

# WATS ON

## ABSTRACTS FROM RECENT PUBLICATIONS

### 'Instrument Review' July, 1965.

Using the Microscope,  
by A.L.E. Barron

published by Chapman & Hall. 1965. 257 pp. £1.16.0d.

This book, as its title implies, presents an essentially practical account of how to obtain the best results with the modern microscope. The first and longer part of the book deals with the optical principles involved. A full description of the microscope and its component parts, is given together with methods of illumination. This is followed by a rather brief account of the metallurgical, polarizing, phase contrast and interference microscopes. References and suggestions for further reading are, however, presented at the end of each chapter.

There is also a useful description of micrometer eyepieces with instructions on how to count and measure microscopic objects. The second part, which is on the subject of photomicrography, and takes up five of the thirteen chapters, forms a useful addition to a practical book of this type. Both instrument engineers and students will appreciate the simple language and the clear presentation of the text and figures found throughout.

L.R.Baker.

### 'J.Sci. Instrum.' 1965. Vol.42.

A New Graticule for Particle Counting & Sizing,  
by K.R. May, Microbiological Research Establishment,  
Porton, Wilts.

A new globe and circle type of graticule is described which is claimed to have advantages over the B.S.3625 graticule in convenience and size range covered. The MAY graticule is available from Graticules Limited.

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# WATS ON

The Editor,  
WATS ON,  
Barnet, Herts.

Dear Sir,

A good salesman, to sell the products of his firm, has sometimes to "sell" himself, and "sell" his firm to his customer. To this latter end, the following historical notes may be of assistance.

## DO YOU KNOW

THAT the Firm is now 129 years old, having been founded in 1837.

THAT the Firm has had the titles shown in the following list, which, incidentally, can be of help when trying to date an old Watson instrument:-

W. Watson	1837 - 1867
W. Watson & Son	1867 - 1882
W. Watson & Sons	1862 - 1908
W. Watson & Sons Ltd.	1908 -

THAT from 1861 both the Showroom and the Factory were located at 313, High Holborn.

THAT the Factory was moved to Barnet in 1906; was burnt down and rebuilt in 1910; and that the new, present factory was completed, and officially opened in 1950 by Mr. R. Maudling, M.P. for Barnet.

THAT the original business of the Firm was the making of Cameras and lenses, magic lanterns and accessories, and that the first photograph which Queen Victoria permitted to be taken of herself was made with a Watson camera.

THAT Microscopes were first made by Watsons about 1876 - sufficiently far back to be included in the 10th edition (1883) of that classic book on microscopy - "The Microscope" by Jabez Hogg - in which are illustrated and described (a) "The New Microscope" which was a Wenham binocular with inclining limb at the side of the body, and (b) "The Medical or College Microscope" which had a sliding tube coarse adjustment and a vertical lever fine adjustment.

THAT Watsons made some of the early cinematograph machines, one of which was demonstrated, by Royal Command, to Queen Victoria at Osborne.

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24th November, 1964.

### WATSON DOUBLE MICROSCOPE FOR MASK ALIGNMENT

The Watson Double Microscope for Mask Alignment is one result of a programme of intensive development aimed at furthering the leadership achieved by the company as manufacturers of precision optical instruments for the semi-conductor industry. The Double Microscope is finding applications in the rapidly expanding field of silicon planar technology.

Designed to facilitate the alignment of small photographic masks to images on photographic or photo-resist material, the Double Microscope is especially suitable for the production of silicon planar transistors and elements for solid state and micro-circuitry where the usual need is to align small contact print masks to patterns produced during earlier stages of manufacture.

Whereas a conventional microscope will allow one point on the mask to be aligned in north-south and east-west directions, the Double Microscope permits the simultaneous alignment of two widely separated points. Such simultaneous alignment guarantees not only perfect north-south and east-west register; it means also that the azimuth (rotation about a vertical axis) is automatically correct.

The separation between the two areas viewed is continuously variable so that alignment marks can be positioned conveniently in each field. The fields may be viewed either alternately or simultaneously by the operation of left and right foot switches.

A range of magnifications is available to suit a variety of applications, and binocular viewing minimizes operator fatigue during prolonged use on the production line.

Further details and photographs available from

Peter A. Clayton, Publicity Manager.

THE WATSON STEP AND REPEAT CAMERA Mk II

The Watson Step and Repeat Camera Mk II is intended primarily for the manufacture of photographic masks on maximum resolution material for use in the semi-conductor industry, for producing either single devices or integrated microcircuits. The camera is, however, equally suited to the making of other graticules with repeated patterns within a 1" x 1" field.

The photographic plate is held on a special mechanical stage operated by conveniently placed co-axial controls. The mechanical stage also carries a standard plate ruled with a rectangular grid which is used to define the step and repeat spacing. An inverted microscope with its own vertical illuminator is focused on the standard ruled plate, and the advancement of the mechanical stage is controlled precisely by setting the intersections of the rulings on the standard plate to cross lines in the inverted microscope. Advancement can be set to the grid spacing or to any small multiple of it.

The reduction lenses in the step and repeat camera are based on microscope objective lens designs. The fine focusing adjustment is monitored pneumatically by a sensitive air gauging system. Exposure is controlled by an automatic timer.

The Watson Step and Repeat Camera Mk II is a versatile instrument capable of manufacturing masks and graticules of the highest precision. It will find application in research and production units where such precision and versatility are the principle requirements.

Further details and photographs available from Peter A. Clayton  
Publicity Manager.



T.W.B.

# WATS ON

JULY 1966

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From time to time we have been asked to indicate our programme regarding development of flat field objectives and wide field eyepieces and the following summary details the proposed types and also shows the approximate selling price at which we are aiming. It is unlikely that any of these will become available before 1967.

<u>Magnification</u>	<u>N.A.</u>	<u>Type</u>	<u>Target Figure</u>
x 5	0.15	Planpara	£ 7 to £ 10
x 10	0.28	Planpara	£ 9 to £ 11
x 20	0.45	Planpara	£12 to £ 15
x 40	0.65	Planpara	£12 to £ 15
x100	1.30	Planpara Oil	£17 to £ 25
x 45/x 50	0.85	Planfluorite dry	£40 to £ 50
x 50	0.95	Planfluorite oil	£40 to £ 50
x 90	1.30	Planfluorite oil	£60 to £ 70

## Eyepieces

x 7	Field of view 10mm.	£ 6 to £ 7
x 10	Field of view 10mm.	£ 6 to £ 7
x 14	Field of view 7.5mm.	£ 9 to £ 10

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JANUARY, 1967

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## BLACK AND WHITE PHOTOGRAPHY WITH PHASE CONTRAST

Many microscopists prefer to use high contrast negative material to enhance image contrast with phase photomicrographs. This can be done conveniently with Kodak Microfile film which is a slow, fine grain material intended for document copying. It is capable of giving excessive contrast for photomicrography but the amount of contrast enhancement can be controlled easily by varying the development time. The optimum exposure and development times for a particular type of specimen have to be determined experimentally but the conditions below are suggested as a good starting point and should enable reasonable results to be obtained at once.

### Equipment:

Microsystem 70, Kohler Illuminating Base operating at 6v., Phase 70 or Student Phase Accessories. Use 35mm. Camera preferably with pillar and clamps. Watson CdS meter.

### Photographic details::

Use Kodak Microfile film.

Develop in Kodak D76 or Ilford 1D II developer, dilute 1 + 3.

Develop for 8 minutes at 61° F.

Take meter reading without filter with field iris set to fill full fields of watching eyepiece. Field iris may be closed to just fill the frame after taking meter reading.

Make exposure time (seconds) =  $\frac{0.7 \times F \times \text{meter range}}{\text{meter reading}}$

Where F is the filter factor = 1 with no filter  
or = 5 with OGRI (2mm.) filter.

This is equivalent to assuming a film speed of 7 ASA (negative) with a setting factor of 4.

The exposure is critical to  $\frac{1}{2}$  stop. The method is suitable for still or slowly moving specimens only. Fast moving specimens are best photographed with flash techniques.

Microfile film is available only in long lengths which must be loaded into cassettes in the dark room.

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Blooming, by N. Smith.	T5/464
Calibration of Graticules - Correspondence.	31.7.64.
Camera Lucida - Discontinuation.	J15/564
CdS Exposure Meter - Preliminary Information.	J45/1164
Chemical Society of America - Biannual Review of Microscopy - in full with references.	T13/764 (R)
Classification - Security of WATS ON articles.	T1/364 (R)
Coles, A.C. - The Star Test for Microscopic Objectives - Reprint from 'Microscope Records'.	T19/964
Course on Microscopy - Barnet Dec. '64 - Report by R.K. Stacey.	T23/1164
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Transverse Colour - Notes on by A.C. Terrell.	T8/464 (R)
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Vibration Engineering.	T10/464
WISE Adjustment to Asymetric Zero.	T14/864
WISE - Compensating Eyepiece for	T16/864
WISE - Report on Mullard Appraisal.	T7/464 (R)

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Rumours that we choose our own  
vehicles next year have not been  
confirmed by the management

