflection of anisotropic specimens in one single optical plane of symmetry. The introduction of this new Universal Stage brings about a considerable simplification of the measuring process and it eliminates doubtful results when determining the position of individual grains or grain aggregates.

The ore specimens to be examined are, of course, worked only to the last grinding process and not polished so that twinning planes remain intact. Metals, on the other hand, are polished and then etched. The structural surface of the specimen is brought into a horizontal position by means of the A_1 and A_2 axes of the rotating stage so that they may reflect light in the direction of the axis of the microscope tube.

The initial setting for maximum intensity of reflection is carried out by rotating the object stage of the microscope (A_3 axis). The fine focusing is done by means of the Bertrand-auxiliary lens which detects even the slightest deviation from the co-axial position under conoscopic observation. Readings are made with the aid of the stage graduations. Thus, the position of the plane of the structure, with respect to the plane of the specimen, and its position in space is determined.

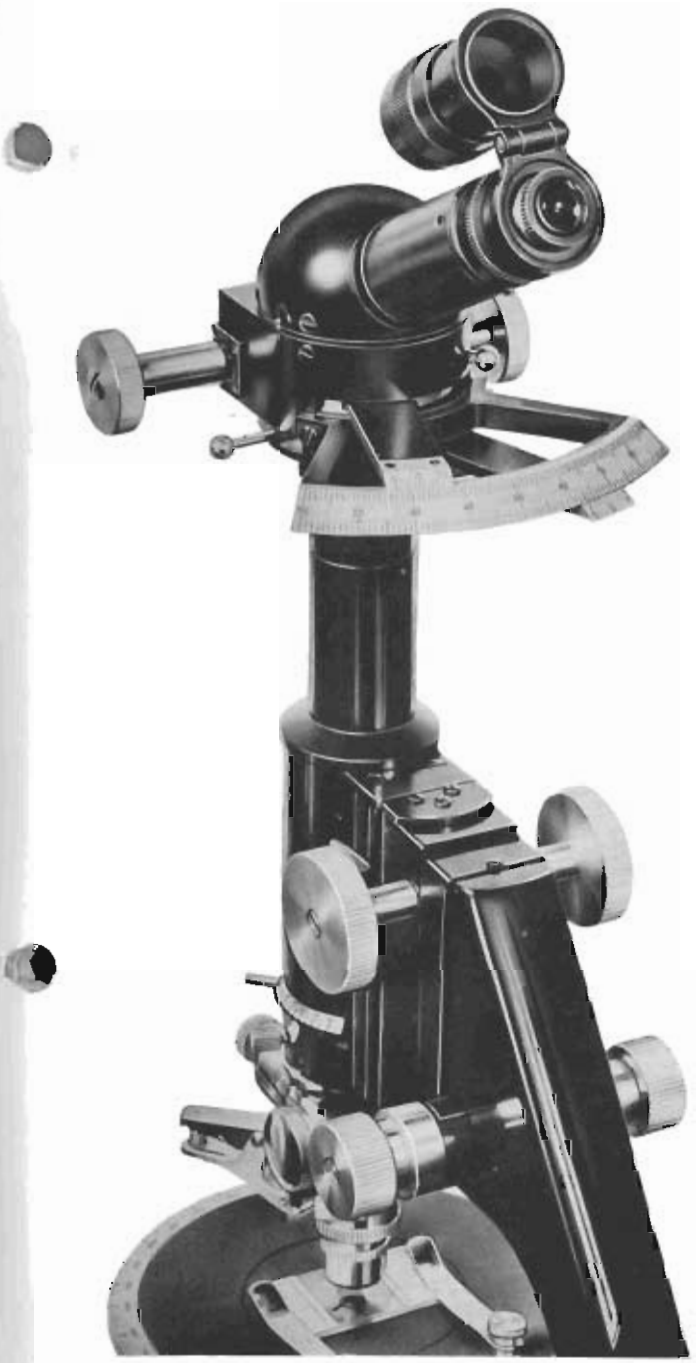
The linear direction in this plane is determined on the graduations of the axis A_3. The results and their interpretations are evaluated on a surface-true net. The use of the UM objectives with built-in iris diaphragm is recommended. These lenses will permit an inclination of the stage to $\pm 63°$ from the linear position of the A_4 axis.

The degree of reflection, particularly on low absorbing ores, as well as the determination of the refractive indexes and absorption co-efficients can also be determined. The measurement has to be carried out with the *eyepiece and elliptical analyzer* together with the Microscope Photometer, after M. Berek.

Reference: M. Berek, Fortschritt der Mineralogie (1937)

	Code Word
Universal Rotating Stage UTR-2 for opaque polished sections with two axes of rotation A_1 and A_2 graduated and with nonius, accuracy to 0.1°. Facilities for raising the stage, built-in mechanical stage, traversing area 20 x 15mm., with graduations, its movement can be arrested in any position, with three interchangeable rings which have a square opening of 5, 10 and 15mm., with device for holding the opaque sections and two clamping screws for the object stage of the microscope	"poduh"

For objectives UM1 to UM4 see Page 25
For surface-true net ruling see Page 25



Elliptical Analyzer

Measuring device for the determination of anisotropic minerals in polarized reflected light

Eyepiece with elliptical analyzer consisting of ocular free from polarization. With rack and pinion for rotating the swing-out gypsum plate and analyzer, reflecting prism for inclined vision, telescope with iris diaphragm, crosshairs and focusing eyelens, eye cup, swing-in and focusable auxiliary lens for conoscopic observation. The position of the gypsum plate and the analyzer can be read from a graduated segment to an accuracy of 0.1°.

As a source of light, we recommend a mercury vapor lamp which is in preparation.

The above equipment can be used on all Leitz Polarizing Microscopes which are equipped with a vertical illuminator for polarized reflected light.

	Code Word
Elliptical analyzer complete in case with calibration table and light filter No. 575..	"iiceg"
Special objective, short mounted, free from polarization, EA3b.....	"iiudn

Ore microscopy

For ore microscopy in polarized reflected light, we recommend particularly our microscopes AM and MOP which are equipped with facilities for raising and lowering the stage. This eliminates the readjustment of the light source and illuminating arrangement respectively when changing from one objective to another and refocusing.

However, all of the other Leitz polarizing microscopes can be used very well for polarized reflected light if they are equipped with substages models "a" or "b". We supply for this purpose a *rotating stem stage* which is interchangeable with the substage condenser and which can be raised or lowered for focusing by means of the rack and pinion motion of the illuminating apparatus.

The Leitz Vertical Illuminator

The Leitz vertical illuminator is of advanced design; it includes a special compensating prism which entirely eliminates *elliptical polarization* of the light. The vertical illuminator is attached to our polarizing microscopes in the same manner as the standard objectives. A separate thumb screw permits tightening of the illuminator on the microscope tube.

	Code Word
Vertical Illuminator with centering device for insertion into the three-point objective changing clutch with compensating prism and glass plate in changing device, with iris diaphragm and adjustable illuminating lens, objective changing and centering clutch, correction lens for tube length of 215mm., including three centering collars, polarizer for insertion into the illuminating tube, thumb screw for attaching illuminator to the microscope tube, in case	"iidvn"
Attaching collecting lens with iris diaphragm and half-stop on spring clip	"igpoi"
Rotating stem stage, graduated, to be inserted instead of the condenser into the illuminating apparatus of the microscope for the purpose of raising and lowering the object	"ierdi"

When ordering, please specify the type of substage used. The rotating stem stage cannot be attached to the illuminating apparatus "c."

Universal microscope lamp "Monla" with aspherical illuminating lens, 6 volts 5 amps	"dcbee"
Six metal object slides	"iswnbi

	Code Word
Hand press for leveling specimens in plasticine	"mepux"
Regulating transformer, with amperemeter, for A.C., 110 volts primary, 6–8 volts secondary	"lynza"

For objectives and eyepieces to be used for polarized reflected light, we refer to the table on Pages 18 and 19.

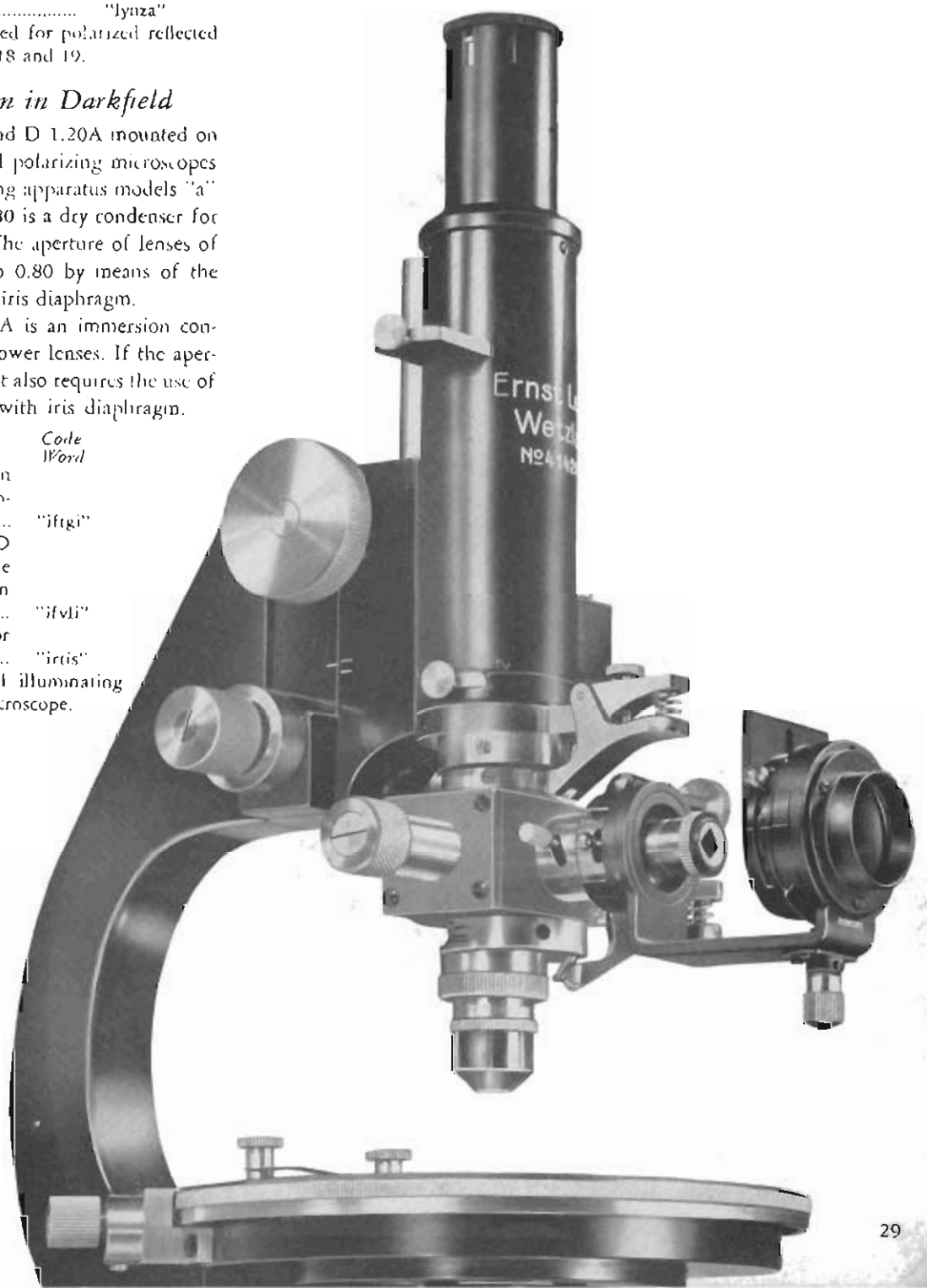
Accessories for Observation in Darkfield

Our darkfield condensers D 0.80 and D 1.20A mounted on dovetail slider, can be used with all polarizing microscopes which are equipped with illuminating apparatus models "a" and "b." Darkfield condenser D 0.80 is a dry condenser for objectives 10:1 to 45:1 inclusive. The aperture of lenses of higher power has to be reduced to 0.80 by means of the intermediate objective adaptor with iris diaphragm.

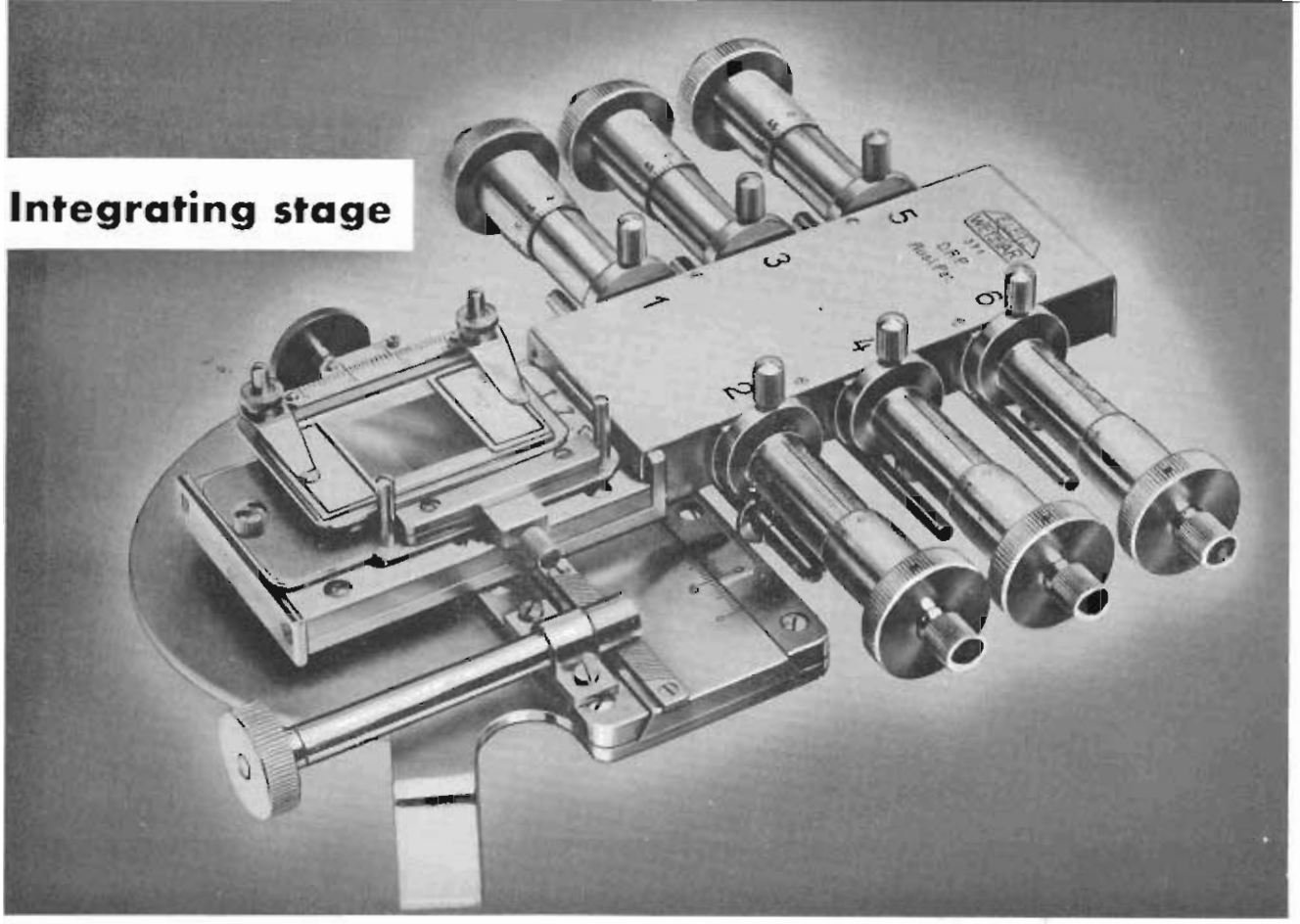
The centering condenser D 1.20A is an immersion condenser and suitable only for high power lenses. If the aperture of the lens is higher than 1.20, it also requires the use of the intermediate objective adaptor with iris diaphragm.

	Code Word
Reflecting condenser D 0.80 on dovetail slider, suitable for substages "a" and "b," in case*	"iftgi"
Centering reflecting condenser D 1.20A on dovetail slider suitable for substages "a" and "b," in case*	"ifvli"
Intermediate objective adaptor with iris diaphragm	"irtis"

* When ordering state which model illuminating apparatus is on your polarizing microscope.



Integrating stage

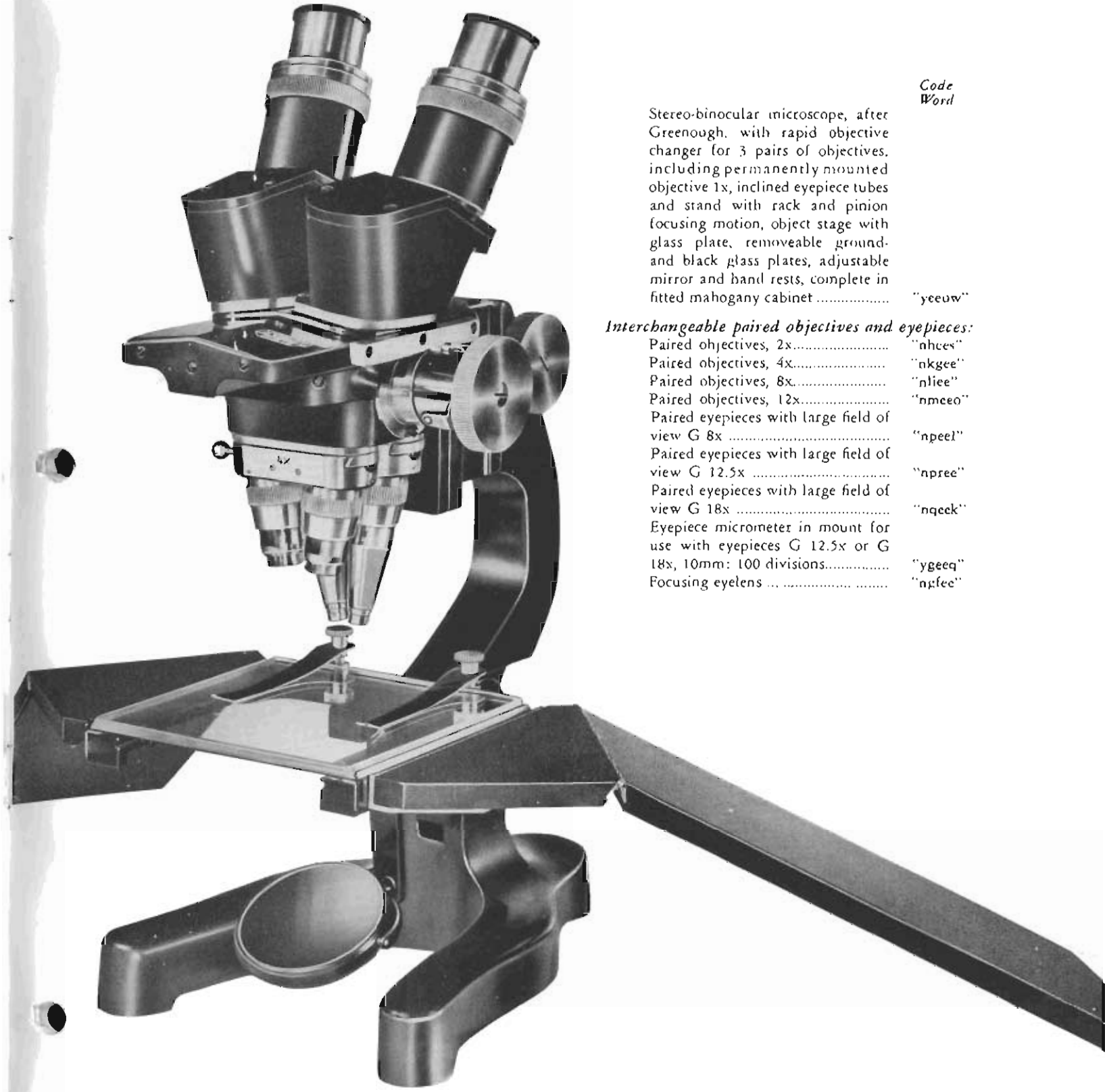


The planimetric analysis of materials is becoming more and more important to the engineer and material testing technologist. The constituents of a given material may be determined from their distribution in the field of view as observed under the microscope. Since direct determination of the surface is a tedious process, A. Rosiwal suggested determining the length proportions of a plane of measurement passing through the surface of the sample examined. This method is based on the fact that the percentage lengths of a constituent bear the same ratio to the total length of the measured plane as the portions of the surface to the total area. The accuracy of analysis possible by this system is greater, the more closely several constituents can be distinguished from one another, and the more uniformly they are distributed in the polished section. The total length of the measuring or reference length should be about 100x the diameter of the largest grains. This analysis can be made both in transmitted as well as incident light. The integrating stage is rigidly attachable to the rotating stage of any microscope. The integrating stage is provided with six or four precision measuring spindles, each one of them to be allocated a separate constituent of the mixture. The specimen—either opaque or transparent—can be moved through its entire area. The length of this travel is accurately read on each spindle to 0.01mm. The sum of the recorded values from the spindles used gives the total length of travel. When the measurement has been completed along one line across the slide, the specimen may be brought back to its initial position by releasing a clamping screw on each measuring spindle without turning the spindles themselves back. The stage springs into its initial position as soon as the clamp is released. A rack and pinion motion is provided to allow for transverse movement. This movement can be read to 0.1mm., so that the specimen can be covered by a close system of parallel measuring lines.

	Code Word
Integrating stage with six spindles, in case, with instructions for use.....	"izabi"
Auxiliary stage for the integrating stage for bridging over gaps in the specimen....	"ifpyi"
Integrating stage with four spindles, in case, with instructions for use.....	"izeki"
Mica plate ¼ λ in mount to screw into the illuminator in place of the condenser cap	"izbdi"
If the integrating stage is to be used under high powers we supply a condenser lens for insertion into the stage.	
Condenser lens	"ifsei"

This lens must be ordered with the stage and cannot subsequently be supplied.

Stereo binocular microscope



	Code Word
Stereo-binocular microscope, after Greenough, with rapid objective changer for 3 pairs of objectives, including permanently mounted objective 1x, inclined eyepiece tubes and stand with rack and pinion focusing motion, object stage with glass plate, removeable ground- and black glass plates, adjustable mirror and hand rests, complete in fitted mahogany cabinet	"yeeuw"
Interchangeable paired objectives and eyepieces:	
Paired objectives, 2x	"nhces"
Paired objectives, 4x	"nkgee"
Paired objectives, 8x	"nliee"
Paired objectives, 12x	"nmeeo"
Paired eyepieces with large field of view G 8x	"npeel"
Paired eyepieces with large field of view G 12.5x	"npree"
Paired eyepieces with large field of view G 18x	"nqeek"
Eyepiece micrometer in mount for use with eyepieces G 12.5x or G 18x, 10mm: 100 divisions	"ygeeq"
Focusing eyelens	"ngfee"

Hand Magnifier, Binocular Prism Magnifiers, and Stereo-Binocular Microscope after Greenough

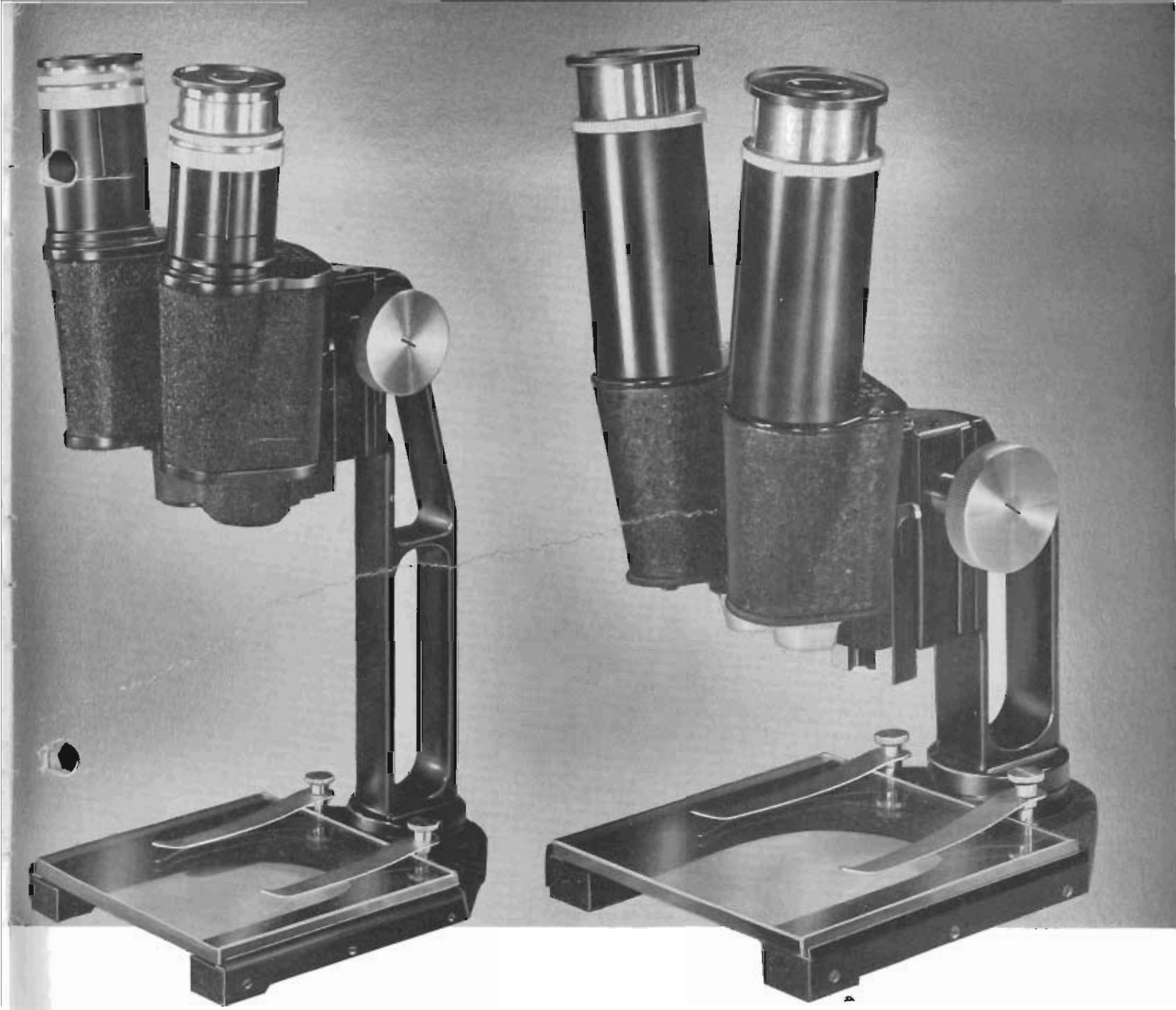
Hand Magnifiers

Aplanatic Magnifiers in cylindrical mount, outside diameter 23mm:

	Code Word
No. 225 A, Magnifier 6x, field of view 30mm	"naias"
No. 225, Magnifier 8x, field of view 22mm	"naibb"
No. 226, Magnifier 10x, field of view 15mm	"naicz"
No. 227, Magnifier 12x, field of view 11mm	"naigi"
No. 229, Magnifier 20x, field of view 5mm	"nailc"
No. 227 handle with spring ring for above Magnifiers	"nafou"
Aplanatic pocket magnifiers, folding type:	
Pocket magnifier, 6x, No. 232 A	"najbe"
No. 232, Pocket Magnifier, 8x	"najes"
No. 233, Pocket Magnifier, 10x	"najni"
No. 234, Pocket Magnifier, 12x	"najlo"
No. 236, Pocket Magnifier, 20x	"najob"
Reading glasses:	
No. 224 hc reading glass, diameter of lens 86mm	"nahky"
No. 224 c, reading glass, diameter of lens 100mm	"ndude"

Binocular Prism Magnifiers

	Code Word
a. For Low Magnifications.	
Low power binocular magnifiers body	"lubin"
Paired eyepieces A 5, 5.5x	"lukul"
Paired eyepieces A 10, 7x	"luken"
Paired eyepieces A 10, 10.5x	"lukar"
Interchangeable solid fitting with rack and pinion, focusing motion	"luzan"
Long interchangeable handle arm	"longa"
Brass foot with removable glass plate	"lofox"
Wooden case for binocular body and eyepieces	"yadee"
Binocular magnifier for low magnification complete, as described above.	"ludas"



b. For High Magnifications.

	Code Word
High power binocular magnifier body	"lubos"
Paired eyepieces, A 5, 10x	"lukul"
Paired eyepieces, A 10, 20x	"luken"
Paired eyepieces, A 15, 30x	"lukar"
Interchangeable slide fitting with rack and pinion, focusing motion	"luzan"
Short interchangeable handle arm	"logur"
Brass foot with removable glass plate	"lofox"
Wooden case for binocular body and eyepieces	"ybeef"
Binocular magnifier for high magnification, complete, as described above	"ludet"

Significant optical data, regarding these magnifiers:
Low Power Binocular Magnifier:

Paired eyepieces	A 5	A 10	A 15
Magnification	× 3½	× 7	× 10½
Field of view, about	45mm.	30mm.	21mm.
Working distance, about	144mm.	144mm.	144mm.
Code Word	lukul	luken	lukar

High Power Binocular Magnifier:

Paired eyepieces	A 5	A 10	A 15
Magnification	× 10	× 20	× 30
Field of view, about	16mm.	11mm.	8mm.
Working distance, about	79mm.	79mm.	79mm.
Code Word	lukul	luken	lukar

Sources of Light

Leitz Universal Monla Lamp

	Code Word
Leitz Universal Monla lamp, with low voltage bulb 6 volt, 5 amp. in housing with aspherical illuminating lens, on stand with ground glass	"dcbee"
The same lamp as described above, but with standard illuminating lens. Can only be used with a suitable transformer	"beech"
Iris diaphragm and filter holder to clamp to the front of the Monla lamp	"deemh"
Spare bulb 6 volt, 5 amp	"binid"
Federal excise tax	
Regulating transformer with amperemeter for A.C. 110 volt (primary) 6--8 volts (secondary)	"lyuza"

Lilliput Arc Lamp

	Code Word
Lilliput arc lamp with clockwork mechanism for feeding the carbons, adjustable aspherical condenser on rectangular cast-iron foot	"dgcea"
Rheostat, 110 volt, 5.5 amp. for D.C.	"dbeez"
Rheostat, 110 volt, 8 amp. for A.C.	"dioee"
100 pairs of carbons for D.C. 7x150mm and 5x150mm	"dkqee"
100 pairs of carbons for A.C. 6x150mm	"dleew"

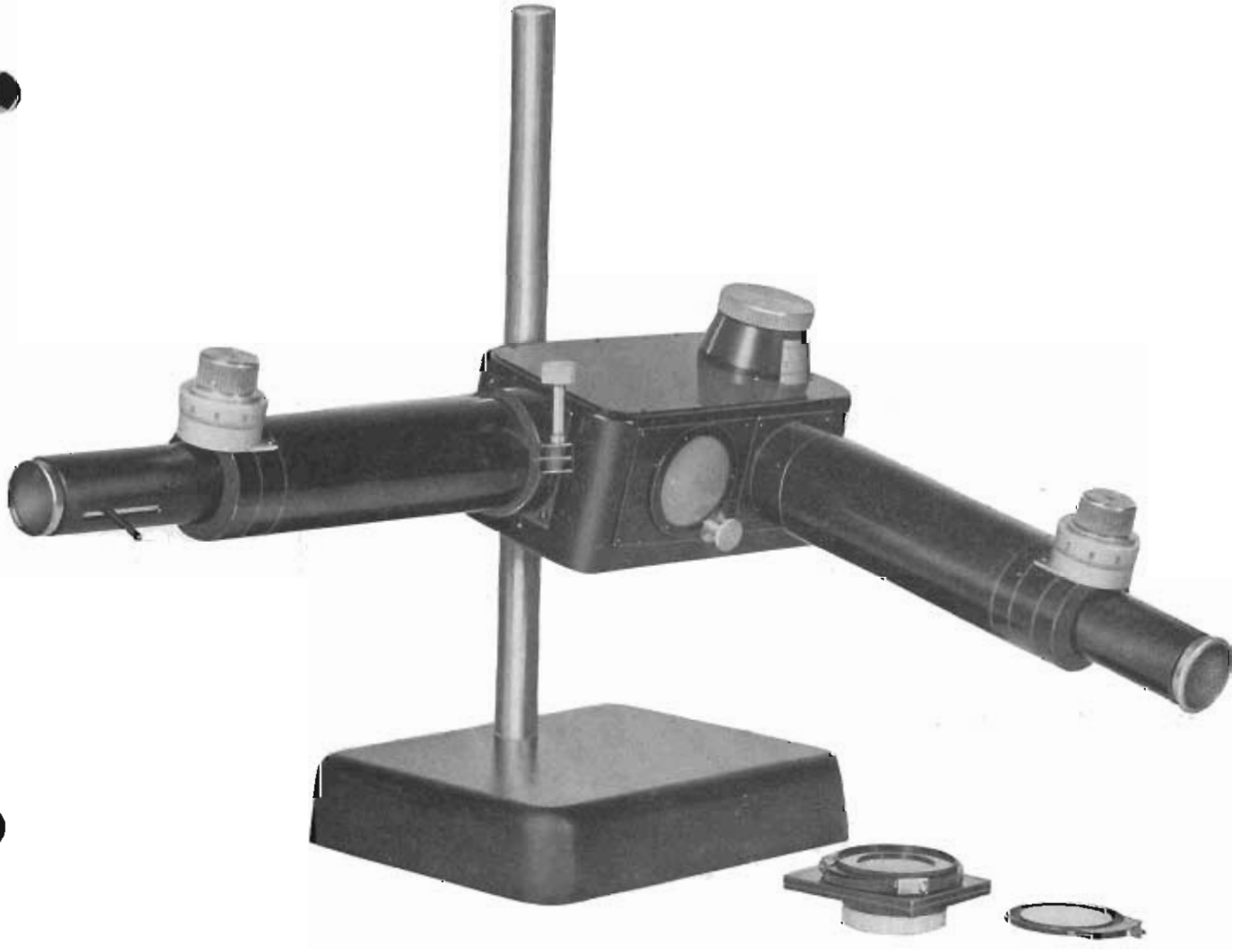
Leitz Monochromator

Many branches of science and industry today utilize quantitative optical methods which require a monochromator of superior light transmission. Light filters usually are insufficiently monochromatic or they tend to absorb too much light. Our new Monochromator distinguishes itself through high light transmission and good spectral purity. In its construction, it was emphasized to keep the light transmission fairly high, even in the range of short waves of the spectrum.

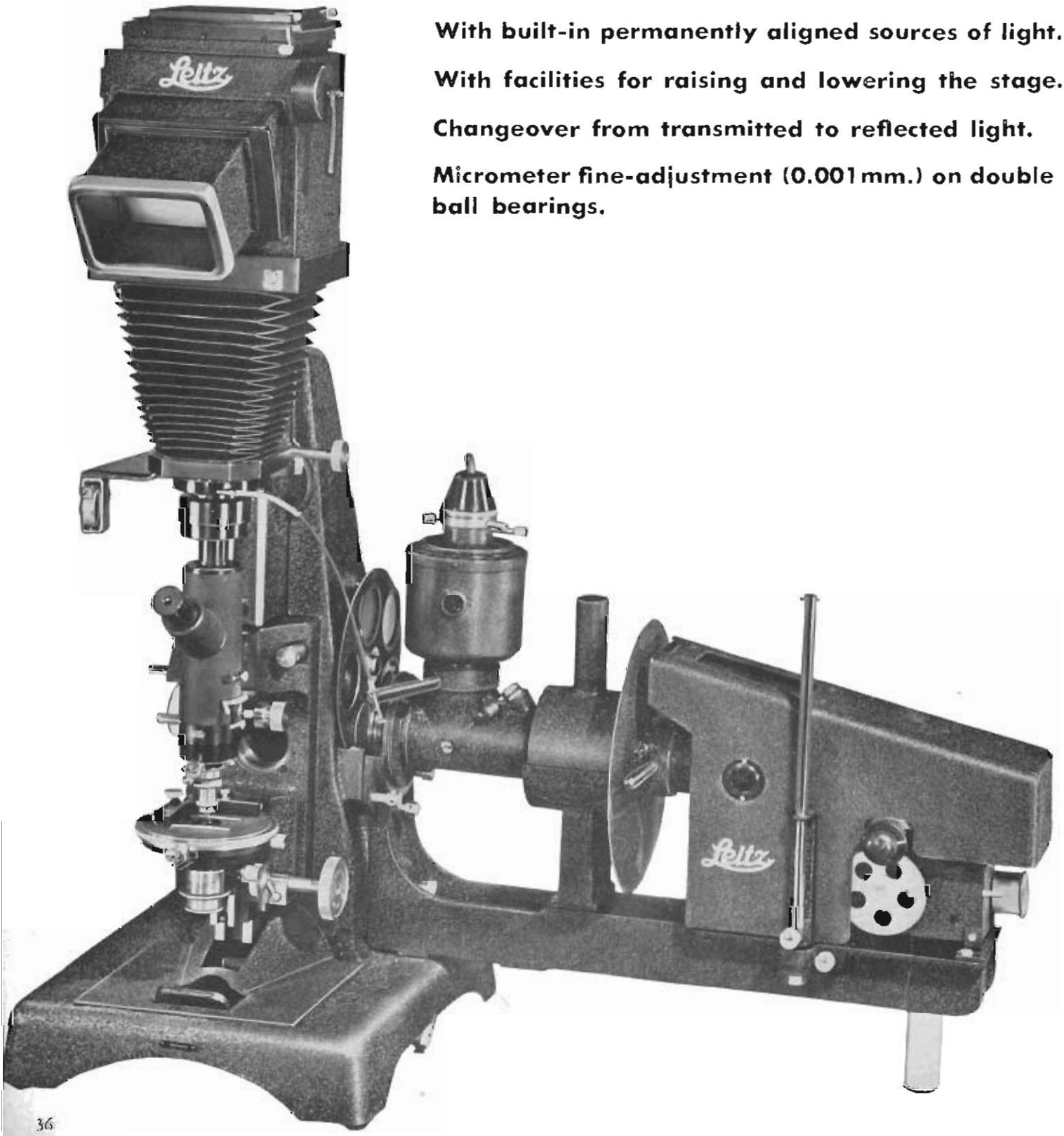
Features of the Monochromator

Constant 90° deflection.
High blue intensity.
Inclined illuminating axis with fixed collimator axis.
Wave lengths scale and calibrating scale.
Can be used with Monla lamp and Arc lamp.
Adjnstable slit widths.
Very convenient adjustment and control of the illumination.

	Code Word
Leitz Monochromator of high intensity, complete with stand and case..	"ikari"



PANPHOT Universal polarizing microscope with built in



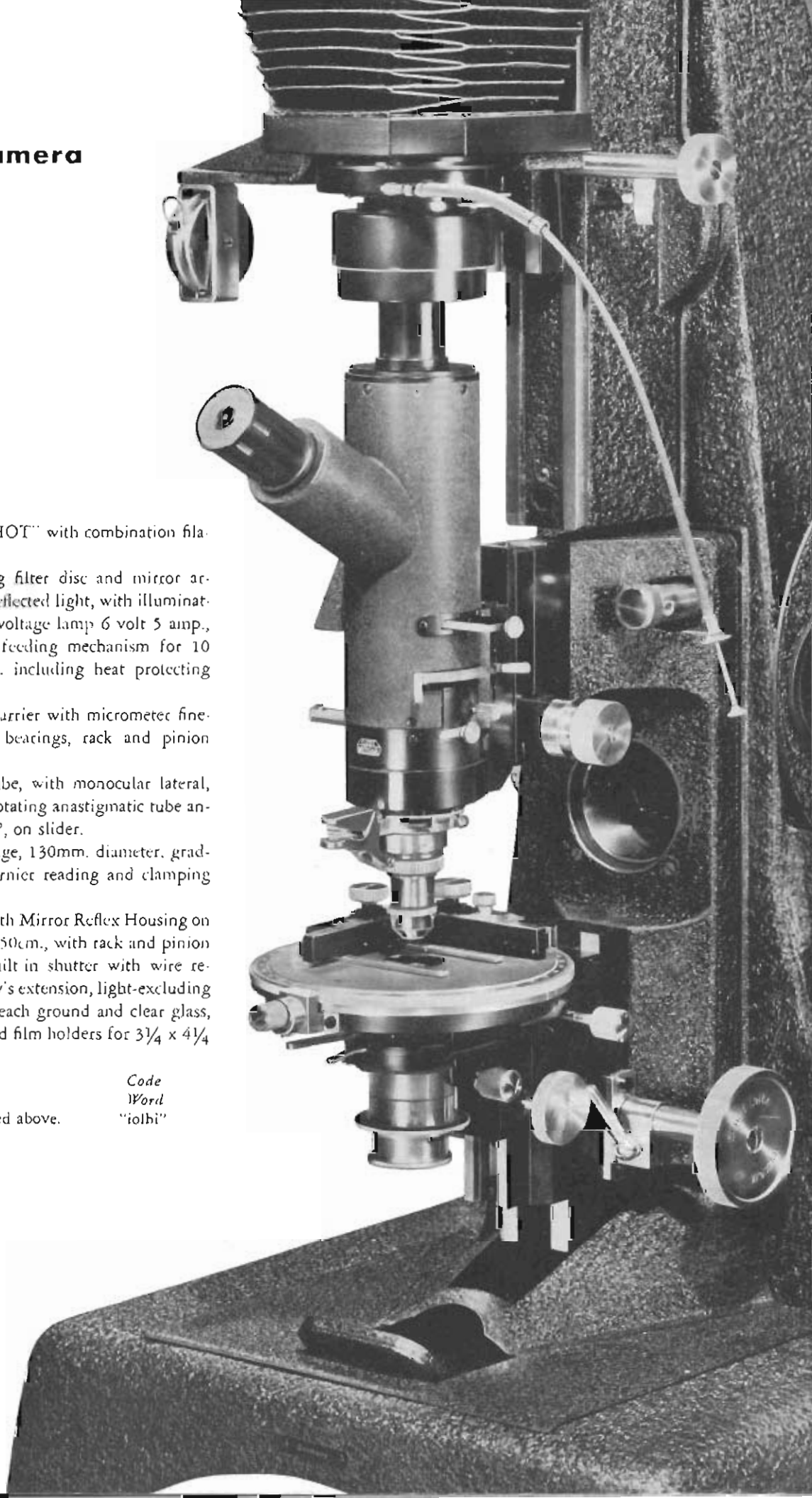
With built-in permanently aligned sources of light.

With facilities for raising and lowering the stage.

Changeover from transmitted to reflected light.

Micrometer fine-adjustment (0.001 mm.) on double ball bearings.

photomicrographic camera



Polarizing Microscope "PANPHOT" with combination filament and arc lamp:

Cast-iron stand with rotating filter disc and mirror arrangement for transmitted and reflected light, with illuminating changing device, with low voltage lamp 6 volt 5 amp., and arc lamp with clockwork feeding mechanism for 10 amp. D. C. or 15 amp. A. C. including heat protecting filter.

Interchangeable Microscope carrier with micrometer fine-adjustment 0.001mm. on ball bearings, rack and pinion coarse adjustment for the stage.

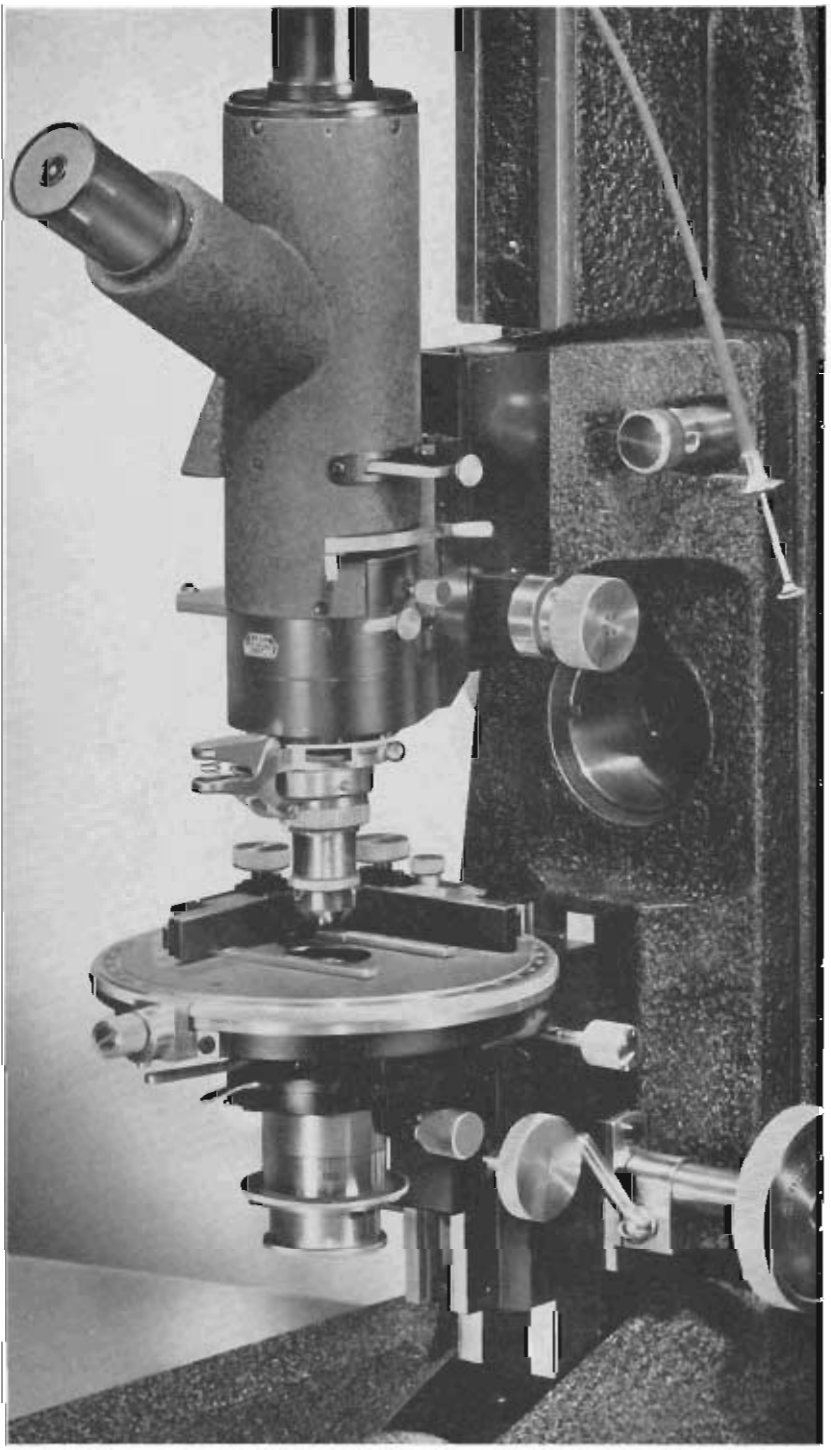
Interchangeable polarizing tube, with monocular lateral, inclined observation tube with rotating anastigmatic tube analyzer, reading at intervals of 1°, on slider.

Large precentered rotating stage, 130mm. diameter, graduated, on ball bearings with vernier reading and clamping screw.

Photomicrographic Camera with Mirror Reflex Housing on interchangeable carrier, bellows 50cm., with rack and pinion for focusing the lens panel, built in shutter with wire release, tape measure for the bellow's extension, light-excluding collar for microscope tube, one each ground and clear glass, focusing magnifier, two plate and film holders for 3¼ x 4¼ inches.

	Code Word
Basic equipment, as described above.	"iolbi"

PANPHOT *(continued)*



	Code Word
Electrical Accessories:	
a. For low voltage lamp: Regulating transformer with amperemeter for 6v 5amp. 110 — 220 volt A. C.	"redyx"
b. For Arc Lamp: Rheostat 15 amp. 110 volts A. C.	"bqiin"
100 pairs of carbons for A. C. x 135 and 10 x 110 mm.	"btiik"
Accessories for Transmitted Light:	
Large substage illuminating apparatus with rack and pinion motion and two-diaphragm condenser, with interchangeable, rotating "Ahrens" Polarizer	"piisd"
Gypsum plate, 1st order red, in metal mount	"kogip"
Mica plate ¼λ, in metal mount	"komer"
Interchangeable, three-point objective changing clutch, on detachable carrier with three centering collars and slit for the reception of compensators	"piitz"
Optical equipment consisting of:	
Achromat 3.2: 1, A 0.12, P 1, free from polarization	"petta"
Achromat 10:1, A 0.25, P 3, free from polarization	"petri"
Achromat 45:1, A 0.65, P 6L, free from polarization	"jazyi"
Huygbens eyepiece P 5x, standard diameter, with crosshairs and adjustable eye lens	"piivs"
Huygbens eyepiece P 8x, standard diameter, with crosshairs and adjustable eye lens	"piifw"
Quartz wedge 1- [illegible] order	"koraz"
Spare Parts:	
Plate—film holder 9 x 12cm. (3¼ x 4¼ inches), drop-in type.	"giipl"
Accessory case, with fittings, to contain all loose PANPHOT parts	"iok6"

Ultropak Illuminator

	Code Word
Large vertical illuminator on detachable carrier, with compensating prism to eliminate eliptical polarization, and plane glass plate in changing device, with iris diaphragm and focusing illuminating lens, tube slit for the reception of compensators, rotating prism polarizer, four objective centering collars.....	"qcpii"
Attachable collecting lens with iris diaphragm and half-stop on spring clip.....	"iqpoi"
Hand press for levelling specimens in plasticene	"mepux"

For recommended objectives and eyepieces see pages 18 and 19.....

With arrangement for polarized light. The Ultropak Illuminator permits dark field observations in reflected light and is particularly valuable for the study of inclusions, etched surfaces, and depths observations in opaque specimens. The Ultropak can be attached to any of our polarizing microscopes by means of an objective centering collar. In connection with polarizer and analyzer it can be used for reflex free observation.

For further particulars see Catalog No. 106.

OPTICAL DATA OF ULTROPAK OBJECTIVES

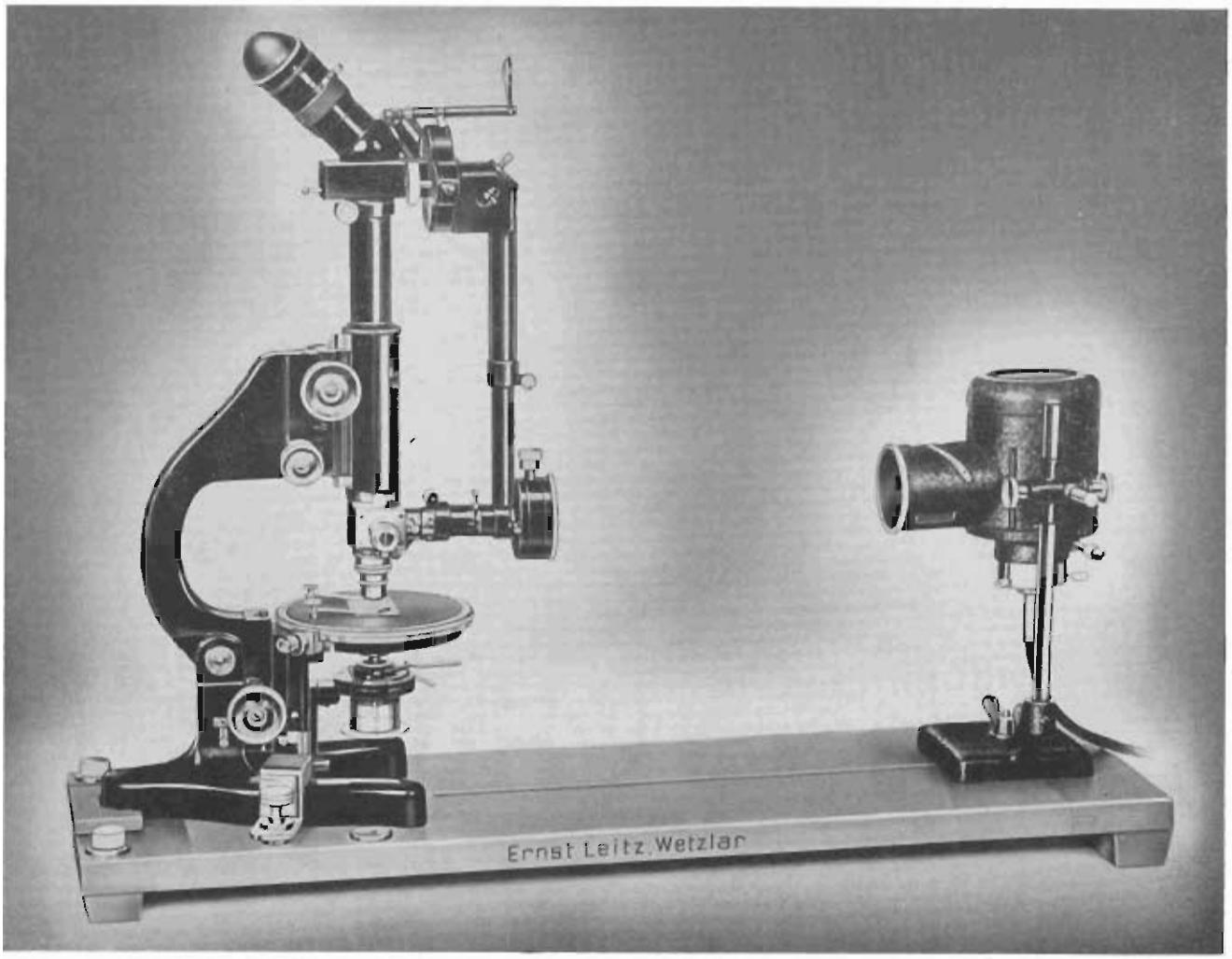
	Objectives UO		*N. A.*	*Free working distance in mm.*	*Magnification with Eyepiece* 6 x	8 x	10 x	*Required Ring Condenser*	*Equipment Possibilities of the Objectives*	*Code Word*
Achromats	3.8	Dry Systems	0 12	33	22.8	30.4	38	K 3.8	*May be* used with immersion attachments *Can be* used with imm. attachments only	ahpee (3.8)
	5		0.15	26.3	30	40	50	K 5		aiees (5)
	6.5		0.18	16.2	39	52	65	K 6 5		airee (6.5)
	11		0.25	5.8	66	88	110	K 11		akeer (11)
	11 (I.A.*)		0.25	5.8	66	88	110	K 11		aktee (11 I.A.**)
	22 (I.A.*)		0 45	2.2	132	176	220	K 22- -100		aleeq (22 I.A.**)
	22		0.45	2.2	132	176	220	K 22—100		alvee (22)
	50		0.65	0.7	300	400	500	K 22—100		ameep (50)
	23	Water Immersions	0.55	0.65	138	184	230	K 22—100	Upon requesr supplied with immersion caps	amxee (23)
	55		0.84	0.57	330	440	550	K 22- 100		aneeo (55)
	75		0 90	0.45	450	600	750	K 22 —100		anzee (75)
	90		1.0	0.42	540	720	900	K 22—100		aobee (90)
Fluorine Systems	12	Oil Immersions	0.55	0.65	138	184	230	K 22—100		aoeen (23)
	60		0.85	0.57	360	480	600	K 22—100		apdee (60)
	75		1.0	0.51	450	600	750	K 22—100		apeem (75)
	100		1.0	0.48	600	800	1000	K 22—100		aqeel (100)
Ultropak Mirror Condenser 23—100, usable with every UO Objective 23—100x										aqfee

*) The Objectives UO 11 x I. A. and UO 22x I. A. can in exceptional cases only be used without immersion attachments, provided, however, that the Objective UO 11 x I. A. is equipped with a diaphragm of 5mm. opening and the Objective UO 22x I. A. with a diaphragm of 3mm. opening.

**) The prices of the Objectives 11 x I. A. and UO 22# x #I.A. already include the immersion attachments. If not specified otherwise, we supply the attachments 11 I. A. or 22 I.A., respectively.

MICROSCOPE PHOTOMETER

after M. Berek



For measuring the degree of reflection. This Photometer is used with Leitz microscopes and the polarizing vertical illuminator. The illustration above shows the complete set-up.

For photometric measurements, as well as for the observation of anisotropic effects under crossed polarizers, we recommend the Universal "Monla" lamp. Instructions for use are provided with each instrument.

	Code Word
Microscope Photometer, consisting of Photometer unit with comparison system, with focusable Photometer eyepiece and slit for the insertion of light filters with measuring segment and auxiliary magnifier to read off the degrees, with entrance tube, polarizer and adjustable slit, three optical glass filters to be inserted into the eyepiece for the spectral lines C, D, E, light screening device, and ten calibration diagrams	"ifghi"
Totally reflecting prism in mount, for the calibration	"ieern"
Base board for the setting-up of the microscope and lamp	"iibgm"
Universal "Monla" lamp on square base plate with ground glass filter and special collimator	"ifkhi"
Regulating transformer 110 volt, A. C.	"Inyza"

scanned by J. G. McHone 31Dec10
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E. LEITZ INC. NEW YORK

G-12/50-AMP.
Printed in U.S.A.

Price List and Index of Code Words

Code Word	*Description*	*Price*	*Page*
"iiolh"	Microscope AM	$1096.00	7
"petta"	Achromat, 3.2:1	18.50	7
"petri"	Achromat, 10:1	23.50	7
"iazyi"	Achromat, 45:1	44.50	7
"iiaws"	Huyghens eyepiece P5x	15.00	7
"iiaxu"	Huyghens eyepiece P8x	15.00	7
"iiayw"	Huyghens micrometer eyepiece, P6x	20.00	7
"ickri"	Net micrometer disc	9.00	7
"obmet"	Stage micrometer, 2mm:200	13.50	7
"iemti"	Gypsum plate	14.00	7
"koraz"	Quartz wedge	55.00	7
"lohij"	Optical equipment No. 1	228.00	7
"petta"	Achromat, 3.2:1	18.50	7
"petri"	Achromat, 10:1	23.50	7
"iazyi"	Achromat, 45:1	44.50	7
"pelim"	Achromatic Oil immersion 100:1	84.00	7
"iiaws"	Huyghens eyepiece P5x	15.00	7
"iiaxu"	Huyghens eyepiece P8x	15.00	7
"iiayw"	Huyghens micrometer eyepiece P6x	20.00	7
"ickri"	Net micrometer disc	9.00	7
"obmet"	Stage Micrometer, 2mm:200	13.50	7
"pukap"	Immersion condenser cap N.A. 1.40	10.50	7
"iemti"	Gypsum plate	14.00	7
"pizut"	Extra objective centering collar	7.50	7
"koraz"	Quartz wedge	55.00	7
"lnklm"	Optical equipment No. 2	330.00	7
"iiolh-lnhij"	Microscope AM with Optical Equipment No. 1	1324.00	7
"iiolh-lnklm"	Microscope AM with Optical Equipment No. 2	1426.00	7
"pirux"	Mechanical Stage	80.00	7
	Polished mahogany case, only, with fittings	30.00	7
"iiogz"	Microscope SY	1300.00	9
"petta"	Achromat, 3.2:1	18.50	9
"petri"	Achromat, 10:1	23.50	9
"iazyi"	Achromat, 45:1	44.50	9
"pelim"	Achromatic oil immersion 100:1	84.00	9
"iiaws"	Huyghens eyepiece P5x	15.00	9
"iiaxu"	Huyghens eyepiece P8x	15.00	9
"iiayw"	Huyghens micrometer eyepiece P6x	20.00	9
"ickri"	Net micrometer disc	9.00	9
"obmet"	Stage micrometer, 2mm:200	13.50	9
"pukap"	Immersion condenser cap N.A. 1.40	10.50	9
"koraz"	Quartz wedge	55.00	9
"pizut"	Four objective centering collars @ 7.50	30.00	9
"lnqrs"	Optical Equipment No. 2	338.50	9
"iiogz-lnqrs"	Microscope SY with substage illuminating apparatus "a", with Optical Equipment No. 2	1638.50	9
	Polished mahogany case, only, with fittings	30.00	9
"iioru"	Microscope CMU	1037.50	11
"iivwx"	Microscope CMU with new polarizing filters	947.50	11
"iiosw"	Microscope CMU with substage illuminating apparatus "b"	$937.50	11
"iiwen"	Microscope CMU as above, but with new polarizing filters	878.50	11
"petta"	Achromat, 3.2:1	18.50	11
"petri"	Achromat, 10:1	23.50	11
"iazyi"	Achromat, 45:1	44.50	11
"iiaws"	Huyghens eyepiece P5x	15.00	11
"iiaxu"	Huyghens eyepiece P8x	15.00	11
"iiayw"	Huyghens micrometer eyepiece P6x	20.00	11
"ickri"	Net micrometer disc	9.00	11
"obmet"	Stage micrometer, 2mm:200	13.50	11
"koraz"	Quartz wedge	55.00	11
"pizut"	Three objective centering collars @ 7.50	22.50	11
"lnnop"	Optical Equipment No. 1	236.50	11
"petta"	Achromat, 3.2:1	18.50	11
"petri"	Achromat, 10:1	23.50	11
"iazyi"	Achromat, 45:1	44.50	11
"pelim"	Achromatic oil immersion 100:1	84.00	11
"iiaws"	Huyghens eyepiece P5x	15.00	11
"iiaxu"	Huyghens eyepiece P8x	15.00	11
"iiayw"	Huyghens micrometer eyepiece P6x	20.00	11
"ickri"	Net micrometer disc	9.00	11
"obmet"	Stage micrometer, 2mm:200	13.50	11
"pukap"	Immersion condenser cap N.A. 1.40	10.50	11
"koraz"	Quartz wedge	55.00	11
"pizut"	Four objective centering collars @ 7.50	30.00	11
"lnqrs"	Optical Equipment No. 2	338.50	11
"iioru-lnnop"	Microscope CMU with substage illuminating apparatus "a", with Optical Equipment No. 1	1274.00	11
"iivwx-lnnop"	Microscope CMU, with new polarizing filters, with substage illuminating apparatus "a", with Optical Equipment No. 1	1184.00	11
"iiosw-lnnop"	Microscope CMU, with substage illuminating apparatus "b" with Optical Equipment No. 1	1174.00	11
"iiwen-lnnop"	Microscope CMU, with new polarizing filters, with substage illuminating apparatus "b" with Optical Equipment No. 1	1115.00	11
"iioru-lnqrs"	Microscope CMU, with substage illuminating apparatus "a" with Optical Equipment No. 2	1376.00	11
"iivwx-lnqrs"	Microscope CMU, with new polarizing filters, with substage illuminating apparatus "a", with Optical Equipment Equipment No. 2	1276.00	11
"iiosw-lnqrs"	Microscope CMU, with substage illuminating apparatus "b" with Optical No. 2	1286.00	11
"iiwen-lnqrs"	Microscope CMU, with new polarizing filters, with substage illuminating apparatus "b", with Optical Equipment No. 2	1217.00	11
	Polished mahogany case, only, with fittings	30.00	11

Price List and Index *(continued)*

Code Word	*Description*	*Price*	*Page*
"iivog"	Microscope IIIM	$524.00	13
"iivut"	Microscope IIIM with new polarizing filters	458.00	13
"iivne"	Microscope IIIM with substage illuminating Apparatus "b"	552.00	13
"iivtr"	Microscope IIIM as above but with new polarizing filters	489.00	13
"petta"	Achromat, 3.2:1	18.50	13
"petri"	Achromat, 10:1	23.50	13
"iazyi"	Achromat, 45:1	44.50	13
"piifw"	Huyghens eyepiece P8x	12.00	13
"pizut"	Three objective centering collars @ 7.50	22.50	13
"purii"	Attachable iris diaphragm	17.50	13
"lntuv"	Optical Equipment No. 1-s	138.50	13
"iagfi"	Allowance for fitting triple nosepiece	2.00	13
"iarhi"	Extra for fitting quadruple nosepiece	7.00	13
"petta"	Achromat, 3.2:1	18.50	13
"petri"	Achromat, 10:1	23.50	13
"iazyi"	Achromat, 45:1	44.50	13
"iiaxu"	Huyghens eyepiece P8x	12.00	13
"pizut"	Three objective centering collars @ 7.50	22.50	13
"lnwxy"	Optical Equipment No. 2-s	121.50	13
"iivog-lntuv"	Microscope IIIM with illuminating apparatus "c" with Optical Equipment No. 1-s	662.50	13
"iivne-lnwxy"	Microscope IIIM with illuminating apparatus "b" with Optical Equipment No. 2-s	673.50	13
"iivut-lntuv"	Microscope IIIM with new polarizing filters, with illuminating apparatus "c", with Optical Equipment No. 1-s	596.50	13
"iivtr-lnwxy"	Microscope IIIM with new polarizing filters with illuminating apparatus "b", with Optical Equipment No. 2-s	610.50	13
"piivs"	Huyghens eyepiece P5x	12.00	13
"koraz"	Quartz wedge	55.00	13
"ringa"	Removable ring plate		13
	Polished mahogany case only, with fittings	22.00	13
"poemp"	Microscope "MOP"	700.50	15
"iicvo-B"	Achromat, 5.5:1	19.50	15
"iicwq-B"	Achromat, 16.5:1	30.00	15
"iicxs-B"	Fluorite, 45:1	54.00	15
"iidbz-B"	Fluorite oil immersion, 80:1	106.50	15
"piivs"	Huyghens eyepiece P5x	12.00	15
"piiwf"	Huyghens eyepiece P8x	12.00	15
"giikn"	Huyghens micrometer eyepiece P6x	16.50	15
"lnzab"	Optical Equipment No. 3	250.50	15
"iituv"	Ore Microscope "MOP" with Optical Equipment No. 3	895.50	15
"dcbee"	"Monla" lamp	43.50	15
"iwmbi"	Six metal object slides	9.00	15
"mepux"	Hand press	20.00	15
"lnyza"	Regulating transformer	30.00	15
"lncde"	Microscope "MOP" with Optical Equipment No. 3 and illuminating accessories	994.80	15
"iekpi"	Illuminating Apparatus "b"	150.00	16
"iehli"	Plane and concave mirror	$ 9.50	16
"iemti"	Gypsum plate	14.00	16
"qiigy"	Bertrand auxiliary lens	12.00	16
"ieoxi"	Achromat, 45:1	38.00	16
"pirux"	Mechanical stage	80.00	16
"petta"	Achromat, 3.2:1	18.50	17
"petme"	Achromat, 6:1	18.50	17
"petri"	Achromat, 10:1	23.50	17
"peaps"	Achromat, 25:1	40.00	17
"petoy"	Achromat, 30:1	40.00	17
"iazyi"	Achromat, 45:1	44.50	17
"petis"	Achromat, 62:1	45.00	17
"pelim"	Achromat, 100:1	84.00	17
"pizut"	Objective centering collar	7.50	18
"iicvo-B"	Achromat, 5.5:1	19.50	18
"iicwq-B"	Achromat, 16.5:1	30.00	18
"iicxs-B"	Fluorite, 45:1	54.00	18
"iicyu-B"	Oil Immersion, 12.5:1	46.00	18
"iicxw-B"	Oil Immersion, 25:1	55.00	18
"iidax-B"	Fluorite Oil Immersion, FL Oil 60:1	76.00	18
"iidbz-B"	Fluorite Oil Immersion, FL Oil 80:1	106.50	18
"iiaws"	Huyghens eyepiece P5x	15.00	19
"iiaxu"	Huyghens eyepiece P8x	15.00	19
"hykul"	Huyghens eyepiece 4x	5.50	19
"hygen"	Huyghens eyepiece 5x	5.50	19
"hyzwa"	Huyghens eyepiece 6x	5.50	19
"hydre"	Huyghens eyepiece 8x	5.50	19
"hyvir"	Huyghens eyepiece 10x	5.50	19
"hyfun"	Huyghens eyepiece 12x	5.50	19
"hypee"	Huyghens eyepiece 16x	5.50	19
"periv"	Periplan eyepiece 4x	13.50	19
"perfu"	Periplan eyepiece 5x	13.50	19
"perse"	Periplan eyepiece 6x	13.50	19
"perot"	Periplan eyepiece 8x	13.50	19
"pezen"	Periplan eyepiece 10x	16.50	19
"pezwo"	Periplan eyepiece 12x	16.50	19
"pezur"	Periplan eyepiece 15x	16.50	19
"pezit"	Periplan eyepiece 25x	16.50	19
"iiaws"	Huyghens eyepiece P5x	12.00	19
"iiaxu"	Huyghens eyepiece P8x	12.00	19
"iiayw"	Huyghens micrometer eyepiece	20.00	19
"iekri"	Net micrometer disc	9.00	19
"ielti"	Same as above, but length of square 1mm.	9.00	19
"icmvi"	Same as above, but length of square 2mm.	9.00	19
"giikn"	Huyghens micrometer eyepiece P6x	16.50	19
"obter"	Stage micrometer 1mm:100	13.50	19
"obmet"	Stage micrometer 2mm:200	13.50	19
"iidmu"	Stage micrometer for reflected light	26.00	19
"pumax"	Illuminating Apparatus "a"	240.00	20
"pumax-F"	Same as above, but with new polarizing filter	182.00	20
"punhar"	Illuminating Apparatus "b"	140.00	20

Price List and Index *(continued)*

Code Word	*Description*	*Price*	*Page*
"punhar-F"	Same as above, but with new polarizing filter	$113.00	20
"pures"	Illuminating Apparatus "c"	112.00	21
"pures-F"	Same as above but with new polarizing filter	82.00	21
"puiri"	Attachable iris diaphragm for illuminating apparatus "c"	17.50	21
"pukap"	Immersion condenser cap N.A. 1.40	10.50	21
"jitvk"	Attachable Collimating lens for Substage "a"	6.00	21
"jitom"	Attachable Collimating lens for Substages "b" and "c"	6.00	21
"pirux"	Attachable mechanical stage	80.00	22
"marki"	Object marker	20.00	22
"pikle"	Stage clips, per pair	1.50	22
"ibsvi"	Spring clamp	3.00	22
"berek"	Berek Compensator	90.00	22
"koraz"	Quartz wedge	55.00	22
"kogip"	Gypsum plate	7.50	22
"komer"	Mica plate	6.50	22
"clipt"	Elliptical compensator $\frac{\lambda}{10}$ to $\frac{\lambda}{30}$	96.00	22
"kohil"	Aplanatic auxiliary magnifier 12x	45.00	22
"antop"	Cap analyzer in metal mount	42.00	22
"lnfgh"	Pinhole diaphragm	5.00	22
"lnijk"	Pinhole diaphragm	3.50	22
"icumi"	Wright's eyepiece with iris diaphragm	90.00	22
"antop"	Cap analyzer	42.00	22
"picro"	Micrometer	15.00	22
"pinet"	Net micrometer	15.00	22
"pibin"	Combination quartz wedge	78.00	22
"pijon"	Quartz gypsum compensator	45.00	22
"pidop"	Double quartz wedge	58.00	22
"pisol"	Double glass plate	30.00	22
"konak"	Half shadow plate	39.00	22
"kolep"	Half shadow wedge	63.00	22
"fedro"	Universal Stage UT 4	445.00	24
"icgli"	Universal Stage UT 5	650.00	24
"ichni"	Universal Stage UT 2	260.00	24
"fegno"	Paired segments n D=1.648	39.00	24
"fegma"	Paired segments n D=1.516	33.00	24
"fegfu"	Parallel guide slide, after Schmidt	12.00	24
"fegse"	Modification of segments	7.50	24
"icvoi"	Alteration of segments	15.00	24
"fedro-fegse-fegfu"	Universal Stage UT 4 with modified segment n D=1.55, and parallel guide slide	464.50	25
"icgli-fegse-fegfu"	Universal Stage UT 5, with modified segment n D=1.55, and parallel guide slide	669.50	25
"ivwxi"	Stereographic net with graph paper	30.00	25
"ivxzi"	Surface true net in rotating mount	30.00	25
"icshi"	Indicatrix model of Optically uni-axial crystal	12.00	25
"ictki"	Indicatrix model of optically uni-axial crystal	15.00	25
"icnxi"	UM 1, 5x	$45.00	25
"icozi"	UM 2, 10x	45.00	25
"icpbi"	UM 3, 20x	81.00	25
"icqdi"	UM 4, 30x	90.00	25
"iitlc"	Supplementary condenser for UT5	3.50	25
"iitng"	Supplementary condenser for UT4 and 2	3.50	25
"idcbi"	Supplementary device	176.00	25
"ideft"	Special eyepiece "index" 8x for microscopes with large diameter tube	30.00	25
"idfhi"	Same as above but for microscopes with standard diameter tube	30.00	25
"idbzi"	Centering Bertrand Auxiliary lens	12.00	25
"idaxi"	Attachable top analyzer	45.00	25
"idhmi"	Illuminating stand	22.00	25
"poduh"	Universal Stage UTR-2	280.00	26
"iiceg"	Elliptical analyzer	350.00	27
"iiudn"	Special EA3b objective	27.00	27
"iidvn"	Vertical illuminator	150.00	28
"iqpoi"	Attachable collecting lens	35.00	28
"icrdi"	Rotating stem stage	36.00	28
"dcbee"	Monla lamp	43.50	28
"iwmbi"	Six metal object slides	9.00	28
"mcpux"	Hand press	16.00	29
"lnyza"	Regulating transformer	30.00	29
"iftgi"	Reflecting condenser D 0.80	98.00	29
"ifvli"	Centering reflection condenser D 1.20A	78.00	29
"irtis"	Intermediate objective adaptor	8.00	29
"izabi"	Integrating stage with 6 spindles	400.00	30
"ifpyi"	Auxiliary stage for integrating stage	54.00	30
"izeki"	Integrating stage with 4 spindles	342.00	30
"izbdi"	Mica plate	6.00	30
"ifsei"	Condenser lens	24.00	30
"yceuw"	Stereo-Binocular Microscope	367.00	31
"nhees"	Paired objectives, 2x	18.00	31
"nkgee"	Paired objectives, 4x	20.00	31
"nlice"	Paired objectives, 8x	20.00	31
"nmeeo"	Paired objectives, 12x	20.00	31
"npeel"	Paired eyepieces G8x	20.00	31
"nprec"	Paired eyepieces G12.5x	23.00	31
"nqeek"	Paired eyepieces G18x	27.00	31
"ygeeq"	Eyepiece Micrometer	6.00	31
"ngfee"	Focusing eyelens	2.50	31
"naias"	Aplanatic Magnifier No. 225A, 6x	10.00	32
"naibb"	Aplanatic Magnifier No. 225, 8x	10.00	32
"naicz"	Aplanatic Magnifier No. 226, 10x	10.00	32
"naigi"	Aplanatic Magnifier No. 227, 12x	10.00	32
"nailt"	Aplanatic Magnifier No. 229, 20x	12.75	32
"nafnu"	No. 227 handle with spring ring for above magnifiers	3.00	32
"najbe"	Aplanatic pocket magnifier 6x	12.00	32
"najes"	Aplanatic pocket magnifier 8x	12.00	32
"najni"	Aplanatic pocket magnifier 10x	12.00	32
"najlo"	Aplanatic pocket magnifier 12x	12.00	32
"najob"	Aplanatic pocket magnifier 20x	15.00	32

Price List and Index *(continued)*

Code Word	*Description*	*Price*	*Page*
"nahky"	Reading glass No. 224	$10.00	32
"ndude"	Reading glass No. 224c	10.00	32
"lubin"	Low power binocular magnifier body	70.00	32
"lukul"	Paired eyepieces A5, 3.5x	16.00	32
"luken"	Paired eyepieces A10, 7x	25.00	32
"lukar"	Paired eyepieces A15, 10.5x	25.00	32
"luzan"	Interchangeable solid fitting	25.00	32
"longa"	Long interchangeable handle arm	14.00	32
"lofox"	Brass foot with removable glass plate	18.00	32
"yadee"	Wooden case for Binocular Body and Eyepieces	8.00	32
"ludas"	Binocular magnifier complete for low power magnification	201.00	32
"lubos"	High power binocular magnifier body	64.00	33
"lukul"	Paired eyepieces A 5, 10x	16.00	33
"luken"	Paired eyepieces A 10, 20x	25.00	33
"lukar"	Paired eyepieces, A 15, 30x	25.00	33
"luzan"	Interchangeable slide fitting	25.00	33
"logur"	Short interchangeable handle arm	12.00	33
"lofox"	Brass foot with removable glass plate	18.00	33
"ybeef"	Wooden case for binocular body and eyepieces	8.00	33
"ludet"	Binocular magnifier complete for high power magnification	193.00	33
"dcbee"	Monla lamp	43.50	34
"beech"	Same lamp as described above, but with standard illuminating lens	38.00	34
"deemh"	Iris diaphragm	14.00	34
"linid"	Spare bulb, incl. tax	1.95	34
"lnyza"	Regulating transformer	30.00	34
"redyx"	Regulating transformer	60.00	34
"dgeea"	Lilliput arc lamp	90.00	34
"dheez"	Rheostat, 110 v, 5.5 amp. for D.C.	12.50	34
"dioee"	Rheostat, 110 v, 8 amp. for A.C.	15.00	34
"dkqee"	100 pairs of Carbons for D.C.	$12.00	34
"dleew"	100 pairs of Carbons for A.C.	12.00	34
"ikari"	Monochromator of high intensity	1400.00	35
"iollhi"	Panphot	1648.00	37
"redyx"	Regulating transformer	60.00	38
"bqiin"	Rheostat, 15 amps, 110 v, A.C.	30.00	38
"btiik"	100 Pairs of Carbons for A.C. (imported)	27.00	38
"piirq"	Large substage illuminating apparatus	210.00	38
"kogip"	Gypsum plate	7.50	38
"komer"	Mica plate	6.50	38
"piitz"	Interchangeable three-point changing clutch	51.00	38
"petta"	Achromat, 3.2:1	18.50	38
"petri"	Achromat, 10:1	23.50	38
"iazyi"	Achromat, 45:1	44.50	38
"piivs"	Huyghens eyepiece P5x	12.00	38
"piifw"	Huyghens eyepiece P8x	12.00	38
"koraz"	Quartz wedge	55.00	38
	4" x 5" Graflok back	55.00	38
	4" x 5" Double cut film holder	4.05	38
	4" x 5" Graphic film pack adapter	8.65	38
	4" x 5" Roll film holder	21.50	38
	4" x 5" Graphic grafmatic film holder	21.95	38
"giipl"	Plate film holder	4.50	38
"iokfi"	Accessory case	48.00	38
"qcpii"	Large vertical illuminator	175.00	39
"iqpoi"	Attachable collecting lens	35.00	39
"mepux"	Hand press	20.00	39
"ifghi"	Microscope Photometer	620.00	40
"ieern"	Reflecting prism	16.00	40
"iibgm"	Baseboard	32.00	40
"lfkhi"	Monla lamp	43.00	40
"lnyza"	Regulating transformer 110 volt, A.C.	30.00	40

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NOTE: *Insert to catalog No. 102*