

WATS ON

FEBRUARY, 1965

J59/265

C

MICRO SYSTEM 70

Since the last Sales Conference the coarse and fine adjustment mechanism for the new instrument has been resubmitted to all Senior Sales people and a number of Works personnel. Complete satisfaction has been expressed on the operation of these motions and life testing is now about to commence.

A number of other points raised at the Conference have been discussed in detail and a solution to these has been found on most of them. Suggested amendments to the instrument have been adopted where practicable.

Although it is a little early to say, pre-estimates of the new System 70 microscope appear to make the instrument extremely competitive with the Service 3.

WATS ON

J60/265

C

TO ALL MICROSCOPE REPRESENTATIVES

The following pricing of the Hilux bases for Service 3 and Bactil-60 microscopes, the projection screens and the land camera equipment has now been completed and code numbers allocated. The following is a list of code numbers with brief descriptions and prices together with delivery information where applicable:-

316/1	-	SERVICE 3 stand with Hilux base, plain stage and dust cover. Delivery end of June.	£ 94. 10. Od.
316/2	-	SERVICE 3 stand with Hilux base, 704 mechanical stage and dust cover. Delivery end of June.	£127. 0. Od.
316/3	-	SERVICE 3 stand with Hilux base, plain stage, Bertrand lens and dust cover. Delivery early July.	£104. 0. Od.
316/4	-	SERVICE 3 stand with Hilux base, 704 mechanical stage, Bertrand lens and dust cover. Delivery early July.	£136. 10. Od.
316/5	-	BACTIL-60 stand with Hilux base, Research substage and dust cover. Delivery end of June.	£149. 10. Od.
316/28	-	Hilux base for existing Service-3 microscope. Delivery end of June.	£ 69. 0. Od.
316/29	-	Hilux base for existing Bactil-60 microscope. Delivery end of June.	£ 69. 0. Od.
317/4	-	Projection screen for Service-3. Delivery early July.	£ 26. 10. Od.
316/5	-	Projection screen for Bactil-60. Delivery early July.	£ 30. 0. Od.
136/3	-	Land Camera complete with pillar and fixing bracket for Hilux base. Delivery end of June.	£109. 0. Od.

A number of further points should be noted: The Bactil-60 has been listed with Research substage, but this does not include changer centring condenser mount (code 149), which should be specified with the optical outfit required for any quotation or order. The price of £69. 0. Od. for fitting the Hilux base to either the Service 3 or Bactil-60 includes fitting which has to be undertaken at the works.

/Contd...

WATS ON

The price of £109. 0. Od. for Land Camera equipment includes the Eyepiece Camera basic unit and Viewing Eyepiece, codes 760 and 763.

Of interest, the code numbers allocated to this equipment comply with Drawing Office drawing schedules and where possible, we will in future be using such numbers which will be a great benefit internally and which we believe will not prove any disadvantage to the customer. Full descriptions will be issued in the Products List as soon as possible.

WATS ON

J61/265

C

HILUX BASES

A comparison has been made of the Service 3 microscope with Hilux base, the Bactil-60 with Hilux base, the Gillett and Sibert Conference microscope and the Vickers Patholux. Full details of these are attached and you will see that the Service 3 has been set up against the Gillett and Sibert and the Bactil-60 against the Patholux. With the Service 3 there are, we believe, a number of advantages which make this an attractive proposition and those immediately to mind are:-

- 1) Continuous light intensity control.
- 2) Simplicity of bulb replacement.
- 3) No flip top condenser required.
- 4) Interchangeable eyepieces for viewing screen.
- 5) The advantage of Watson quality optics.

In addition to the above mentioned advantages the Bactil-60 with Hilux base when compared with the Patholux microscope also offers a price advantage, and the availability of projection and viewing equipment.

As previously mentioned, availability of these instruments is from the end of June onwards.

WATS ON

HILUX BASES

All microscopes have built-in 100 watt Quartz Iodine bulbs
and Kohler illuminating systems

<u>WATSON</u>		<u>G. & S.</u>	
Service 3 with plain stage, focusing substage and dust cover.	£ 94.10. 0d.	Conference with plain stage, substage sleeve centring mount and quadruple nose-piece.	£ 87.12.0d.
Centring mount with iris.	6. 6. 0.	Focusing substage unit.	5.18.0.
Abbe condenser.	2.10. 0.	Abbe condenser with iris.	4.15.0.
Quadruple nosepiece.	4. 4. 0.	Quadruple nosepiece.	with stand
x 5 Achro. objective.	3.14. 0.	x 5 Achro. objective.	3.10.0.
x 10 " "	4.10. 0.	x 10 " "	5. 0.0.
x 40 " "	8. 0. 0.	x 40 " "	7. 0.0.
x 100 " "	15. 0. 0.	x 100 " "	13.15.0.
Viewing screen.	26.10. 0.	Viewing screen.	35.10.0.
Huygenian eyepiece,x10.	1.14. 0.	Huygenian eyepiece,x10.	with screen
Dust cover.	<u>with stand</u>	Dust cover.	<u>2. 2.0.</u>
	166.18. 0.		165. 2.0.
Vertical mono.body.	3.10. 0.	Extension tube and prism head.	16.17.0.
x 2.5 projection eyepiece and prism.	15. 0. 0.	x 2 projection eyepiece.	15.16.0.
x 4.5 projection eyepiece and prism.	15. 0. 0.	x 4 " "	4.10.0.
(x 3.5 also available)			
704 mechanical stage with substage centring (mount required is 161 in place of 159)	32.10. 0.	Built-in mechanical stage.	28.12.6.
Inclined mono. head.	5. 0. 0.	Inclined mono. head.	7. 0.0.
Inclined bino. head.	37.10. 0.	Inclined bino. head.	38. 0.0.

/Contd...

WATS ON

HILUX BASES (Contd.)

<u>WATSON</u>			<u>G. & S.</u>		
Service 3 with 704 mechanical stage, focusing centring substage and dust cover.	£127. 0. 0d.		Conference with substage centring and quadruple nosepiece.	£ 87.12. 0d.	
Dust cover.	with stand.		Dust cover.	2. 2. 0.	
Condenser mount and iris.	4.10. 0.		Focusing substage unit.	5.18. 0.	
Built-in mechanical stage.	with stand.		Built-in mechanical stage.	28.12. 6.	
Quadruple nosepiece.	4. 4. 0.		Quadruple nosepiece.	with stand.	
Universal No. 1 condenser.	13. 8. 0.		Flip-top Achromatic condenser and iris mount.	21. 0. 0.	
Inclined bino. head.	37.10. 0.		Inclined bino. head.	38. 0. 0.	
x 5 Achro. objective.	3.14. 0.		x 5 Achro. objective.	3.10. 0.	
x 10 " "	4.10. 0.		x 10 " "	5. 0. 0.	
x 40 " "	8. 0. 0.		x 40 " "	7. 0. 0.	
x 100 " "	15. 0. 0.		x 100 " "	13.15. 0.	
Pair x 10 Huygenian eyepieces.	3. 8. 0.		Pair x 10 Huygenian eyepieces.	3. 0. 0.	
	221. 4. 0.			215. 9. 6.	
x 50 Fluorite objective.	25.10. 0.		x 50 Fluorite objective.	27. 0. 0.	
x 90 " "	38. 0. 0.		x 100 " "	28. 0. 0.	
Compensating eyepieces (x 7 or x 10)	4. 0. 0.		Compensating eyepieces. (x 5, x 8 or x 10)	4. 0. 0.	
Annulus centring unit with annular disc.	10. 0. 0. (approx)		Phase condenser with 3 lower rings.	20. 5. 0.	
Phase telescope (or Bertrand lens)	9.10. 0.		Phase telescope.	8. 5. 0.	
x 10 Phase objective.	11. 6. 0.		x 10 Phase objective.	14. 0. 0.	
x 40 " "	14.16. 0.		x 40 " "	16.15. 0.	
x 100 " "	22. 6. 0.		x 100 " "	23.10. 0.	
Polaroid camera outfit.	109. 0. 0.		Polaroid camera outfit.	91. 6. 0.	
CdS exposure meter.	29. 0. 0.		CdS exposure meter.	81. 0. 0.	

WATS ON

HILUX BASES (Contd.)

<u>WATSON</u>		<u>VICKERS</u>	
Bactil-60 stand with focusing substage and dust cover.	£149.10. 0d.	Patholux with mechanical stage and focusing substage.	£210. 0. 0d.
Dust cover.	with stand.	Dust cover.	2. 2. 0.
Centring condenser mount and iris.	9. 0. 0.	Centring condenser mount and iris.	with condenser.
704 mechanical stage.	38. 0. 0.	Mechanical stage.	with stand.
Quadruple nosepiece.	4. 4. 0.	Quadruple nosepiece.	4. 4. 0.
Universal No. 1 condenser	13. 8. 0.	Achro. condenser in centring iris mount.	26. 4. 0.
Inclined bino. head.	42. 0. 0.	Inclined bino. head and beam splitting cube.	45. 14. 0.
x 5 Achro. Objective.	3.14. 0.	x 5 Achro. objective.	5. 18. 0.
x 10 " "	4.10. 0.	x 10 " "	4. 10. 0.
x 40 " "	8. 0. 0.	x 40 " "	7. 12. 0.
x 100 " "	15. 0. 0.	x 100 " "	11. 8. 0.
Pair x 10 Huygenian eyepieces.	3. 8. 0.	Pair x 10 Huygenian eyepieces.	3. 8. 0.
	<hr/> 290.14. 0.		<hr/> 321. 0. 0.
x 50 Fluorite objective.	25.10. 0.	x 50 Fluorite objective.	35. 16. 0.
x 90 " "	38. 0. 0.	x 100 " "	31. 12. 0.
Compensating eyepieces (x 7 or x 10)	4. 0. 0.	Compensating eyepiece x 6.	5. 10. 0.
		" " x 10.	7. 2. 0.
Annulus centring unit with annular disc.	10. 0. 0. (approx)	Phase unit with condenser.	28. 0. 0.
Phase telescope.	9.10. 0.	Phase telescope.	6. 6. 0.
x 10 Phase objective.	11. 6. 0.	x 10 Phase objective.	5. 14. 0.
x 40 " "	14.16. 0.	x 40 " "	9. 10. 0.
x 100 " "	22. 6. 0.	x 100 " "	13. 6. 0.
Polaroid camera outfit.	109. 0. 0.	Polaroid camera outfit.	112. 4. 0.
CdS. exposure meter.	29. 0. 0.	CdS. exposure meter.	22. 12. 0.

WATS ON

J62/265

C

DELIVERY SCHEDULE

BACTIL-60 (Standard Optics)	-	6 weeks
BACTIL-60 (Apo. Optics or Phase Accs.)	-	8 weeks
BACTIL	-	4 weeks
SERVICE 68	-	6 weeks
SERVICE 69	-	4 weeks
SERVICE 3 (292)	-	3 weeks
SERVICE 3 (293)	-	3 weeks
BARNET STAGE	-	8 weeks
SERVICE 3 (1293)	-	June, 1965
STEREOS: 850 range	-	3-4 weeks
1050 range	-	3-4 weeks
Box Foot	-	4 weeks
Research	-	5 weeks
L.A.S.	-	4 weeks
Zoom, Inclined	-	6 weeks
Zoom, Vertical	-	7-8 weeks
METALLURGICAL	-	4 weeks
MICROPROJECTOR	-	6 weeks
EYEPIECE CAMERA	-	3 weeks
LAND CAMERA	-	4 weeks
35mm. CAMERA ATTACHMENT	-	4 weeks
KONIMETER	-	4 months
W.I.S.E.	-	6 weeks
FLUORESCENT ILLUMINATOR	-	10 days
16mm. INTERFERENCE OBJECTIVE	-	4 weeks
8mm. INTERFERENCE OBJECTIVE	-	6 weeks

WATS ON

FEBRUARY, 1965.

T.S.M. No. 28

P.R.

SHORT COURSE ON TRANSMITTED LIGHT MICROSCOPY

April 22nd and 23rd 1965

and to be repeated on

June 30th and July 1st 1965

at

Barnet Technical College, Wood Street, Barnet, Herts.

The Course will include a series of lectures on microscope optics and practical microscopy. A number of practical exercises will be arranged to illustrate a wide variety of techniques and a short tour of the WATSON microscope factory will be included in the itinerary.

The Course is intended for biological and medical laboratory technicians and should be especially useful for those whose responsibilities include the instruction of juniors in microscopic technique.

A fee of £ 4. 4. Od. will be made to cover the incidental expenses of the Course and this will include lunch on both days.

Accommodation can be arranged for early applicants.

For further particulars, write or phone,

Mr. A.C. Terrell,
W. Watson & Sons Limited,
BARNET,
Herts.

(Telephone - BAR. 4404)

WATS ON

FEBRUARY 1965.

T.S.M. NO. 29.

U.C.

NOTES ON PHOTOMETRY

A number of recent telephone enquiries to Barnet leave us with the impression that the whole subject of photometric units is veiled in confusion. We hope the notes below will not add still further to this confusion.

Radiant energy flux, (usually denoted by E) like any other energy is measured in watts. Light flux is measured in lumens, lm . The relationship between light flux, (lm) and energy flux, (watts) depends on the visibility of the particular radiation. The highly visible part of the spectrum extends from about 470 milli microns, $m\mu$, to about 650 $m\mu$ but very bright light can be seen well outside this wavelength range. The visibility rises gradually to a maximum for green light at a wavelength of about 555 $m\mu$ for most people. We express this changing visibility with colour as a relative visibility factor which is equal to 1 at the maximum. Standard values of the relative visibility factor, V_λ , are accepted internationally as being those for a typical person. Some of these are given below:-

λ ($m\mu$)	V_λ
400	0.0004
Violet 450	0.038
Blue 500	0.323
Green 550	0.995
Yellow 600	0.631
Red 650	0.107
700	0.0041
750	0.00012

For light of any one wavelength the light flux in lumens is equal to $K_m \times V_\lambda \times E$, where K_m has a constant ($\frac{1}{K_m}$ is sometimes called the mechanical equivalent of light). For green light of wavelength 555 $m\mu$ where $V_\lambda = 1$, K_m becomes the number of lumens per watt of energy. K_m

/Contd...

WATS ON

is taken, for most purposes, to be about 680 lumens per watt and this would be the efficiency of a perfect lamp which converted all the electrical energy into green light. A typical Tungsten filament projector lamp has an efficiency of about 16 lumens per watt.

The luminous intensity of a source is measured in candle power and a uniform source of 1 candle power emits 1 lumen through unit solid angle. That is to say if we had a black sphere of radius 1 meter with a small source of 1 candle power at the centre and were to cut a hole in the sphere of area 1 square meter, the light flux passing through the hole would be 1 lumen.

The luminance or the brightness of a surface or an extended source in a given direction is the luminous intensity per unit area in the viewing direction. It is measured in candles per square foot in English units or candles per square centimetre (called stilb) in metric units. Another way of measuring luminance or brightness which is only applicable to a diffusing surface or one which reflects or emits light equally in all directions is in foot-lamberts. A surface with luminance 1 foot-lambert emits 1 lumen per square foot in all directions.

The total amount of light falling on to a surface is called the illumination of the surface usually denoted by the letter E and is taken to be the total light flux the surface receives per unit area from all directions. E is measured in foot candles. One foot candle is one lumen per square foot. In the metric system the unit is the lux, which is a lumen per square meter.

If we consider an instrument like the Watson CdS exposure meter with its cell placed in the eyepiece tube of a microscope, the instrument will measure (in arbitrary units) the total light flux passing through the microscope. The various camera backs which can be used for photomicrography use films with different areas, so that if the total light flux is spread over these different areas, the illumination (foot candles or lumens per square foot) on the film will be different. This is taken care of in the setting factor.

The setting factor will vary also for different eyepieces except when the cell is placed above the eyepiece as it is when used over the watching eyepiece of the camera, because the higher powered eyepieces have smaller field stops and so do not accept the total light flux measured by the cell when it is in the eyepiece tubes.

WATS ON

The Editor,
"WATS ON",
Barnet.

22nd February, 1965.

Dear Sir,

THE LAND CAMERA

Uses in the Electron Microscope Department

Recently I have had occasion to sell a Land Camera to the Imperial Cancer Research Fund, for use in aligning specimens on the Electron Microscope. They do this by taking a photomicrograph of the specimen at about x 400 using ordinary transmitted light and then use the photomicrograph to orientate their specimen on the fluorescent screen of the Electron Microscope. They are not interested in image quality nor in anything other than black and white film. Up to now, they have had to take photographs by conventional methods and sometimes enlarge, waiting anything up to a day for the final prints from the Photographic Department. Using the Land Camera, they can do the whole operation at once.

I think this application for the Land Camera has quite good prospects as the use of Electron Microscopes seems to be snowballing.

Other customers in this field feel that it could be a very useful piece of equipment.

R. Stacey,
Sales Department.