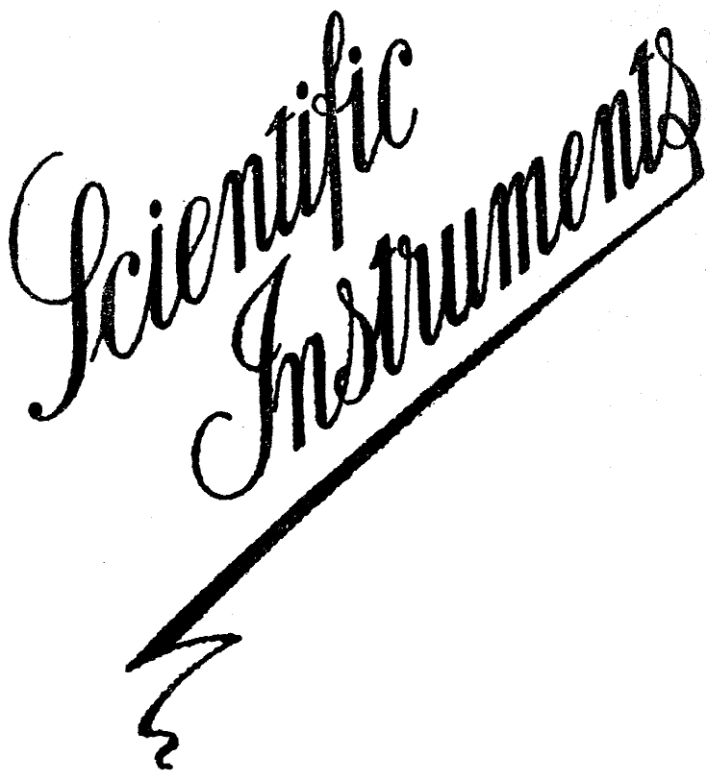


R & J. Beck Ltd.
69, Mortimer St.
LONDON, W.1.
Factories: Kentish Town N.W.

TERMS

The prices in all cases are arranged at nett rates, and no discount can be allowed.
All goods made to order or experimental work must be paid for half in advance and half on delivery
All goods are carefully packed, and a charge is made for packing cases, which when returned empty, will be credited at full price if in good condition.

Goods are delivered free in the London district only, and are sent carriage forward elsewhere unless specially ordered otherwise.

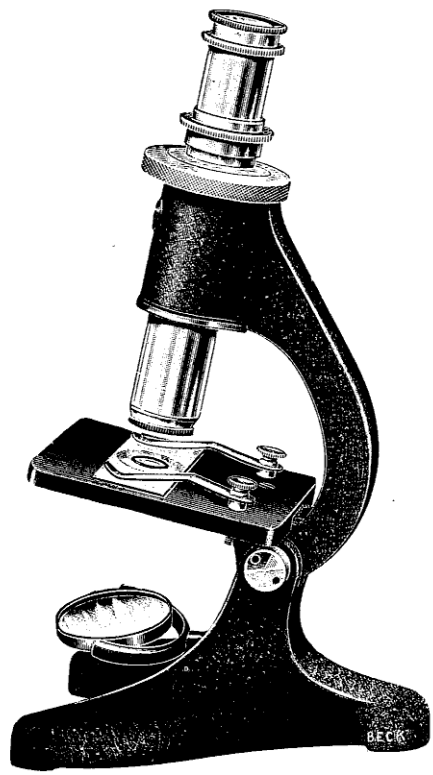
We do not hold ourselves in any way responsible for damage to goods in transit, although every care is expended in the packing. Our risk terminates on the goods leaving our London warehouse We can insure goods at customer's expense if instructed to do so.

We cannot consider complaints as to the execution of any order unless it is lodged within three months.

It should be borne in mind in ordering goods to be sent abroad that they are liable to be delayed in transit, and the orders should be placed sufficiently in advance to allow for this.

Goods are despatched without any avoidable delay, and if in stock can generally be forwarded on the same day as the receipt of order.

BECK SIMPLEX MICROSCOPE.



For elementary teaching requirements the elaborate type of microscope is not a necessity and its elaborations are often troublesome to the young pupil. For such requirements the Simplex microscope will be found admirably suited. Although of a simple design it is constructed with the same degree of precision as our other models.

The stand is of moderate size, the illustration being approximately one-third size. It is solidly constructed and has all the adjustments which are necessary, including joint for inclination.

BECK SIMPLEX MICROSCOPE.

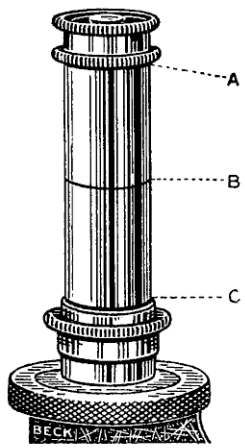


Fig. 1.

The focussing adjustment is operated by a large milled ring placed in a convenient position accessible to either hand. The stage measures $3\frac{1}{2}$ in. × $3\frac{1}{4}$ in., and is provided with stage clips for holding the object. The drawtube is adjustable in length by means of which the magnifying power is changed.

The range of magnifying powers obtainable is ×35 to ×200. The drawtube is engraved with lines as indicated in diagram (Fig. 1), and the following table gives the magnifying powers with the drawtube set at these positions and with the two eyepieces.

Drawtube set at position.	×6 Eyepiece.	×15 Eyepiece.
A	35	120
B	55	150
C	75	200

Intermediate magnifying powers are obtained at intermediate positions.

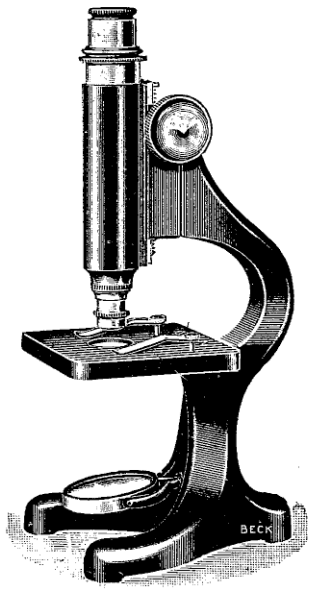
The instrument gives clear and distinct definition, and a good field of view. The object glass and eyepieces are of the highest quality and of the standard size. The instrument is contained in a strong case, which measures $9\frac{1}{2}$ in. × $6\frac{1}{2}$ in. × $5\frac{1}{4}$ in.

For botany, entomology, pond life and general nature study, this microscope will be found to be thoroughly efficient and convenient in use.

No. 75 Simplex microscope complete, without case £4 10 0

No. 76 Simplex microscope complete with case 4 17 6

No. 10 LONDON MICROSCOPE.



This microscope is a simple instrument of the vertical type, without joint for inclination and with one focussing adjustment by means of a specially cut rack and pinion giving very smooth motion free from backlash, capable of focussing object glasses up to $\frac{1}{6}$ in. The base with the handle shaped limb is made in a solid casting, giving great rigidity. The stage is 4 in. square, and is provided with clips for holding specimens. The body tube has an adjustable drawtube. The mirror is plane on one side and concave on the other, and is held in gimbals. The total height of the instrument is $11\frac{1}{2}$ in.

The eyepieces and object glasses are of the highest quality, and are of the standard sizes. This microscope will be found to be suitable for use in schools and educational establishments for elementary botany, zoology and similar work, and is also an excellent instrument for workshop use.

No. 10.	**London microscope,** stand only			£3 10 0
No. 10A.	**London microscope,** stand only	£3 10 0		
No. 3260.	2 Eyepieces, 42 m/m. (×6) and 25 m/m. (×10)	1 4 0		
No. 3231A.	$\frac{2}{3}$ in. Object glass (16 m/m.) without box	0 12 0		
	Magnifications: 62 to 110.			£5 6 0
No. 10B.	**London microscope,** stand only	£3 10 0		
No. 3260.	Eyepiece, 42 m/m. (×6)	0 12 0		
No. 3231A.	$\frac{2}{3}$ in. Object glass (16 m/m.) without box	0 12 0		
No. 3234A.	$\frac{1}{6}$ in. Object glass (4 m/m.) without box	2 13 0		
	Magnifications: 62 to 285.			£7 7 0

Accessories.

No. 3815.	Oak case with lock and key	0 17 6
No. 3310.	Cylindrical substage fitting with iris diaphragm	0 9 6
No. 3285.	Abbe condenser	1 9 6
No. 3300.	Dust-tight double nosepiece	1 1 0

Any apparatus can be added or omitted at a corresponding addition or reduction of price.

NO. 22 LONDON MICROSCOPE.

Base, pillar and limb. The base and pillar are in one heavy iron casting, so shaped that the microscope stands firmly, in all positions. The limb is hinged into the top of the pillar, so that the microscope can be used at any angle, from the vertical to the horizontal. These parts are finished in stoved black enamel, which withstands the action of acids.

Stage. The stage is large, measuring 4 in. × 3½ in., and is therefore of a sufficient size to permit of a petri dish or culture plate being placed upon it. It is of solid construction, and rigidly attached to the limb of the microscope. Stage clips are fitted for holding specimens in position.

Focussing adjustments. The microscope has a coarse adjustment, actuated by helical rack and pinion. The greatest care is taken in the perfect smoothness of working of the slides in which the body moves, so that any shake or backlash is obviated. Comparatively high powers can be focussed with it. The fine adjustment is of a simple but very strong and effective design. It is constructed in such a manner that a smooth working focussing adjustment giving no backlash is obtained. It is actuated by a large milled head, giving a sufficiently delicate movement for use with an oil immersion object glass. It is readily accessible to either hand, a quality which every slow motion should possess. It is superior to a fine adjustment worked by milled head at the side, unless two milled heads are provided one on each side of the limb.

Body tube. This is of the standard length and has an extending drawtube, marked so that the tube length can be readily set at 160 m/m., for which the object glasses are corrected.

Mirror. A double mirror, plane and concave, is fitted into the lower end of the limb. It is in a semi-circular fitting which rotates, and in which the mirror turns on its axis.

Substage. The stand No. 22A is not provided with a substage fitting. At a small extra cost we can supply a revolving dome shaped diaphragm with a number of apertures of varying sizes, which owing to its shape is nearly flush with the top suface of the stage. The stand No. 22B has a substage which is focussed by a spiral screw and which can be swung aside when not in use.

Nosepieces. Double or triple nosepieces of the dustproof pattern can be supplied, so that the object glasses, if left on the microscope are protected from dust settling on their back lenses.

Condenser. This is of the Abbe type.

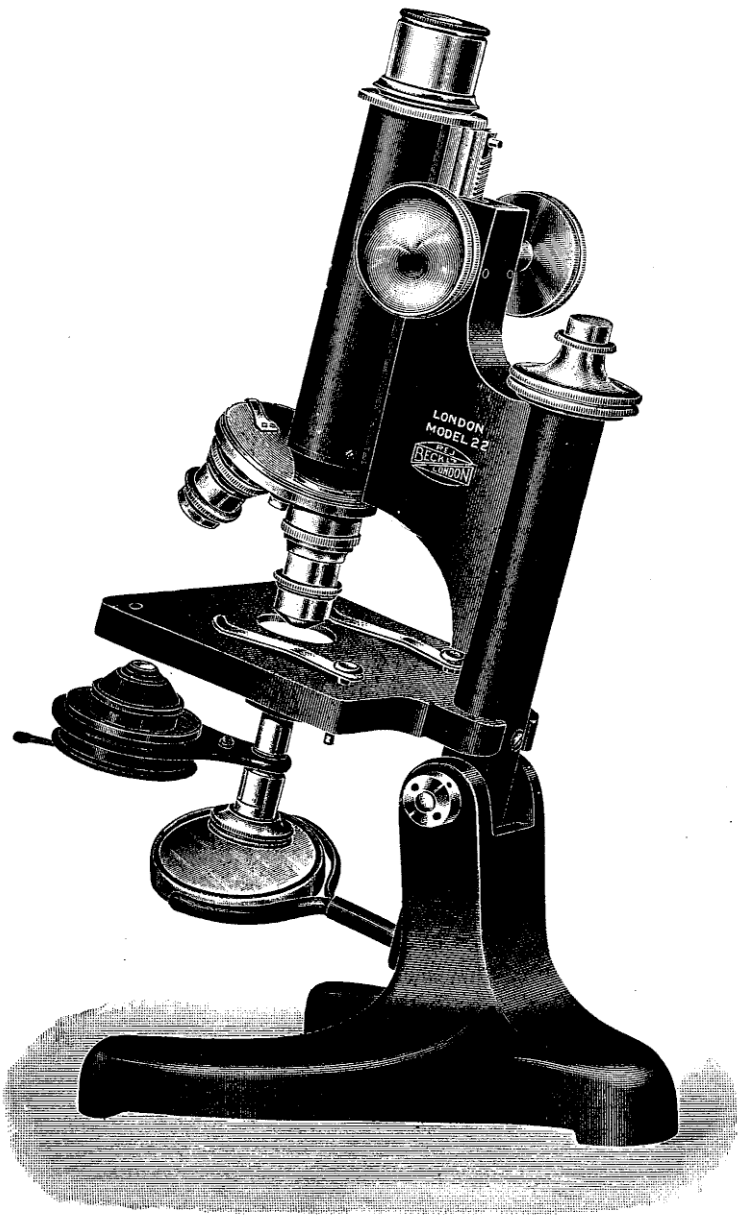
Object glasses. All object glasses are of our standard series, the performance of which has gained them a world wide reputation.

Eyepieces are of the Huyghenian type, of our standard quality.

Mechanical stage. The type of mechanical stage fitted to this model will be found illustrated on page 28. It has a horizontal travel of 2½ in. and vertical travel of 1 in.

Case. The instrument is supplied in either a stiff canvas case with carrying handle, oak case or polished mahogany cabinet, as specified in price list.

No. 22 LONDON MICROSCOPE.



Stand No. 22B.

No. 22 LONDON MICROSCOPE.

No. 22A (0).	**Stand** without substage in canvas covered case	£5	2	6		
No. 3260.	Eyepiece, 42 m/m. (× 6)	0	12	0		
No. 3230A.	1½ in. Object glass, 32 m/m. without box	1	3	0		
No. 3231A.	⅔ in. Object glass, 16 m/m. without box	0	12	0		
					£7	9 6
No. 22A (1).	**Stand** without substage in canvas covered case	£5	2	6		
No. 3260.	Eyepiece, 42 m/m. (× 6)	0	12	0		
No. 3231A.	⅔ in. Object glass, 16 m/m. without box	0	12	0		
No. 3234A.	⅙ in. Object glass, 4 m/m. without box	2	13	0		
					£8	19 6
No. 22A (2).	No. 22A (1) as above	£8	19	6		
	No. 3300. Double nosepiece	1	1	0		
					£10	0 6
No. 22B (1).	**Stand** with swing-out focussing substage in canvas covered case	£6	0	6		
No. 3260.	Eyepiece, 42 m/m. (× 6)	0	12	0		
No. 3231A.	⅔ in. Object glass, 16 m/m. without box	0	12	0		
No. 3234A.	⅙ in. Object glass, 4 m/m. without box	2	13	0		
No. 3285.	Abbe condenser and iris diaphragm	1	9	6		
					£11	7 0
No. 22B (2).	**Stand,** with swing-out focussing substage in mahogany cabinet	£7	5	6		
No. 3260.	2 Eyepieces, 42 m/m. (× 6) and 25 m/m. (× 10)	1	4	0		
No. 3231A.	⅔ in. Object glass, 16 m/m.	0	16	6		
No. 3234A.	⅙ in. Object glass, 4 m/m.	2	17	6		
No. 3251.	1/12 in. 2 m/m. Object glass, oil immersion	3	18	6		
No. 760.	Cedar oil bottle, with dipper, ground-on cap and supply of oil	0	2	0		
No. 3285.	Abbe condenser and iris diaphragm	1	9	6		
No. 3301.	Triple nosepiece	1	10	0		
					£19	3 6
No. 3816.	Oak case in place of canvas covered case				£0	7 6
No. 3817.	Mahogany cabinet in place of canvas covered case ..				1	5 0
No. 3184.	Circular revolving diaphragm to No. 22A				0	5 0
No. 3305.	Detachable mechanical stage to any above models ..				6	0 0

Any apparatus can be added or omitted at a corresponding addition or reduction of price.

No. 29 LONDON MICROSCOPE.

A complete series of No. 29 microscopes is made covering the requirements for all purposes.

Every point in the design and manufacture of a microscope, which tends to make it efficient and serviceable, has been considered and incorporated into this microscope, but in such a way that the price remains moderate. The whole instrument is of particularly solid construction, so that flexure in the parts is obviated and wear through use is reduced to a minimum. For use in teaching and research institutions where instruments receive constant and hard use, this microscope will give the best possible service, both as regards convenience in use and in lasting properties.

The differences in the various models are in the stages and substages of which there are several forms.

They are so made that all apparatus, such as mechanical stages, condensers and dark ground illuminators, nosepieces, object glass changers and extra object glasses and eyepieces, can be added as occasion arises, without the necessity of returning the instrument for fitting. By this means the No. 29 London microscope can be purchased in its simplest form and built up as desired into a complete instrument for high power work.

The following is a specification of the microscope—

Base and pillar are in a heavy solid casting with arge spread ($7\frac{1}{2} \times 5\frac{1}{2}$ in.), making the microscope stand firmly in either the vertical or horizontal position. The limb is hinged into the top of the pillar so that the instrument can be used at any angle from the vertical to the horizontal.

Limb is made in a solid casting, and is of an exceptionally robust construction and is shaped for conveniently lifting the instrument without risk of damage to the adjustable parts.

Stage is of extra large size, measuring about $4\frac{1}{2}$ in. square, so arranged that the distance from its centre to the limb is $3\frac{1}{4}$ in., so that the whole of a 6 in. petri dish or culture plate can be examined. Stage clips for holding specimen in position are provided.

Focussing adjustments. The microscope has a coarse adjustment, actuated by helical rack and pinion. The greatest care is taken in the perfect smoothness of working of the slides in which the body moves, so that any shake or backlash is obviated. Comparatively high powers can be focussed with it. The fine adjustment is of a very strong and effective design. It is constructed in such a manner that a smooth working focussing adjustment giving no backlash is obtained. It is actuated by two milled heads, one on each side of the limb, thus being readily accessible to either hand.

Body tube. This is of the standard length and has an extending drawtube, marked so that the tube length can be readily set at 160 m/m., for which the object glasses are corrected. If desired the drawtube can be graduated in millimetres at an extra cost. The models Nos. 29 J, K, L and M are always supplied with a graduated drawtube.

Mirror. A double mirror, plane and concave, is fitted into the lower end of the limb. It is in a semi-circular fitting which rotates, and in which the mirror turns on its axis.

Substages. The substage is made in various forms. No. 29A has a simple tubular substage. Nos. 29B and J have substages with a focussing adjustment actuated by spiral screw, and which can be swung aside when not in use.

Nos. 29G and L are provided with a substage focussed by rack and pinion, and which has an adjustment for centring the condenser or dark ground illuminator. Nos. 29F and K have similar substages, but without the centring device The substage of No. 29M is operated by rack and pinion and also has a centring device, in addition to which the whole substage can be swung out of the optic axis.

Nosepieces. Double, triple or quadruple nosepieces can be supplied of the dustproof pattern, so that the object glasses, if left on the microscope are protected from dust settling on their back lenses.

Condensers of various types are supplied on these instruments. For general work Abbe condensers are fitted or for high power work achromatic condensers and dark ground illuminators are supplied. The latter should be used on the models with centring adjustment to the substage.

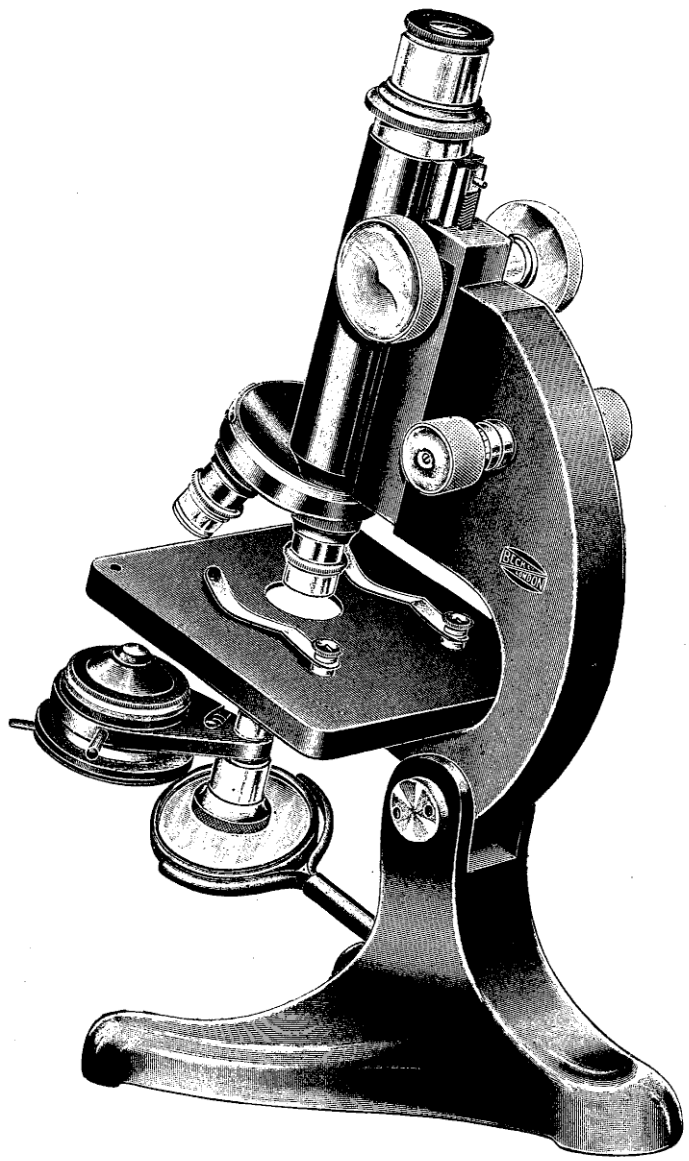
Object glasses and eyepieces. All object glasses and eyepieces are of our standard series, the performance of which has gained them a world wide reputation.

Mechanical stage. On models Nos. 29A and B a detachable mechanical stage illustrated on page 28 giving 1 in. vertical and 2½ in. horizontal travel can be fitted. This stage is readily attached and detached. The mechanical stage has a pin which is inserted into a hole in the stage of the microscope. A clamp screw fixes the mechanical stage firmly in position, drawing it up against the back edge of the stage so that there is no tendency for it to shift its position once it is clamped. The movements of this mechanical stage are actuated by specially cut racks and pinions with fine teeth, giving a very delicate motion. In the Nos. 29F and G, a built-in mechanical stage of a new and simple type is fitted. This gives a travel in either direction of ½ in., and is of very robust construction. It will be noticed that the price of this mechanical stage is very moderate, and it is intended for the use of microscopists to whom a mechanical motion to the stage is necessary, but who do not require the large travel given by the detachable mechanical stage. The smaller amount of travel is sufficient for making blood counts and for the examination of mounted specimens, as it is seldom that more is required and the slide can be readily moved on the surface of the stage where different portions of the slides have to be examined in succession. Nos. 29J, K, L and M have a mechanical stage built into the instrument which has a vertical travel of 1 in., and a horizontal travel of 3 in. This type of stage is particularly suitable for the examination of specimens consisting of smears covering practically the whole of a 3 × 1 in. slide or of a number of serial sections, occupying a large portion of the slide and which are examined consecutively. To allow of this large travel, the stage itself is made of a larger size than is usual, being 5 in. square. It is fitted with scales and verniers for both movements. The slide holders are both adjustable so that slides of different sizes can be used. The left hand holder has an indicator to set it to the correct position for the use of the scales. The scales read to ·1 m/m. by means of the verniers. These slide holders can be entirely removed to leave the stage clear for Petri dishes, culture plates or large objects. A clamp is supplied to the vertical movement for photography when the instrument is in a horizontal position.

Finish. The stand is finished in bright black enamel, the milled heads and other fitments being heavily chromium plated, thus rendering the complete finish acid resisting.

Case. The instrument is supplied in oak case with lock and key, or for tropical climates, a teak case, specially screwed.

No 29 LONDON MICROSCOPE.



Stand No. 29B.

No. 29 LONDON MICROSCOPE.

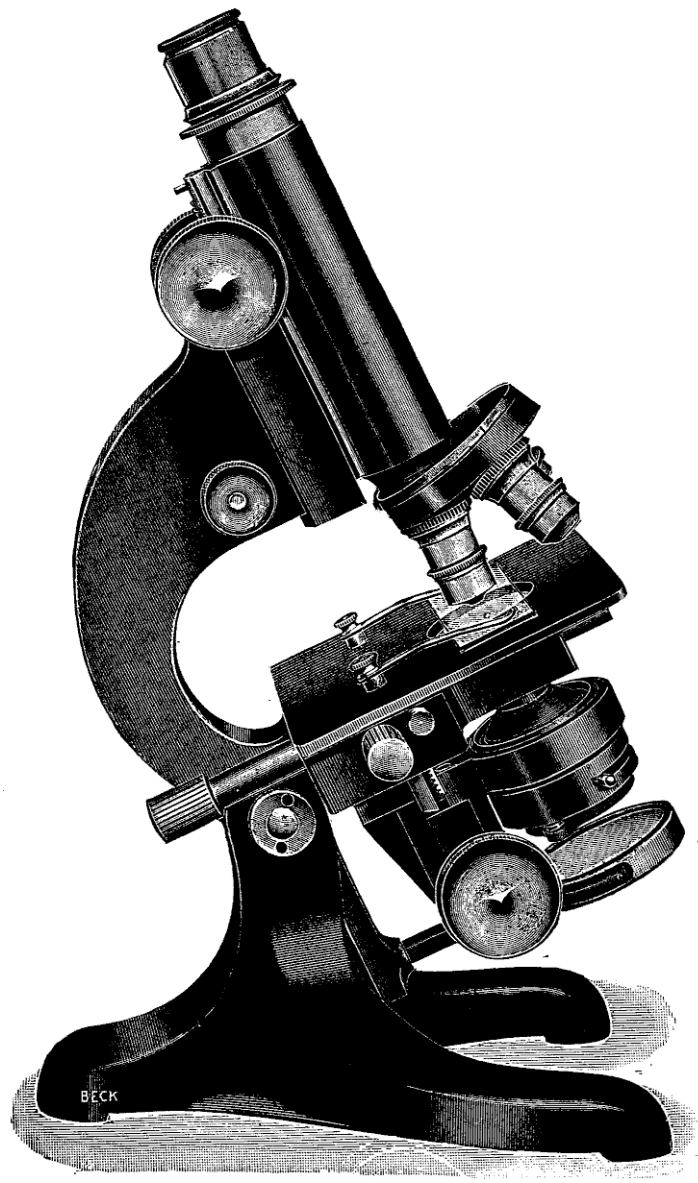
No. 29A (1).	**Stand,** with tubular substage and iris diaphragm	£6	13	0		
No. 3260.	Eyepiece, 42 m/m. (×6)	0	12	0		
No. 3231A.	$\frac{2}{3}$ in. Object glass, 16 m/m., without box	0	12	0		
No. 3234A.	$\frac{1}{6}$ in. Object glass, 4 m/m., without box	2	13	0		
					£10	10 0
No. 29A (2).	No. 29A (1) as above	£10	10	0		
No. 3300.	Double nosepiece	1	1	0		
					£11	11 0
No. 29B (1).	**Stand,** with swing-out focusing substage	£7	1	6		
No. 3260.	2 Eyepieces, 42 m/m. (×6) and 25 m/m. (×10)	1	4	0		
No. 3231A.	$\frac{2}{3}$ in. Object glass, 16 m/m., without box	0	12	0		
No. 3234A.	$\frac{1}{6}$ in. Object glass, 4 m/m., without box	2	13	0		
No. 3285.	Abbe condenser and iris diaphragm ..	1	9	6		
No. 3301.	Triple nosepiece	1	10	0		
					£14	10 0
No. 29B (2).	**Stand,** with swing-out focusing substage	£7	1	6		
No. 3260.	2 Eyepieces, 42 m/m. (×6) and 25 m/m. (×10)	1	4	0		
No. 3231A.	$\frac{2}{3}$ in. Object glass, 16 m/m., without box	0	12	0		
No. 3234A.	$\frac{1}{6}$ in. Object glass, 4 m/m., without box	2	13	0		
No. 3251.	$\frac{1}{12}$ in. Object glass, 2m/m., oil immersion	3	18	6		
No. 760.	Cedar oil bottle, with dipper, ground on cap and supply of oil	0	2	0		
No. 3285.	Abbe condenser and iris diaphragm ..	1	9	6		
No. 3301.	Triple nosepiece	1	10	0		
					£18	10 6
No. 29B (3).	No. 29B (2) as above	£18	10	6		
No. 3305.	Detachable mechanical stage	6	0	0		
					£24	10 6

An oak case with lock and key is included in the price of microscopes supplied complete with object glasses and eyepieces.

No. 3818.	Teak cabinet, screwed, for tropical climates, in place of oak case, ... extra	£1	5	0	
No. 3304.	Graduations to drawtube in millimetres .. .. „	0	7	6	

Any apparatus can be added or omitted at a corresponding addition or reduction of price.

No. 29 LONDON MICROSCOPE.



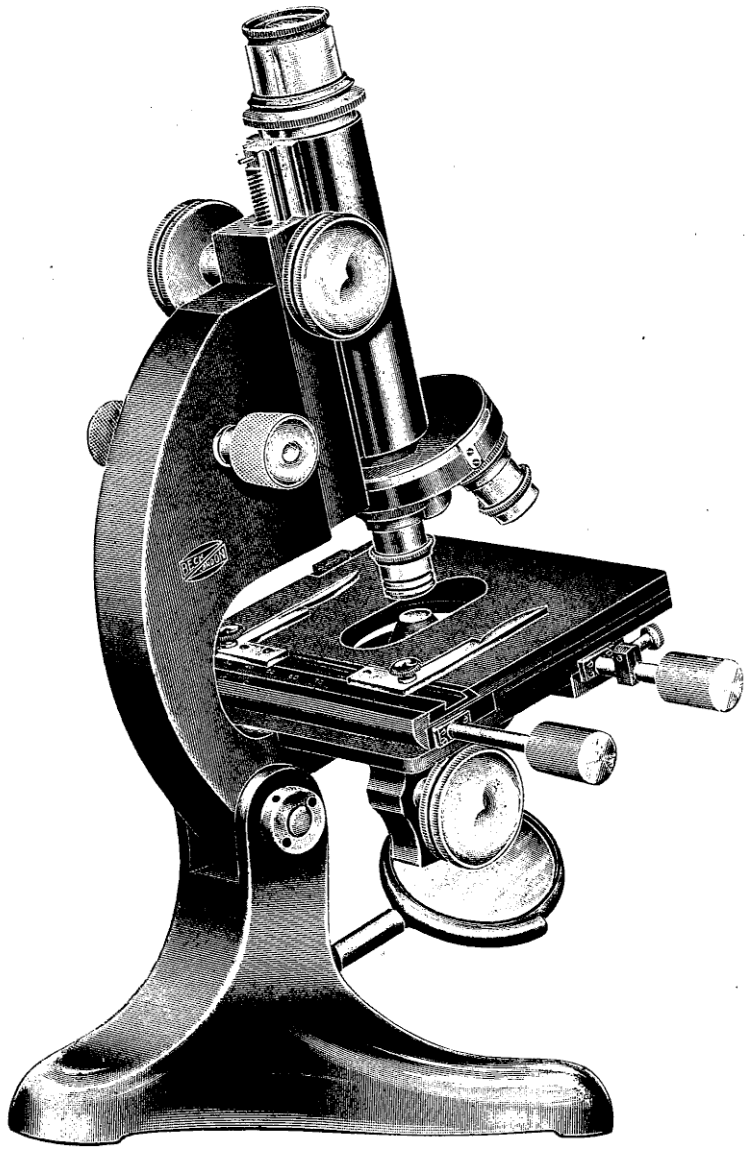
Stand No. 29F.

No. 29 LONDON MICROSCOPE.

No. 29F (1).	**Stand,** with built-in mechanical stage and rack and pinion focussing substage, in oak case	£12	13	6	
No. 3260.	2 Eyepieces, 42 m/m. (× 6) and 25 m/m. (× 10).	1	4	0	
No. 3231A.	$\frac{2}{3}$ in. Object glass, 16 m/m.	0	16	6	
No. 3234A.	$\frac{1}{6}$ in. Object glass, 4 m/m.	2	17	6	
No. 3285.	Abbe condenser and iris diaphragm ..	1	9	6	
No. 3300.	Double nosepiece	1	1	0	
					£20 2 0
No. 29F (2).	**Stand,** with built-in mechanical stage and rack and pinion focussing substage, in oak case	£12	13	6	
No. 3260.	2 Eyepieces, 42 m/m. (× 6) and 25 m/m. (× 10).	1	4	0	
No. 3231.	$\frac{2}{3}$ in. Object glass, 16 m/m.	1	10	0	
No. 3234A.	$\frac{1}{6}$ in. Object glass, 4 m/m.	2	17	6	
No. 3251.	$\frac{1}{12}$ in. Object glass, 2 m/m., oil immersion	3	18	6	
No. 760.	Cedar oil bottle with dipper, ground on cap and supply of oil	0	2	0	
No. 3286.	Abbe condenser and iris diaphragm ..	2	10	0	
No. 3301.	Triple nosepiece	1	10	0	
					£26 5 6
No. 29F (3).	**Stand,** with built-in mechanical stage and rack and pinion focusing substage, in oak case	£12	13	6	
No. 3260.	2 Eyepieces, 42 m/m., (×6) and 25 m/m. (×10)	1	4	0	
No. 3231.	$\frac{2}{3}$ in. Object glass, 16 m/m.	1	10	0	
No. 3234.	$\frac{1}{6}$ in. Object glass, 4 m/m.	3	15	0	
No. 3235.	$\frac{1}{12}$ in. Object glass, 2 m/m., oil immersion	6	10	0	
No. 3286.	Abbe condenser	2	10	0	
No. 3301.	Triple nosepiece	1	10	0	
					£29 12 6
No. 29G (3).	**Stand,** with built-in mechanical stage and rack and pinion focussing and centring substage, in oak case	£13	13	6	
No. 3260.	3 Eyepieces, 42 m/m., (× 6) 25 m/m. (× 10) and 17 m/m. (× 15) ..	1	16	0	
No. 3231.	$\frac{2}{3}$ in. Object glass, 16 m/m.	1	10	0	
No. 3234.	$\frac{1}{6}$ in. Object glass, 4 m/m.	3	15	0	
No. 3235.	$\frac{1}{12}$ in. Object glass, 2 m/m., oil immersion	6	10	0	
No. 3296.	High power dark ground illuminator, in substage fitting	2	10	0	
No. 3298.	Stop for $\frac{1}{12}$ in. object glass	0	2	6	
No. 3288.	Achromatic condenser	5	15	0	
No. 3301.	Triple nosepiece	1	10	0	
					£37 2 0
No. 3818.	Teak cabinet, screwed, for tropical climates in place of oak case	extra			£1 5 0
No. 3304.	Graduations to drawtube in millimetres ..	,,			0 7 6

Any apparatus can be added or omitted at a corresponding addition or reduction of price.

No. 29 LONDON MICROSCOPE.



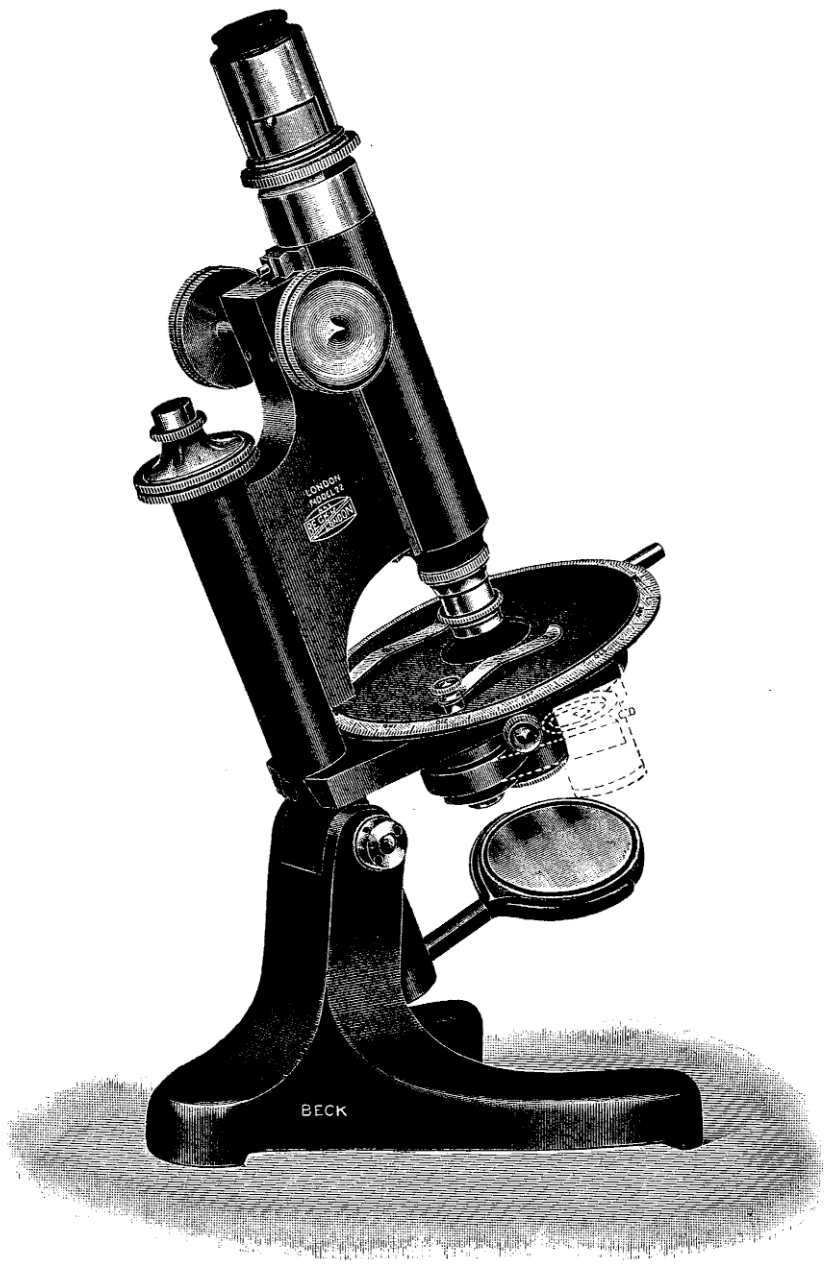
Stand No. 29M.

No. 29 LONDON MICROSCOPE.

No. 29J (1).	**Stand,** with built-in mechanical stage, spiral screw focussing and swing-out substage, in oak case	£18	1	6			
No. 3260.	2 Eyepieces, 42 m/m. (×6) and 25 m/m. (×10)	1	4	0			
No. 3231A.	⅔ in. Object glass, 16 m/m., without box	0	12	0			
No. 3234A.	⅙ in. Object glass 4 m/m., without box..	2	13	0			
No. 3285.	Abbe condenser and iris diaphragm ..	1	9	6			
No. 3300.	Double nosepiece..	1	1	0			
					£25	1	0
No. 29J (2).	**Stand,** with built-in mechanical stage, spiral screw focussing and swing-out substage, in oak case	£18	1	6			
No. 3260.	2 Eyepieces, 42 m/m. (×6) and 25 m/m. (×10)	1	4	0			
No. 3231A.	⅔ in. Object glass, 16 m/m.	0	16	6			
No. 3234A.	⅙ in. Object glass, 4 m/m.	2	17	6			
No. 3251.	1/12 in. Object glass, 2 m/m., oil immersion	3	18	6			
No. 760.	Cedar oil bottle, with dipper, ground in cap and supply of oil..	0	2	0			
No. 3286.	Abbe condenser and iris diaphragm ..	2	10	0			
No. 3301.	Triple nosepiece	1	10	0			
					£31	0	0
No. 29K (1).	**Stand,** with built-in mechanical stage, rack and pinion focussing substage, in oak case, and apparatus as No. 29J (1)				£26	13	0
No. 29K (2).	**Stand,** with built-in mechanical stage, rack and pinion focussing substage, in oak case, and apparatus as No. 29J (2)				£32	12	0
No. 29L (3).	**Stand,** with built-in mechanical stage, rack and pinion focussing and centring substage, in oak case	£20	13	6			
No. 3260.	3 Eyepieces, 42 m/m. (×6), 25 m/m. (×10) and 17 m/m. (×15)	1	16	0			
No. 3231.	⅔ in. Object glass, 16 m/m.	1	10	0			
No. 3234.	⅙ in. Object glass, 4 m/m.	3	15	0			
No. 3235.	1/12 in. Object glass, 2 m/m. oil immersion	6	10	0			
No. 3296.	High power dark ground illuminator, in substage fitting	2	10	0			
No. 3298.	Stop for 1/12 in. object glass	0	2	6			
No. 3288.	Achromatic condenser	5	15	0			
No. 3301.	Triple nosepiece	1	10	0			
					£44	2	0
No. 29M (3).	**Stand,** with built-in mechanical stage, rack and pinion focussing, centring and swing-out substage, in oak case, and apparatus as No. 29L (3) ..				£45	2	0
No. 3818.	Teak cabinet in place of oak case, screwed, for tropical climates				extra £1	5	0

Any apparatus can be added or omitted at a corresponding addition or reduction of price.

No. 22 LONDON PETROLOGICAL MICROSCOPE.



No. 22 LONDON PETROLOGICAL MICROSCOPE.

In the main construction the specification on page 5 applies, but the necessary fitments and additions for petrology have been added. The stage has concentric rotation, divided in degrees, and centring adjustments. The polarising prism rotates for 90°, being stopped at each end of its travel and it swings in and out of the optic axis. The analyser fits over the eyepiece and also rotates for 90°. If the analyser and polariser are both turned as far as they will go in the same direction, the prisms are parallel. If they are turned in opposite directions as far as they will go they are crossed.

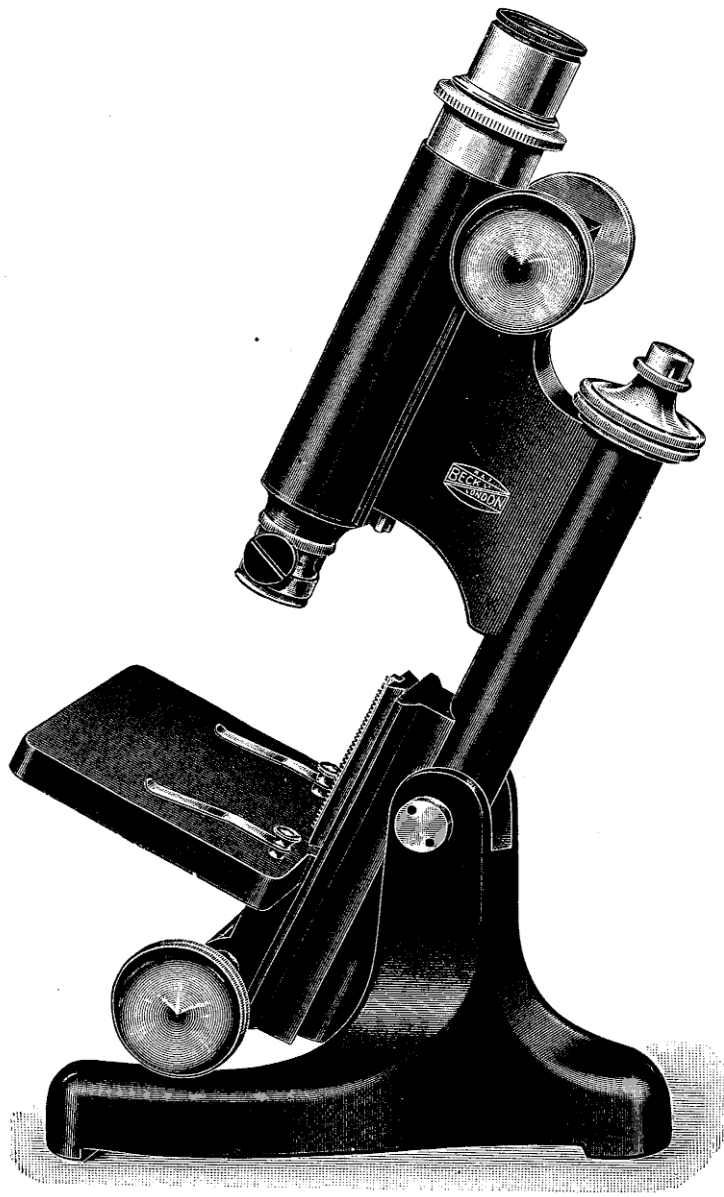
The eyepiece has a slot for the insertion of a quartz wedge, mica wave plate or micrometer.

A system of converging lenses fits the central aperture of the stage and for the examination of rings and brushes in crystals, the eyepiece can be removed and the analyser replaced on the tube of the microscope. If it is desired a Becke lens can be supplied to fit over the top of the analyser in which case the eyepiece is not removed. The eyepiece is provided with crosswires.

No. 22 P.O. Stand, with eyepiece, crosswires, swing-out polariser, analyser over eyepiece, in cabinet	£14	8	6		
No. 3231A. $\frac{2}{3}$ in. Object glass, 16 m/m.	0	16	6		
				£15	5 0
No. 22 P.B. Stand, with eyepiece, crosswires, swing-out polariser, analyser over eyepiece, in cabinet	£14	8	6		
No. 3231A. $\frac{2}{3}$ in. Object glass, 16 m/m.	0	16	6		
No. 3234. $\frac{1}{6}$ in. Object glass, 4 m/m.	3	15	0		
No. 3233. Converging system of lenses	1	5	0		
				£20	5 0
No. 22 P.C. Stand, with eyepiece, crosswires, swing-out polariser, analyser over eyepiece, in cabinet	£14	8	6		
No. 3230A. $1\frac{1}{2}$ in. Object glass, 32 m/m.	1	7	6		
No. 3231A. $\frac{2}{3}$ in. Object glass, 16 m/m.	0	16	6		
No. 3234. $\frac{1}{6}$ in. Object glass, 4 m/m.	3	15	0		
No. 3233. Converging system of lenses	1	5	0		
No. 3354. Becke lens	1	10	0		
No. 3056. $\frac{1}{4}$ Mica wave plate	0	15	0		
No. 3059. Klein's quartz plate	1	0	0		
No. 3283. Micrometer	0	15	0		
No. 3250. Quartz wedge on gypsum plate, graduated	4	10	0		
				£30	2 6
No. 22 P.D. No. 22 P.C. As above	£30	2	6		
No. 3306. Circular rotating mechanical stage	12	0	0		
				£42	2 6

Any apparatus can be added or omitted at a corresponding addition or reduction of price.

No. 22 LONDON METALLURGICAL MICROSCOPE.



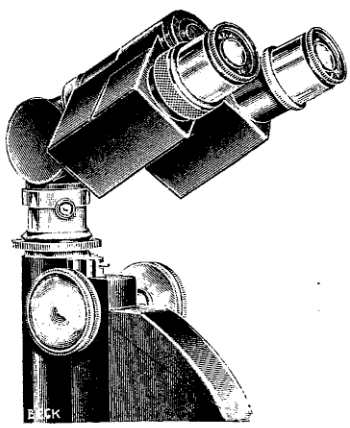
No. 22 LONDON METALLURGICAL MICROSCOPE.

This microscope is of the same construction as the model specified on page 5, but is adapted for metallurgy. The stage measures 4 in.×3¼ in., and can, if desired, be fitted with a levelling plate. It is supported on a strong dovetailed slide, up and down which it is moved by means of a rack and pinion. By racking the stage to its lowest position, and by raising the body tube to its highest position, a maximum distance between stage and vertical illuminator of 5 in. can be obtained, so that large specimens can be accommodated.

No. 22M.A. Stand in oak box	£11	0	0
No. 3363. Thin glass vertical illuminator ..	1	7	6
No. 3260. 2 Eyepieces, 42 m/m. (× 6) and 25 m/m. (× 10)	1	4	0
No. 3231A. ⅔ in. Object glass, 16 m/m. without box	0	12	0
No. 3234A. ⅙ in. Object glass, 4 m/m. without box	2	13	0
			£16 16 6
No. 22M.B. Stand, in oak box	£11	0	0
No. 4960. Thin glass vertical illuminator ..	1	15	0
No. 3260. 2 Eyepieces, 42 m/m. (× 6) and 25 m/m. (× 10)	1	4	0
No. 3231. ⅔ in. Object glass, 16 m/m.	1	10	0
No. 3234. ⅙ in. Object glass, 4 m/m.	3	15	0
No. 3251. 1/12 in. Object glass, 2 m/m., oil immersion	3	18	6
No. 760. Cedar oil bottle with dipper, ground on cap and supply of oil	0	2	0
No. 3286. Sloan objective changer and 3 fittings, in case	2	17	0
			£26 1 6
No. 2025. Levelling plate to stage		extra	£2 0 0

Any apparatus can be added or omitted at a corresponding addition or reduction of price.

HIGH POWER BINOCULAR ATTACHMENT.



No. 3781

This binocular eyepiece is made in a form which replaces the ordinary eyepiece so that a monocular microscope can be converted into a thoroughly efficient binocular instrument. It is well known that the use of the two eyes for microscopic observation prevents fatigue and improves the quality of vision. With a binocular the perceptive faculties are more constant during prolonged observation than with a monocular, and with the latter, the detection of fine detail is less certain. Often, however, where the worker has already a satisfactory and probably expensive monocular microscope, he is disinclined to dispose of it and purchase a new complete binocular microscope. The Beck binocular eyepiece solves the problem. It has all the qualities of the binocular bodies which are built into the microscopes, but is made in a form which permits it to be inserted into any microscope. It can be used with all powers and with any standard objectives, and any eyepieces of the standard (.917 in.) size. The optical construction consists of a prism composed of two right angled prisms cemented together which receives the light from the object glass. The cemented surface has a thin semi-transparent layer of silver. This divides the light into two complete bundles, one of which is directed into each eye. As the full aperture of the object glass is used in each eye, the resolution is unimpaired.

The two tubes of the binocular are inclined at the normal convergence for near objects.

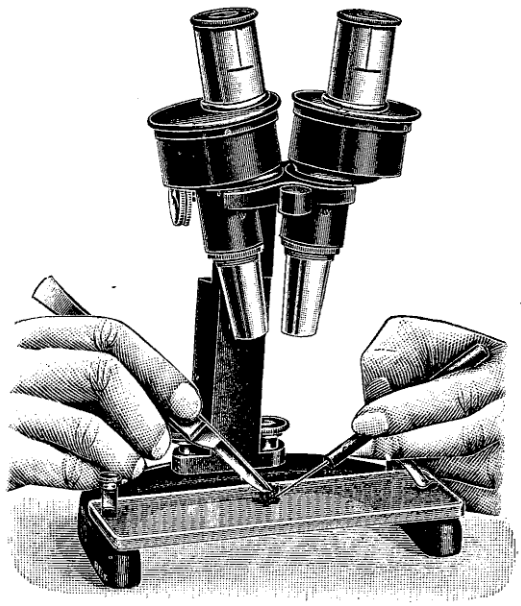
The interocular distance is variable from 47 to 78 millimetres, and is adjusted by turning the two tubes on a common centre, the tubelength remaining unaltered. A tubelength corrector is supplied to compensate for the extra optical path.
The high power binocular eyepiece is made in two forms, No. 3780, the straight model, and No. 3781, angular model.

The straight model is suitable where the microscope is used at an inclined position. If used with the microscope vertical it increases the working height of the instrument and may lead to discomfort for the user. The angular model overcomes this as the prismatic attachment allows the binocular to be inclined at a convenient angle when the microscope is upright, as shown in the illustration.

Either form of binocular is suitable for attachment to any microscopes of our make and to many instruments of other makes. It is advisable for us to have the drawtube of the instrument to ensure that there are no obstructions, which would prevent its insertion. If the eyepiece size is not the standard size (.917 in.) a small cost is entailed for adaption.

No. 3780. High power binocular, straight model £10 10 0
No. 3781. High power binocular, angular model 13 10 0

DISSECTING MICROSCOPES.



No. 3760.

The Binomax (patent).

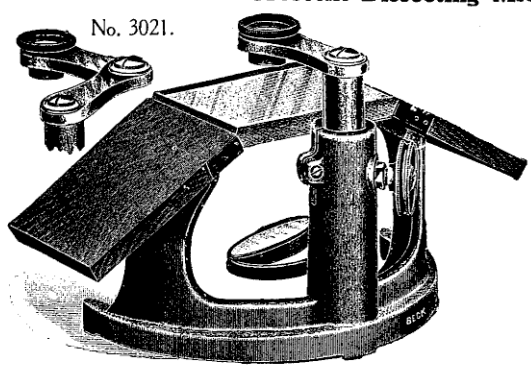
This binocular microscope is on a new optical principle, giving powers of ×4, ×8, ×16 and ×32. Large field of view, long working distance, erect image combined with stereoscopic relief, render the instrument invaluable for low power observation, dissection, etc. The model as illustrated is specially suited for dissecting; objects can be either placed on the glass plate, or this can be removed and the instrument used over a dish or tray. Rack and pinion focussing motion is provided.

Other types of mountings can be supplied; these are fully illustrated in our general catalogue.

No. 3760. Binomax microscope £16 11 6

Crescent Dissecting Microscope.

No. 3021.



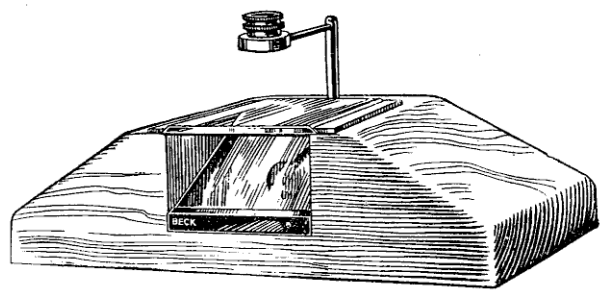
No. 3020.

This dissecting microscope has been specially designed to obviate any liability to tipping on account of the pressure of the hands, by placing a support immediately under the hand rests. The base is a heavy casting with two uprights to support the hand rests and stage. The amount of focussing motion is 3 in., so that very thick specimens can be examined. The hand rests are of hard wood and the stage is a thick plate of glass. A mirror is provided below the stage, silvered on one side and opal white glass on the other. For holding the lenses a single or double jointed swinging arm is supplied.

No. 3020. Stand only, with single arm £2 17 6
No. 3020A. Stand, No. 3020 with 2 single lenses ×5 and ×10 ... 3 6 6
No. 3020B. Stand, No. 3020, with 1 single lens ×5, and 2 achromatic lenses, ×12 and ×20 ... ... 5 1 6
No. 3021. Double jointed arm ... ... extra 0 12 6

DISSECTING MICROSCOPES AND ARMS.

Cornex Dissecting Microscope.

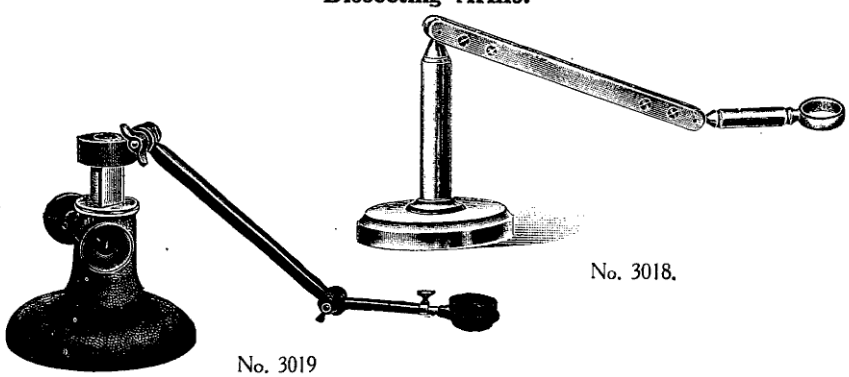


No. 33B.

This dissecting microscope is constructed from a solid block of wood with the sides of the block cut away at a convenient angle so as to form rests for the hands. A glass stage is provided upon which to place the objects, which are illuminated by a mirror set at an angle of 45°.
The lenses are carried in an arm which is attached to a rod, the rod being held in a tubular fitting which allows it to be slid up and down for focussing purposes and also to be swung over the stage plate so that objects at different positions can be examined.
With the lenses supplied, magnifications of 7 and 14 are obtained. These lenses are so arranged that they combine together, the higher power being obtained with the two lenses combined, the lower power when used singly.
Holes are provided in the top of the microscope in which the lenses can be placed for storage purposes when the instrument is not in use.
For class use this dissecting microscope will be found most satisfactory, as although it is of the simplest construction, it is very rigid and strong, and the magnification given is all that is required for ordinary botanical and entomological dissection.

No 33B. Cornex dissecting microscope, complete with two magnifiers .. £0 15 6

Dissecting Arms.



No. 3018.

No. 3019

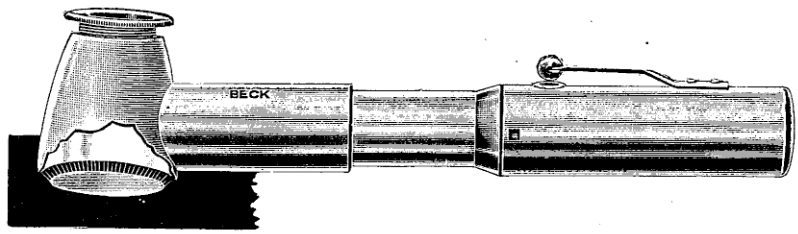
No. 3019 Jointed dissecting arm, mounted on heavy base, rack and pinion focussing adjustment, clamp nuts to joints £2 2 0
No. 3018. Jointed dissecting arm, simple pattern, mounted on circular base .. 0 16 6

Magnifiers for Dissecting Microscopes.

No. 3171D. Achromatic magnifier × 5 .. .. £0 18 6
No. 3172D. Achromatic magnifier ×12 .. .. 0 18 6
No. 3173D. Achromatic magnifier ×20 .. .. 1 1 0
No. 3170D. Single lens magnifier × 5 .. .. 0 4 6
No. 3168D. Single lens magnifier ×10 .. .. 0 4 6

LUMINEX ILLUMINATING MAGNIFIER.

(Regd. Design No. 771009)



The Luminex magnifier is the latest development in magnifiers, the source of light for the illumination of the object being contained in the instrument. By means of a specially shaped reflector the light is condensed into a brilliant patch which shows detail in the most effective manner. The convenience of this method is readily seen, as however inaccessible the object may be, or in whatever position the magnifier is held, an intense light is thrown upon the object.

The Luminex is made in a fixed focus model, focussing the object just below the rim of the reflector. This has a power of ×10.

Another model, made with a power of either ×10, ×15 or ×20, has a focussing motion to the lens, so that the magnifier may be rested upon an object and the image brought into focus by the adjustment to the lens. The power ×20 is fitted with an achromatic lens, giving at this high magnifying power a field of view free from aberration.

A model is also manufactured containing a graduated scale which is seen superimposed upon the object being viewed, so that measurements can be readily taken, this has a power of ×10. A focussing adjustment is provided to the lens, bringing both scale and object into accurate focus. Any of the following scales can be supplied :—

½ in. straight scale divided into 10ths, 50ths and 200ths of an inch.

10 m.m. straight scale divided into 100 divisions, i.e., 1/10th of a millimetre.

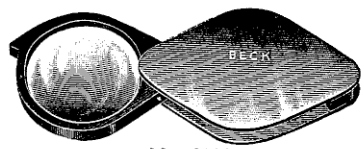
Squares over the whole field in either ¼, ½ or 1 m.m.

Replacements of lamps and batteries can be obtained anywhere.

No. 3725.	**Luminex magnifier,** fixed focus model, complete with lamp and battery	£0	17	6
No. 3726.	**Luminex magnifier,** adjustable focus model ×10, complete with lamp and battery	1	1	0
No. 3731.	**As No. 3726,** but ×15	1	5	0
No. 3732.	**As No. 3726,** but ×20, achromatic lens	2	2	0
No. 3727.	**Luminex magnifier,** scale model with one scale ...	2	3	6
No. 3728.	**Extra scales**	0	17	6

With all Luminex magnifiers a daylight blue bulb can be supplied in place of ordinary bulb, if desired. It should be specified if required when ordering.

MAGNIFIERS.



No. 3125.

Folding Pocket Magnifiers.

No. 3125. Single lens magnifier, 1¼ in. diameter, × 3, mounted with metal sides £0 2 0

No. 3126. As No. 3125, × 5 .. 0 2 6

No. 3137. Planoscopic magnifier giving flat field 1¼ in. diameter, mounted with metal sides 0 5 0



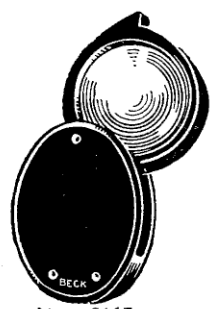
No. 3161.

No. 3161. Three lens combination, in vulcanite, with ⅞ in., ¾ in. and ⅝ in. diameter lenses 0 3 0

No. 3163. Three lens combination, in vulcanite, with 1 in., ⅞ in. and ¾ in. diameter lenses 0 4 0

No. 3165. Two lens combination, in vulcanite, with ⅞ in. and ¾ in. diameter lenses 0 2 3

No. 3166. Ditto, with 1 in. and ⅞ in. diameter lenses 0 3 3



No. 3167.

No. 3167. Single lens magnifier, box frame in vulcanite, ⅞ in. diameter .. 0 1 3

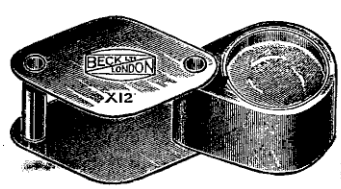
No. 3168. Ditto, 1 in. diameter 0 1 6

No. 3169. Ditto, 1¼ in. diameter 0 2 6

No. 3170. Ditto, 1½ in. diameter 0 3 9

Folding Pocket Magnifier, Achromatic Lenses.

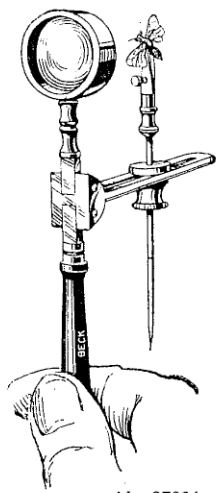
The optical properties of this series of magnifiers are of the highest order, giving a large, flat field of view free from distortion and colour. They are mounted in strongly made nickel-plated mounts and are supplied in chamois leather cases.



No. 3172.

Cat. No.	Dia of lenses.	Magnification.	Working distance.	Dia. of field of view.	Price.
3171	1″	×5	1.4″	1.3″	£1 2 0
3172	.625″	×12	.5″	.6″	1 2 0
3173	.325″	×20	.375″	.3″	1 5 0
3174 Double Magnifier	.625″ and .325″	×10 and ×20	.8″ & .375″	.7″ & .3″	1 18 6

MAGNIFIERS AND READING GLASSES.



No. 3703A.

Entomological Magnifier.

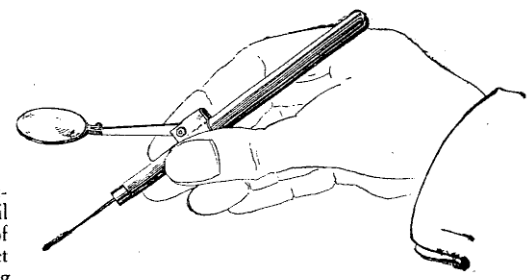
This consists of a magnifier (× 12), which together with a handle, by which the instrument is held, is hinged upon a slotted bar. In this slot is placed a fitting having at one end a forceps for holding an object and at the other end a spike upon which suitable objects can be impaled. A cork upon which entomological objects are pinned can be mounted on this spike. The forceps slides along the bar for focussing and can also be raised or lowered, and rotated. The whole appliance folds into a case 3½ in.× 2¼ in.× ⅞ in. in the achromatic type and 3½ in.× 1¾ in.× ⅞ in. in the single lens type.

No. 3703. Entomological magnifier, achromatic lens £1 15 0

No. 3703A. Entomological magnifier, single lens 1 5 0

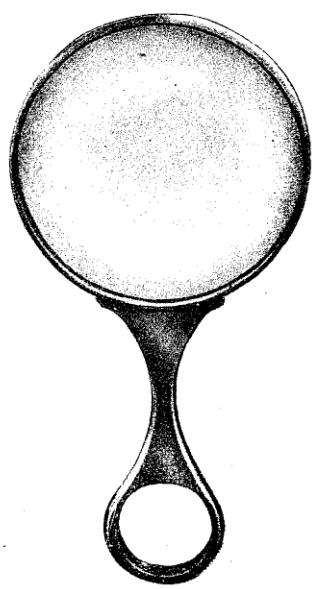
Focostat Magnifier.

This lens fits the handle of a dissecting instrument, mapping pen, pencil or needle, and magnifies the point of the instrument together with the object being dissected or the drawing being made.



No.3378.

No. 3378. Focostat lens, complete with dissecting needle £0 10 6
No. 3378A. Ditto, with mapping pen 0 10 6
No. 3378B. Ditto with two scalpels 0 16 0

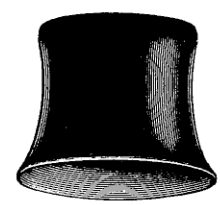


No. 3709

Watchmakers' Eyeglass.

No. 4564. In vulcanite mount £0 1 6

No. 4564A. In aluminium mount 0 2 0



No. 4564.

Reading Glasses.

No. 3707. In aluminium rim with black handle.

Diameter of lens ..	2½ in.	3 in.	3½ in.	4 in.
	2/9	3/6	4/9	5/9

No. 3708. In nickel rim with ebonised handle, best quality.

Diameter of lens ..	1⅝ in.	2⅜ in.	2⅞ in.	3½ in.	4 in.
	3/9	5/-	6/6	8/-	11/-

No. 3709. In solid aluminium mounts with loop shaped handles.

Diameter of lens ..	2½ in.	3 in.	3½ in.	4 in.	4½ in.
	8/6	9/6	12/-	14/6	17/6

No. 3710. In solid aluminium mounts with loop shaped or corner handles, and with bi-cylindrical lenses.

Size of lens ..	3 in.× 2 in.	3½ in.× 2¼ in.	4 in.× 2½ in.
	16/-	18/-	£1 4 0

OBJECT GLASSES AND EYEPIECES.

Beck object glasses are recognised to be of the highest quality produced in this or other countries

Achromatic Series.

Cat. No.	English designation.	Focal length.	Numerical aperture	Approximate magnifying power. With eyepiece. 42 m/m.	25 m/m.	17 m/m.	Add for each 20 m/m. extension of drawtube 42 m/m.	25 m/m.	17 m/m.	Price. £ s. d.
	inches.	m/m.								
3010b	2½	60	·07	7	13	20	3	5	7	0 18 0
3011b	2	50	·08	10	20	27	3	6	8	0 18 0
3230a	1½	32	·12	25	45	65	4	6	8	1 7 6
3230	1½	32	·15	25	45	65	4	6	8	2 5 0
3238	1	25	.12	38	63	95	7	10	13	1 7 6
3231a	⅔	16	·17	62	110	155	8	12	18	0 16 6
3231	⅔	16	·28	62	110	155	8	12	18	1 10 0
3232	⅓	8	·54	115	200	285	20	30	40	3 5 0
3239	¼	6	·85	180	300	450	30	45	70	4 5 0
3234	¼	4	·85	285	490	690	40	60	80	3 15 0
3234a	⅙	4	·65	285	490	690	40	60	80	2 17 6
***3236**	⅛	3	·95	380	650	950	50	85	120	6 17 6
***†3237**	⅛	3	1·2	380	650	950	50	85	120	7 10 0
***3251**	1/12	2	1·0	530	900	1275	60	100	150	3 18 6
***3235**	1/12	2	1·3	530	900	1275	60	100	150	6 10 0

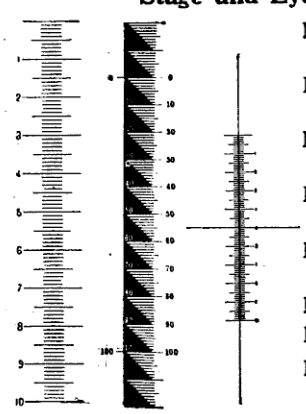
* Oil immersion. † Including stop to reduce aperture to 0·95 N.A.

Huyghenian Eyepieces.

All eyepieces are made to fit easily into the Royal Microscopical Society's No. 1 Standard, ·917 in. diameter. They are designated by their focal length, and their magnifying power is given for the distance of distinct vision 250 m/m., and is engraved on each eyepiece.

Cat. No.	Focal length.	Magnifying power.	Price.
3260	42 m/m.	× 6	£0 12 0
3261	25 m/m.	×10	0 12 0
3262	17 m/m.	×15	0 12 0
3798	10 m/m.	×25	0 18 0
3263	25 m/m. **with indicator**	×10	0 17 0
3264	**Eyepiece (any of above powers) with cross lines**		0 17 0

Stage and Eyepiece Micrometers for Measuring.



No. 3810. No. 3812 No. 3811.

No. 3277. Stage micrometer, on 3×1 slip, engraved 1/10 and 1/100 m/m. £0 12 6

No. 3278. Stage micrometer, on 3×1 slip, engraved 1/100 and 1/1000 inch 0 12 6

No. 3276. Eyepiece micrometer, scale 5 m/m., divided into 50 parts 0 10 6

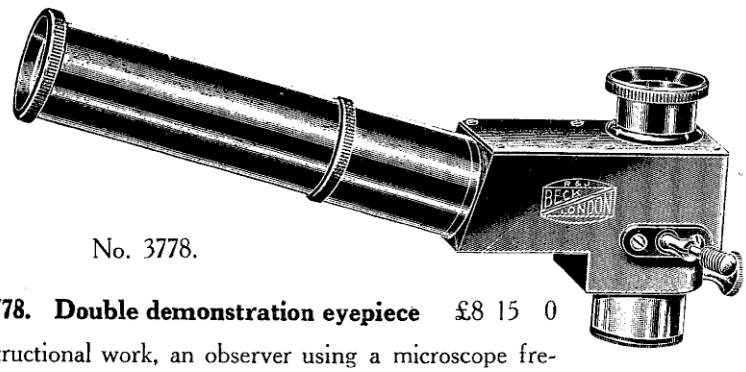
No. 3810. Eyepiece micrometer, scale 10 m/m., divided into 100 parts 0 10 6

No. 3811. Eyepiece micrometer, scale 10 m/m., divided into 100 parts and cross lines 0 12 6

No. 3812. Step eyepiece micrometer .. 0 12 6

No. 3265. Glass plate, ruled with cross lines .. 0 5 0

No. 3279. Glass plate, ruled in squares, ¼ m/m., ½ m/m., or 1 m/m. 0 10 6



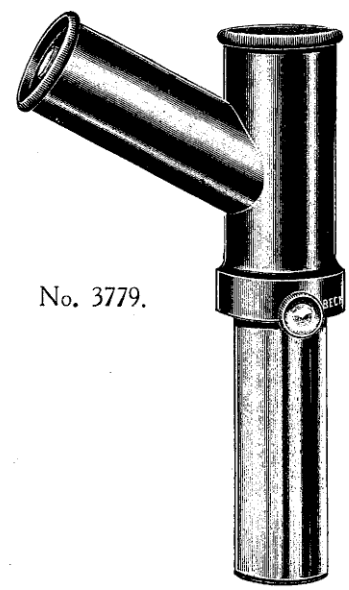
No. 3778.

No. 3778. Double demonstration eyepiece £8 15 0

In instructional work, an observer using a microscope frequently desires to show the object under examination to a second person and point out some feature which he wishes to demonstrate. This is difficult with the ordinary microscope, but with the double demonstration eyepiece two persons can observe an object at the same time. A movable pointer is provided which is visible in both fields, so that any particular part of the specimen can be indicated. The great assistance which this piece of apparatus can render in teaching can be readily realised.

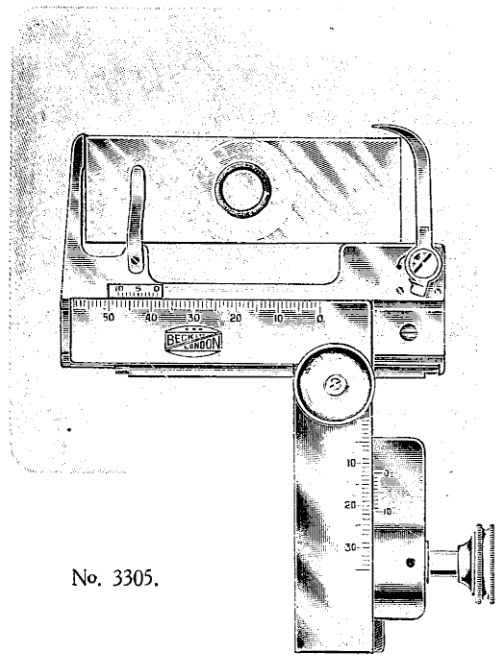
No. 3779. Angular eyepiece attachment. Suitable for use with any standard (·917 in.) eyepiece £1 15 0

When it is necessary to use a microscope vertically, the observer finds that his position when working, gives considerable discomfort. The angular eyepiece bends the path of light so that the eyepiece projects from the microscope at a convenient angle for observation. It will accommodate any power of eyepiece of the standard gauge, and has a correcting lens to compensate for the increased tube length.



No. 3779.

MICROSCOPE APPARATUS.



No. 3305.

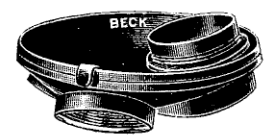
No. 3305. Mechanical stage £6 0 0

This stage has both horizontal and vertical motions actuated by milled heads. The rack employed is very finely cut, which gives an exceedingly delicate and smooth motion. In the horizontal direction, the travel is 2½ in. and in the vertical 1 in. This type of stage is the one supplied for the Nos. 22 and 29 London microscopes. It can be fitted to other instruments but in some instances a small charge for fitting is entailed.

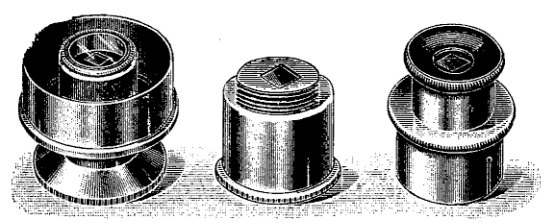
No. 3300. Dust tight double nosepiece .. £1 1 0

No. 3301. Dust tight triple nosepiece .. 1 10 0

No. 3302. Dust tight quadruple nosepiece 1 15 0



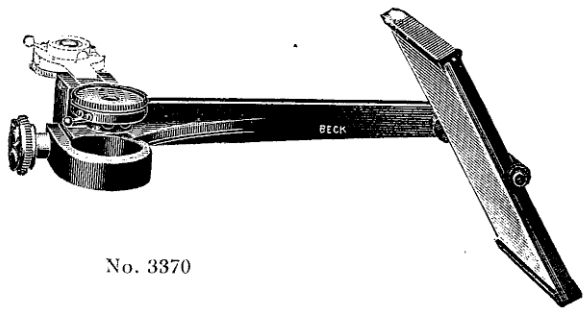
No. 3301.



No. 3345.

No. 3345. Polarising apparatus comprising polariser in revolving fitting to fit substage analyser in revolving fitting to fit nosepiece or to fit over eyepiece. Selenite plate is provided with polariser £4 4 0

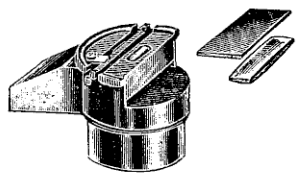
MICROSCOPE APPARATUS.



No. 3370

No. 3370. Abbe camera lucida .. £4 5 0

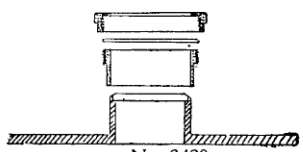
With this form of camera lucida the microscope is generally used in a vertical position, as if inclined the drawing paper must be set in the same plane as the stage.



No. 3369.

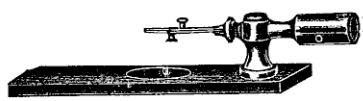
No. 3369. Beck camera lucida £2 10 0

The microscope can be used in either a vertical or inclined position. When used in the former manner the drawing paper must be placed at an angle of 30° in front of the microscope. When inclined the tube of the microscope should be at 60° and the paper placed on the flat table.



No. 3420

No. 3420. Live box. A circular thin glass is held in a cylindrical cap by means of a screwed cell. This cap slides over a fitting at the upper end of which is fixed a thick glass plate. The whole is mounted on a 3×1 slip of ebonite £0 8 6



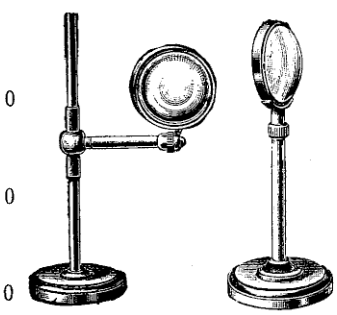
No. 3422.

No. 3422. Stage forceps. A 3×1 plate carries a metal fitting holding a short revolving rod with a pair of spring forceps at one end and a tube with cork at the other .. 0 14 0

No. 3315. Bulls eye condenser on stand, 2¼ in. diameter lens with complete adjustments £2 10 0

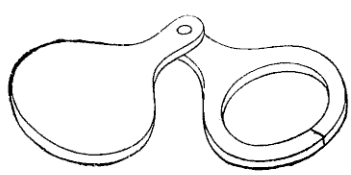
No. 3315A. Bulls eye condenser on stand, 2¼ in. diameter lens with vertical adjustment only 2 0 0

No. 3316. Bulls eye condenser on stand, 1½ in. diameter lens, with complete adjustments 1 5 0



No. 3315

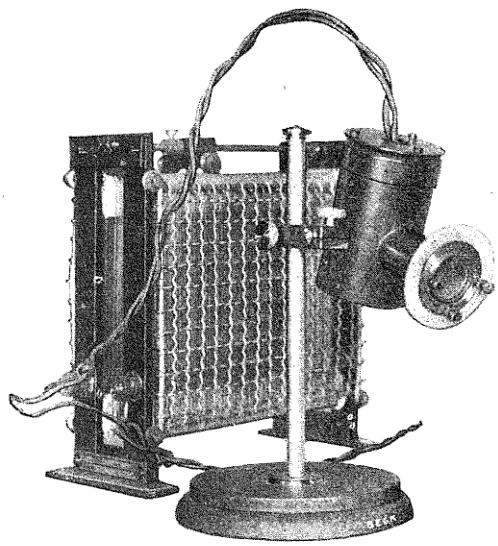
No. 3315A



No. 3257.

No. 3257. Eyeshade, to shield the unemployed eye from light and enable it to remain open .. £0 2 0

ILLUMINATING APPARATUS.



No. 3344.

Beck Intensity Microscope Lamp.

The illuminant is of great intrinsic brilliancy and is suitable for all microscopic work, including dark ground illumination. It is run from an ordinary house supply by means of a variable resistance or transformer and can be used on any voltage from 100 to 250 volts, or where electric supply is not available, accumulators or batteries of 12 volts can be employed. The lamp is contained in a tubular housing and is provided with a focussing adjustment for the condensing lens. The lamp housing is mounted on a firm base, and can be adjusted for height and tilted to any angle, each adjustment being provided with a clamp. A ground and signal green glass are supplied with each outfit, also flex and connector to fit the standard sized bayonet lampholder.

When ordering we require to have full details of the electric supply available.

No. 3344. Beck Intensity lamp, on stand, with condenser, one ground and one green glass, with resistance or transformer £4 15 0

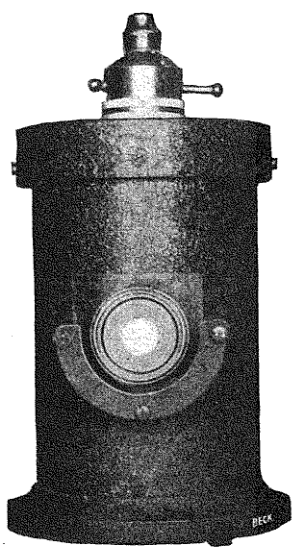
No. 3344A. Ditto, but with iris diaphragm 6 0 0

No. 3344B. Beck Intensity lamp, without resistance to work from accumulators on 12 volt current 3 7 6

No. 3344C. Ditto, but with iris diaphragm .. 4 12 6

No. 3344D. Spare bulbs .. .. each 0 2 6

No. 3682. Achromatic and aplanatic condenser in place of ordinary condenser .. .. extra 0 7 6



No. 3086.

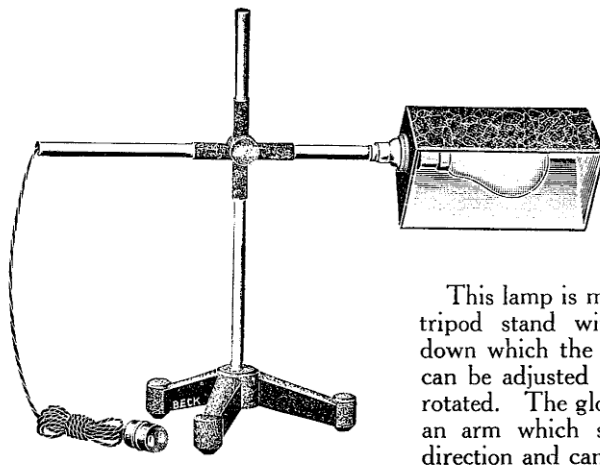
Beck Canister Lamp.

This is a very simple lamp containing a opal globe, the general design being seen from the illustration. It is solidly made and is fitted with an iris diaphragm and a cell in which a colour filter can be placed.

It is a useful lamp for general work, as the light can be readily controlled by the iris diaphragm, but it is not sufficiently powerful for high power dark ground illumination, and cannot be used for top lighting or work with a vertical illuminator, as it has no raising motion.

No. 3086. Beck Canister lamp, with Fullolite globe, iris diaphragm and green glass screen £2 2 0

ILLUMINATING APPARATUS.

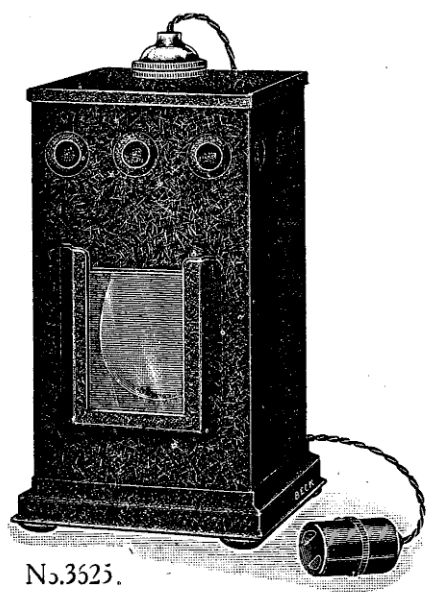


No. 3336A.

This lamp is mounted on a heavy iron tripod stand with an upright, up and down which the lamp slides, so that it can be adjusted for height and can be rotated. The globe itself is mounted on an arm which slides in a horizontal direction and can also be rotated about a horizontal axis, so that practically universal adjustment is given. A shade shields direct light from the eyes. It is suitable for both transparent and opaque illumination, and also for illuminating trays, dishes, etc., during dissection.

No. 3336A. Beck Reflex lamp, with Fullolite globe, wiring and connector £1 7 6

Beck Simplex Microscope Lamp.



No. 3625.

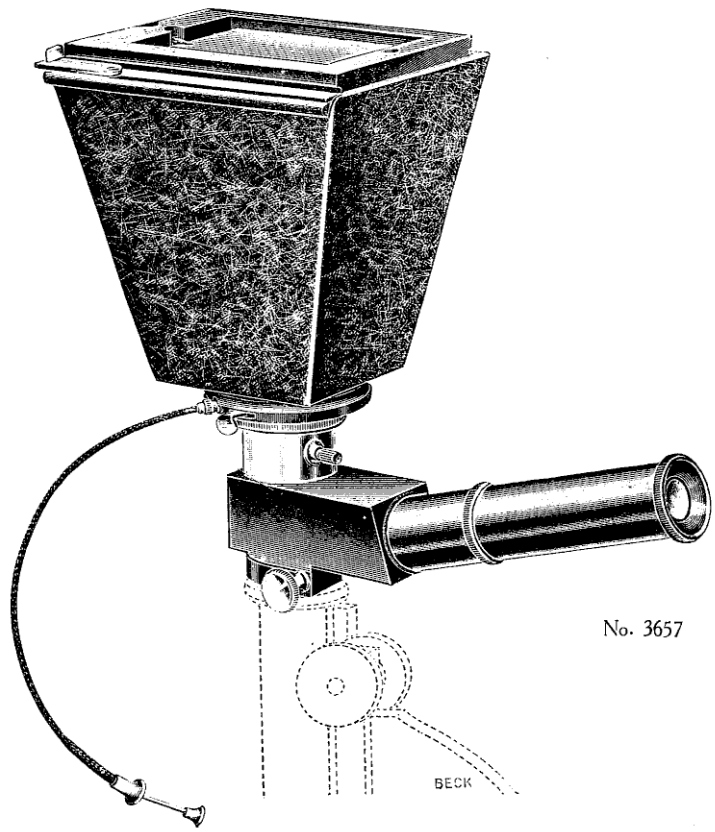
This lamp is suitable for general microscopic work, excepting dark ground illumination. The casing is strongly made and well ventilated, finished in crystalline enamel. The light source is a 60 watt opal globe and the screen a special blue glass, giving an illumination equivalent to day light. Other coloured screens, as listed, can be supplied.

The lamp is supplied complete with flexible wire and bayonet or pin adapter. In ordering, the voltage of the electric supply should be specified, also whether bayonet or pin adapter is required.

No. 3625. Beck Simplex lamp .. £0 18 6

No. 3626. Spare screens, ruby, red, orange, green, blue - green, blue .. .. each 0 2 0

PHOTOMICROGRAPHIC APPARATUS.



No. 3657

No. 3657. Eyepiece camera with observing tube, shutter and three single metal plateholders £12 12 0

No. 3658. Extra single metal plateholders .. .. each 0 3 0

This camera fits in the drawtube of the microscope and is so constructed that the object to be photographed is seen through the observing tube up to and during exposure. By means of the observing eyepiece the position of the object in the field and its correct focus are accurately set, and the exposure then made by means of an antinous release fitted to the timed shutter. The plate carried by the camera is $3\frac{1}{2}$ in. $\times$ $2\frac{1}{2}$ in., and the size of the picture given is a circle of $2\frac{1}{4}$ in. diameter.

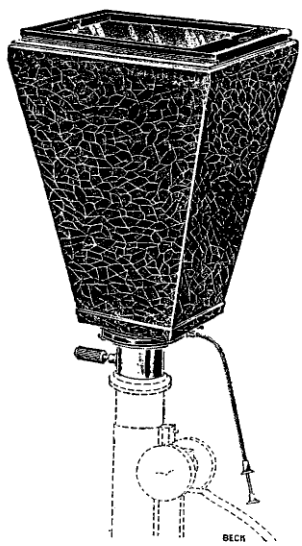
The upper portion of the camera, i.e., the tapered box and shutter, can be removed from the lower part with its observing tube, and this lower portion forms a double demonstration eyepiece enabling two workers to observe simultaneously, one with the side eyepiece and one by means of the eyepiece directly over the tube of the microscope. A pointer is fitted for indicating any special object in the field. The eyepieces have separate focussing motions for bringing this pointer sharply in focus. For photography both eyepieces are pushed home in the mountings and in this position they synchronise so that an object is in focus both in the observing eyepiece and on the plate of the camera. A ground glass screen is provided, so that this setting may be checked if it becomes necessary.

The apparatus fits the standard size drawtube and has a clamp to ensure its rigidity.

PHOTOMICROGRAPHIC APPARATUS.

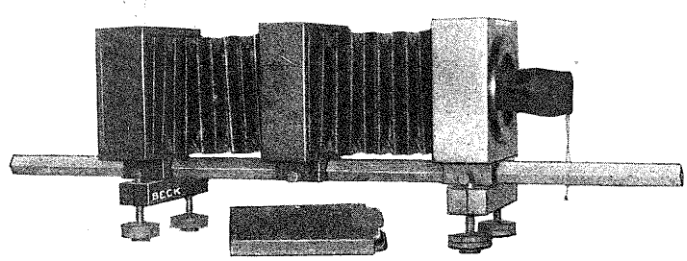
No. 3654. Eyepiece camera, complete with three single metal plate holders £3 3 0

No. 3655. Extra single metal plate holders .. .. .. each 0 3 6



No. 3654

This camera is for use over the eyepiece of the microscope and consists of a tapered box, $6\frac{3}{4}$in. long. The upper end is fitted with a frame which carries a focussing screen or single metal plate holder. The lower end is fitted with an exposing shutter giving time, bulb and instantaneous speeds. Into this shutter is screwed an adapter which fits over the drawtube of the microscope. The adapter is provided with a clamping screw to ensure the camera being rigidly held in position. The shutter is actuated by an antinous release. The size of the plate which the single metal plate holders carry is $\frac{1}{4}$-plate ($4\frac{1}{4}\times3\frac{1}{4}$ in.). The camera is extremely light in weight the total weight including a single metal slide being 15 ozs.

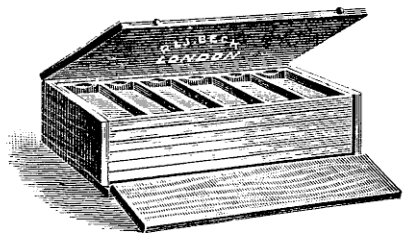


No. 3340

No. 3340. Beck photomicrographic camera, complete with one double dark slide, $\frac{1}{4}$-plate, $3\frac{1}{4}$ in.$\times4\frac{1}{4}$in. size ... £6 6 0

The camera has an extension of 30 in. It consists of a steel hexagonal bar supported on four levelling and raising screws. Along this bar slide three frames with connecting bellows, each frame being provided with a clamp screw. The frame at one end holds the ground glass and double plate holder, the the frame at the other end carries a flexible bag to form a light tight connection with the microscope.

SLIDE CABINETS AND BOXES.

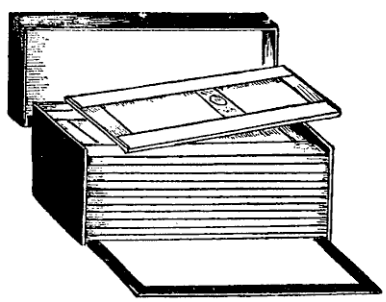


No. 3491.

Cabinet of rack type, well constructed throughout in wood, index provided in lid.

No. 635. To hold 50 slides £0 3 0

No. 636. To hold 100 slides 0 4 0



No 711.

No. 3496. Cardboard trays, with folding flaps, to hold 20 slides. .. £0 1 0

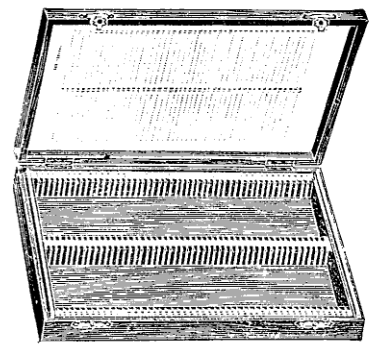
No. 3496A. As No. 3496 but with two fasteners to hold flaps 0 1 3

Cabinets in polished pine, with trays in which the slides lie flat each in separate divisions, drop front.

No. 3490. To hold 36 slides .. £0 5 6

No. 3491. „ „ 72 „ .. 0 7 0

No. 3492. „ „ 144 „ .. 0 15 0



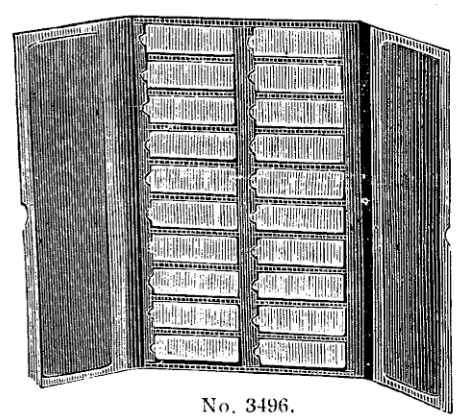
No. 636.

Cardboard slide boxes, leatherette covered, drop front and trays with hinged flaps.

No. 710. To hold 54 slides .. £0 2 6

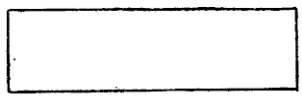
No. 711. „ „ 108 „ .. 0 3 3

No. 712. „ „ 144 „ .. 0 4 3

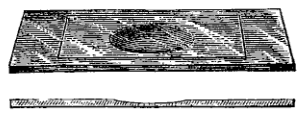


No. 3496.

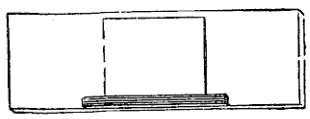
GLASS SLIDES, COVERS, Etc.



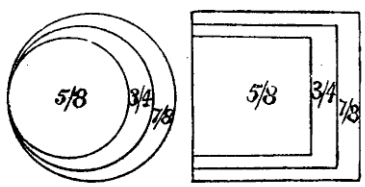
No. 3828



No. 3405



No. 3406

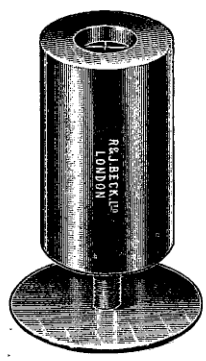


No 3390/5

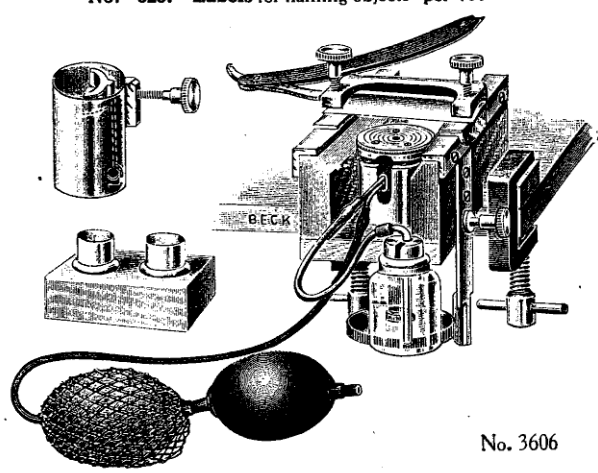
No. 3830. **Glass slides,** 3× 1, extra thin, half white .. .. per gross £0 4 6
No. 3831. **Ditto,** thin, half white per gross 0 3 9
No. 3832. **Ditto,** ordinary, half white per gross 0 3 0
No. 3833. **Glass slides,** 3× 1½, extra thin, half white .. .. per gross 0 6 0
No. 3834. **Ditto,** thin, half white per gross 0 5 0
No. 3835. **Ditto,** ordinary, half white per gross 0 4 6
No. 3405. **Glass slides,** 3× 1. ground edges and excavated hollow .. each 0 0 2
per doz. 0 1 6
No. 3390. **Cover glasses,** No. 1, average thickness ·006, circular .. per oz. 0 6 0
No. 3391. **Ditto,** square or rectangular per oz. 0 5 3
No. 3392. **Cover glasses,** No. 2, average thickness ·008, circular .. per oz. 0 4 6
No. 3393. **Ditto,** square or rectangular per oz. 0 3 9
No. 3394. **Cover glasses,** No. 3, average thickness 01, circular .. per oz. 0 3 6
No. 3395. **Ditto,** square or rectangular per oz. 0 3 0

Cover glass is stocked in ¼ oz. or ½ oz. boxes and in ⅝ in., ¾ in., ⅞ in. squares and circles, or 1 in.×⅞ in., 2 in.×⅞ in., 2¼ in.×⅞ in., 2½ in.×⅞ in. rectangles.

No. 3388. **Micrometer screw gauge,** for measuring thickness of cover glass, slides, etc. £0 12 6
No. 3406. **Glass slide with ledge** 0 1 0
No. 3409. **Cells, metal, circular** per 100 0 6 0
No. 3410. **Cells, glass** .. per doz. 0 5 0
No. 525. **Labels** for naming objects per 100 0 0 6



No. 3602



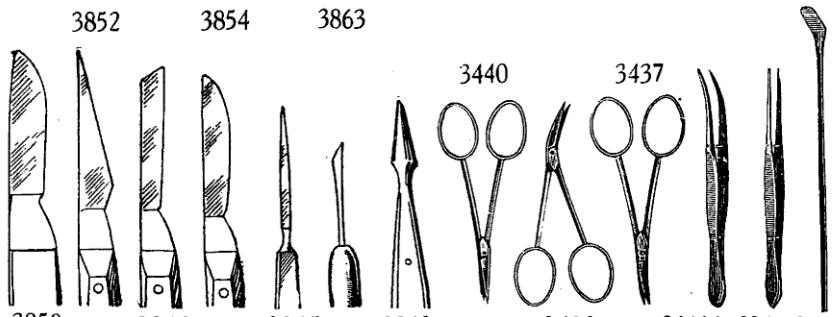
No. 3606

No. 3602. Hand microtome, constructed of solid brass 1½ in. diameter with well ⅝ in. diameter. Though simple in design, being solidly made, considerable accuracy can be obtained. The raising screw has approximately 40 threads to the inch £0 15 6

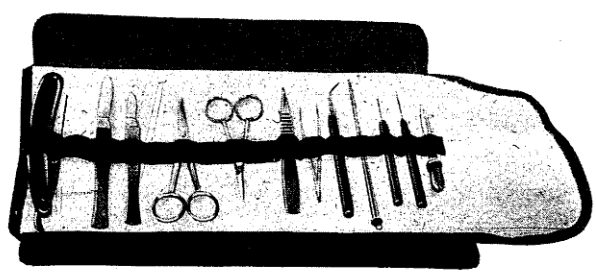
No. 3605 Cathcart microtome. This consists of a central fitting which carries either an ether freezing chamber or embedding cell which is raised by a fine screw. On either side of the fitting are two metal rails and the section is cut by sliding a frame containing a razor along these rails. It is clamped to the table by two clamps. For embedding only £2 15 6

No. 3606. Ditto, for embedding and ether freezing 3 15 6

DISSECTING INSTRUMENTS.



No. 3850.	**Scalpels,** all metal handles, sizes of blades 1¼ in., 1⅜ in., 1½ in., 1⅝ in., 1⅞ in. and 2 in. .. .. each	£0	2	0
No. 3851.	**Scalpel,** as No. 3850, size of blades 1 in. .. .. each	0	2	6
No. 3852	**Scalpel,** ebony handle, size of blade 1¼ in. .. .. .. each	0	1	9
No. 3853.	**Scalpel,** ebony handle size of blade 1¼ in. .. .. .. each	0	1	9
No. 3854.	**Scalpel,** ebony handle, size of blade 1¼ in. .. .. .. each	0	1	9
No. 3855.	**Greafe's knife,** for very fine dissection .. .. each	0	5	0
No. 3856.	**Scissors,** straight, 5½ in. .. .. each	0	2	6
No. 3857.	**Scissors,** straight, 5 in. .. .. each	0	2	0
No. 3440.	**Scissors,** straight, 4½ in. .. .. each	0	1	9
No. 3439.	**Scissors,** straight, 4 in., very fine points .. .. each	0	2	6
No. 3437.	**Scissors,** curved, 4 in., very fine points .. .. each	0	2	6
No. 3438.	**Scissors,** elbow .. .. each	0	5	6
No. 3445.	**Forceps,** straight, 6 in., blunt points .. .. each	0	1	9
No. 3858.	**Forceps,** straight 5 in., blunt points .. .. each	0	1	6
No. 3859.	**Forceps,** straight, 5 in., fine points and steady pin .. .. each	0	2	0
No. 3860.	**Forceps,** straight, 4 in., fine points and steady pin .. .. each	0	2	0
No. 3861.	**Forceps,** straight, 4½ in., spear-headed with steady pin .. .. each	0	1	9
No. 3446A.	**Forceps,** curved, 4 in., fine points and steady pin .. .. each	0	2	0
No. 3447.	**Forceps,** Cornett's cover glass .. .. each	0	2	3
No. 3434.	**Needles,** straight, in rosewood handles with ferrule .. .. each	0	0	4
No. 3862.	**Needles,** triangular, in plain wooden handles .. .. .. each	0	0	4
No. 3863.	**Needles,** with one cutting edge .. .. each	0	0	8
No. 3864.	**Needles,** spear-headed, as No. 3861 Forceps .. .. .. each	0	0	7
No. 3436.	**Needles,** platinum, in glass handles .. .. each	0	2	6
No. 3443.	**Chain hooks** .. .. per set	0	3	0
No. 3865.	**Bone cutting forceps,** 5½ ins. .. .. each	0	7	0
No. 3431.	**Blow pipe** with stilette .. .. each	0	1	0
No. 3432.	**Razor,** hollow ground one side, flat other side .. .. .. each	0	2	9
No. 3448.	**Section lifter,** in copper or aluminium .. .. each	0	0	6
No. 3442.	**Seeker,** in rosewood handle .. .. each	0	0	6
No. 3427.	**Metal holder,** for platinum wire, needles, etc. .. .. .. each	0	1	9
No. 3450.	**Metallic hone,** for sharpening razors, scalpels, etc. .. .. each	0	2	6
No. 3429.	**Glass pipette,** curved or straight .. .. each	0	0	2
No. 3430.	**Glass pipette,** curved or straight, with teat .. .. .. each	0	0	4
No. 3451.	**Case of dissecting instruments,** consisting of three pairs of scissors, two scalpels, razor, two pairs of forceps, seeker, section lifter, blow-pipe, two needles, pipette with teat, magnifier, in walnut case	1	7	6



No. 3426.

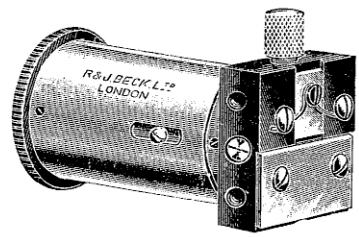
No. 3426. Roll up canvas kit, containing two pairs of scissors, two scalpels, razor, two pairs of forceps, seeker, two needles, blow-pipe, pipette with teat £0 15 6

SPECTROSCOPES.



No. 2444.

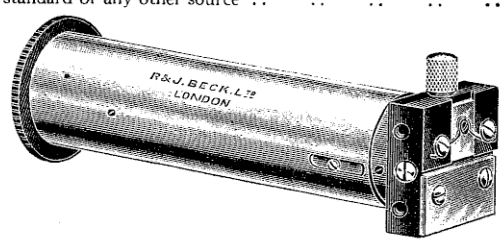
No. 2444. **Beck minimum diffraction pocket spectroscope.** This instrument is of an extremely small size, being 2 in. long and of ½ in. diameter, and is supplied in a case for pocket use. It has a replica grating and gives a dispersion of 20°. The slit is of a fixed width .. £1 3 0



No. 2447.

No. 2447. **Beck pocket diffraction spectroscope.** This spectroscope is on the same principle as the No. 2444, with the addition of an adjustable slit. It readily shows Frauenhofer lines and rain bands 2 5 0

No. 2449. **Beck pocket diffraction spectroscope**, with comparison prism. This is exactly similar to the No. 2447, but has in addition a comparison prism so that the spectrum being examined can be compared with that of a standard or any other source 2 15 0



No. 2458.

No. 2458. **Beck prism direct vision spectroscope.** This is a direct vision spectroscope employing a train of five prisms. It gives a dispersion of 10° and has an adjustable slit. In this type of spectroscope the dispersion is less than that given by a diffraction grating, but it gives great brilliancy in the spectrum 3 3 0

No. 2459. **Beck prism direct vision spectroscope,** with comparison prism. This is exactly similar to No. 2458, but has, in addition, a comparison prism 3 13 0

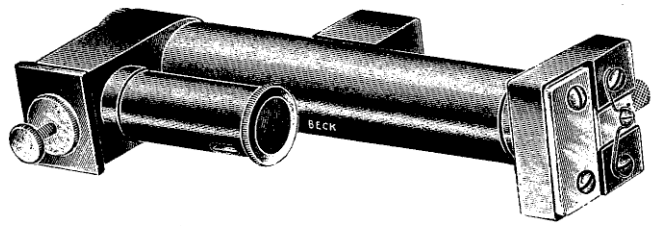
No. 2437. **Table stand** for Nos. 2447, 2449, 2458 and 2459 .. .. .. 0 15 0

No. 2696. **Cylindrical lens attachment** for examining small sources of light, to produce an extended image on the slit. This can be supplied to Nos. 2447, 2449, 2458, 2459 and 2425 .. .. 0 10 6

No. 2697. **Test tube holder** for attachment to Nos. 2447, 2449, 2458, 2459 and 2425. This clips on to the body of the spectroscope and holds a test tube for containing liquids 0 8 6

SPECTROSCOPES.

Wavelength Model.



This spectroscope is of the prismatic type, having a dispersion of approximately 10°.

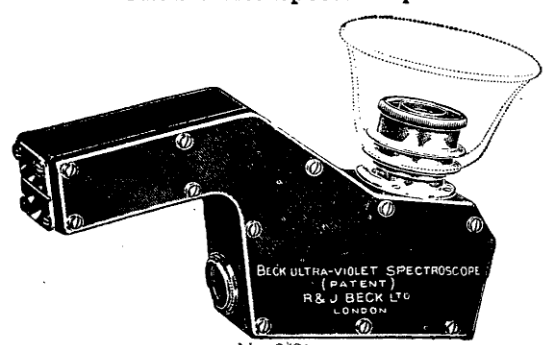
A scale giving direct readings in wavelengths is viewed in the same field as the spectrum. This scale is calibrated, each division representing 100 A.U. The slit is adjustable and focussing adjustments are provided. The scale has an adjustment so that it can be set accurately in relation to the spectrum.

The model No. 2523 has the addition of a comparison prism.

No. 2522. Wavelength model spectroscope in case £6 15 0

No. 2523. As No. 2522 but with comparison prism 7 5 0

Ultra Violet Spectroscope.



No. 2435.

This is a compact spectroscope for the examination of the ultra violet spectrum. It has an accurately made slit, fixed or adjustable, through which the light passes on to a quartz prism, forming a spectrum upon a fluorescent screen. The spectrum thus formed is examined by an eyepiece, giving a magnified mage. The eyepiece is provided with a focussing motion and an eye cup to exclude extraneous light.

Beside the spectrum in the field of view is an illuminated scale, divided in Angström units, so that the wave-length of any portion of the spectrum under observation can be determined. The spectrum included in the field of view is from 2,000 A.U. to 4,500 A.U., which includes a small portion of the visible light.

When a small source of light is being examined, the brilliancy of the spectrum can be increased by using a cylindrical lens attachment, which is supplied for fitting to the spectroscope.

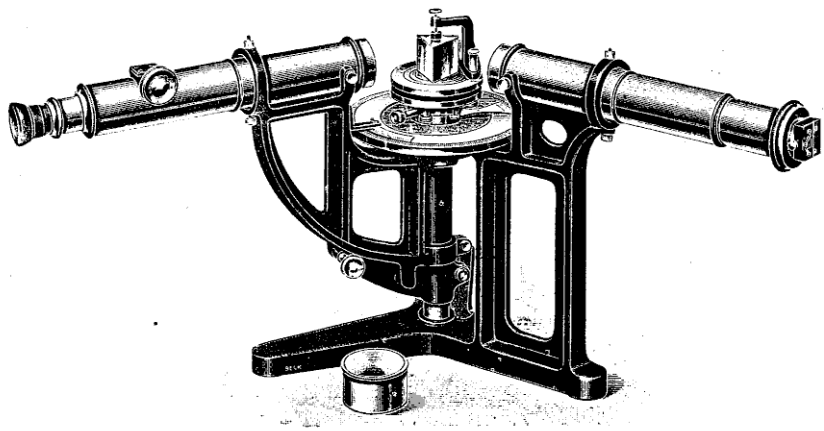
No. 2435. Beck ultra violet spectroscope, in case £6 17 6

No 2438. Beck ultra violet spectroscope, exactly similar to No. 2435, but with the addition of an adjustable slit, in case 8 2 6

No. 2436. Cylindrical lens attachment 0 15 0

No. 2437. Table stand for Nos. 2435, 2438, 2522 and 2523 .. .. .. 0 15 0

GIRDER SPECTROMETER.



No. 2700.

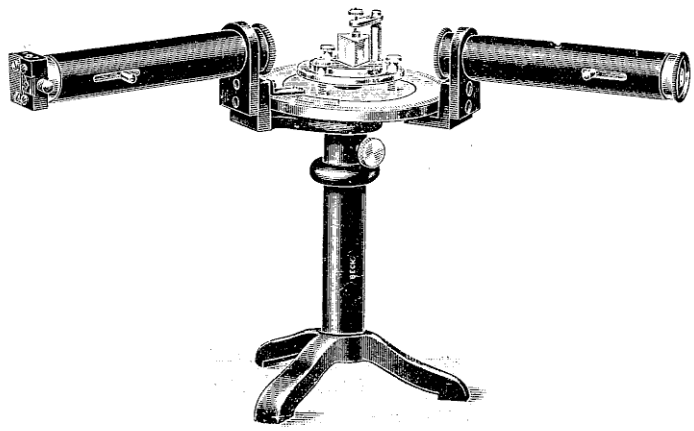
This spectrometer has been designed with a view to producing an instrument for laboratory use more rigid than the usual type. The novelty of the design of the stand consists of its particularly solid construction. It comprises a main casting with three feet having a very large spread. Cast solid with this is a framework supporting the collimator tube and a centre pillar which has a 6 in. divided circle attached to it. Upon the centre pillar and rotating by means of long bearings, is the framework upon which the telescope is fitted. By having these long bearings, any lack of rigidity or shake in the telescope is avoided, and a perfectly smooth motion is ensured. A fine adjustment is provided to this motion and also a clamping screw by which its position can be fixed. Attached to the arm carrying the telescope is a vernier reading upon the divided circle. This vernier reads to 1 minute. Fixed above the divided circle is a table for holding the prism. This table can be rotated about its axis and clamped. It carries a vernier reading also upon the divided circle, which reads to 1 minute. The table also has levelling screws by which the prism can be accurately levelled and raised or lowered. The prism is held in position by a clamp screw. The collimator tube has at one end an object glass of good quality of 10 in. focus and 1 in. aperture. At the other end is an accurately made adjustable slit and comparison prism. A cap is provided for protecting the slit from dust and damage when not in use.

The telescope has also a first quality object glass of the same focus as the collimator and an achromatic eyepiece giving a total magnifying power of 15 and is focussed by means of rack and pinion. The eyepiece has cross wires.

Adjustments are provided both to the collimator and telescope for their accurate alignment, and to enable them to be set at right angles to the vertical axis of the instrument. This is effected by screws which can be clamped in position when the adjustment has been made.

No. 2700.	**Girder spectrometer,** 6 in. diameter circle reading to 1 minute. Telescope and collimator with 10 in. focus object glass, 1 in. diameter, focussing of telescope by rack and pinion, cross wires and focussing eyepiece. Prism of flint glass with faces 1¼ in. × 1¼ in., prism table with rotating motion and clamp, and vernier reading to 1 minute, raising and lowering adjustments having ⅜ in. motion. Fine adjustment by micrometer screw and clamp to rotation of telescope. Adjustable slit with comparison prism and cap	£32 10 0
No. 2701.	**Girder spectrometer,** as No. 2700, but with additions as follows :— Levelling screws to stand, reader to telescope vernier, extra eyepieces, micrometer slit of greater length in place of ordinary slit, with adjustments for reading its length and for setting jaws parallel, larger object glasses of 12 in. focus and 1½ in. diameter, larger prism 1½ in. × 1½ in. faces, replica diffraction grating, case for complete instrument	£47 10 0
No. 2704.	**Autocollimating eyepiece** for No. 2700 and No. 2701	2 2 0
No. 3276a.	**Cobweb eyepiece micrometer**	9 0 0

JUNIOR SPECTROMETER.

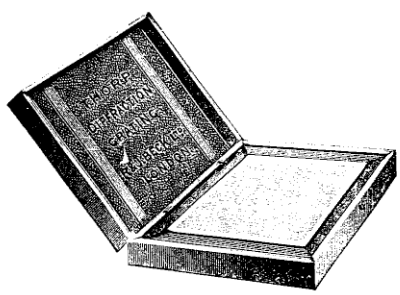


No. 2767.

This is a small and simplified instrument in which the stand consists of a tripod foot and solid pillar on which a 4 in. divided circle is placed. Upon the circle is a prism table with revolving motion and levelling and raising screws. It has a screw clamp for holding the prism upon the table. The collimator has an adjustable slit and both telescope and collimator are provided with object glasses 5 in. focus and $\frac{5}{8}$ in. diameter. Sliding focussing motion is provided to both slit and eyepiece. The eyepiece has cross wires.

No. 2767. Junior spectrometer, as described, prism $\frac{3}{4}$ in. × $\frac{3}{4}$ in. faces, cross wires to eyepiece £9 10 0

DIFFRACTION GRATINGS.



No. 2452A.

These gratings are suitable for work of the highest class for visual, photographic and projection purposes, and give brilliant spectra. They are supplied on flat plates. The number of lines per inch is 14,950.

No. 2452A. Grating, 25 m/m.× 25 m/m., mounted on selected plate glass £1 10 0

No. 2451A. Grating, 25 m/m.× 25 m/m., mounted on worked glass .. 2 0 0



No. 3532.

No. 3532. SPINTHARISCOPE.

This instrument demonstrates radium energy; it consists of a tube about 1½ in. long, with a fluorescent screen at one end, a movable pointer carrying the radium being placed over it, and a powerful lens combination in a sliding tube at the other for examining the scintillations.

No. 3532. Spinthariscope £1 11 6

LENSES AND PRISMS.

60° Prisms, not optically worked.

	Size of face.	
No. 4890	1 in.× 1 in.	£0 2 6
No. 4891	1½ in.× 1 in.	0 3 0
No. 4892	2 in.× 1 in.	0 3 6

60° Prisms, optically worked, in light or dense flint.

	Size of face.	
No. 4893	¾ in.× ¾ in.	£1 0 0
No. 4894	1 in.× 1 in.	1 4 0
No. 4895	1¼ in.× 1¼ in.	1 12 0
No. 4896	1½ in.× 1½ in.	1 16 0

90° Prisms, not optically worked.

	Size of face.	
No. 4897	1 in.× 1 in	£0 2 6
No. 4899	1½ in.× 1½ in.	0 3 3
No. 4900	2 in.× 2 in.	0 5 0

90° Prisms, optically worked.

	Size of face.	
No. 4307	1 in.× 1 in.	£1 0 0
No. 4309	1¼ in.× 1¼ in.	1 13 0
No. 4310	1½ in.× 1½ in.	2 0 0
No. 4311	1¾ in.× 1¾ in.	2 10 0
No. 4312	2 in.× 2 in.	3 10 0

Biconcave and biconvex lenses, for demonstration work, 2 in. diameter.

		Biconcave.					Biconvex.
No. 4901.	6 in. focus	£0	1	9	**No. 4907.** 6 in. focus	£0	1 4
No. 4902.	8 in. focus	0	1	8	**No. 4908.** 8 in. focus	0	1 2
No. 4903.	10 in. focus	0	1	8	**No. 4909.** 10 in. focus	0	1 2
No. 4904.	12 in. focus	0	1	8	**No. 4910.** 12 in. focus	0	1 2
No. 4905.	20 in. focus	0	1	6	**No. 4911.** 20 in. focus	0	1 1
No. 4906.	40 in. focus	0	1	6	**No. 4912.** 40 in focus	0	1 1

Prisms. Nicol's polarising, diamond section, with oblique ends, unmounted. 22° angle of polarisation.



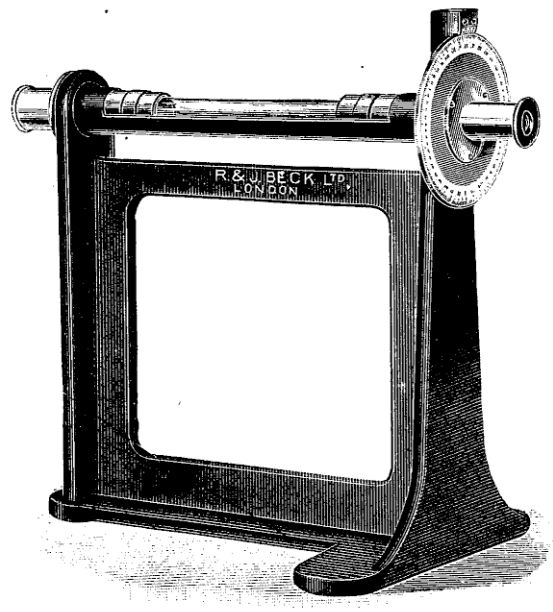
	Size of side A B. m/m.	
No. 4860	7	£1 0 0
No. 4861	8	1 2 6
No. 4862	9	1 5 0
No. 4863	10	1 7 6
No. 4864	12·5	2 0 0
No. 4865	13	2 5 0
No. 4866	14	2 10 0
No. 4867	15	3 0 0
No. 4868	17·5	4 10 0

Quartz double plate. Made of R. & L. quartz.

	Size thick. in.	Size square. in.	
No. 4475	·15	·40	£1 2 6

We issue a complete list of Optical Units, which contains particulars of lenses, prisms, mirrors, etc., of all types, in glass, Iceland spar, quartz and fluorite. Copy will be forwarded, post free, on application.

POLARIMETERS.

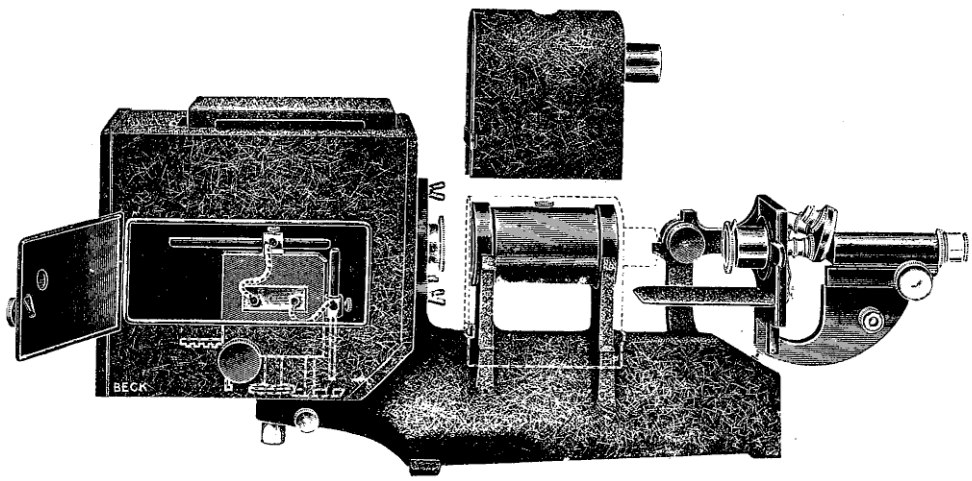


This instrument is made in three types:—The type employing a biquartz plate, the Laurent half shadow type and the Lippich type. In all models the optical portions and the cradle for the observation tube are carried on an exceptionally rigid framework made from a solid casting. The Nicol polarising prism is fitted at one end and the analysing prism is carried in a revolving fitting with a 4 in. circle, divided into degrees and with a vernier reading to 6 minutes. The whole instrument is extremely rigid, and although of simple design, is thoroughly well made throughout and efficient in use. No. 3590 employs a biquartz, and the readings are made by the comparison of the tint in the two halves of the field. No. 3593 is constructed with a Laurent quartz plate by means of which the field is divided into two halves of different intensity, which by the rotation of the analyser can be matched. The No. 3594 is on the Lippich principle, in which two extra Nicol prisms of half the size of the polarising prism are employed. The field is divided into three, the intensity of the centre portion varying in relation to the two outside portions, in which the intensity is equal. This gives a very sensitive method of obtaining an accurate matching of the fields.

An observation tube of 200 m/m. is supplied with each instrument. Tubes of other lengths can be supplied. A reader for the vernier can also be fitted if required.

No. 3590.	**Polarimeter,** biquartz type with 200 m/m. tube	£13 13 0
No. 3593.	**Polarimeter,** Laurent half-shadow type with 200 m/m. tube	14 14 0
No. 3594.	**Polarimeter,** Lippich type with 200 m/m. tube	24 0 0
No. 3595.	**Reader to vernier**	0 15 0
No. 3591.	**Spare tubes,** with screw-on brass caps	1 2 6
No. 3592.	**Glass tubes** only	0 5 0

THE UNIVERSITY MICRO-PROJECTOR.

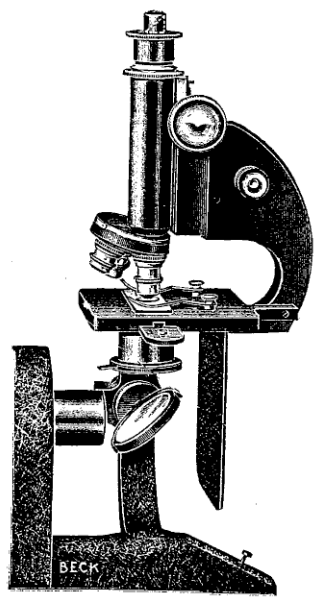


No. 4954.

For micro-projection on a sufficiently large scale for class purposes, including work with high powers, a very rigid construction is essential and a powerful source of light must be employed to enable a critically defined and brilliant picture to be shown. If an apparatus is employed consisting of a separate microscope and illuminating apparatus, it is practically impossible to keep the various parts in continuous adjustment, and to be convenient and satisfactory in use such an apparatus should be made in a complete unit to ensure its stability.

The general design of this projector can be seen from the illustration—and it will be seen that the whole of the parts are carried on a heavy casting which gives it the necessary solidity. The illuminant is an arc lamp which is enclosed in a well ventilated lamp-house with a large door on one side to allow of access to the arc lamp. The light is concentrated by means of a condenser fitted to the front of the lamp-house and is then passed through a cooling trough to the substage condenser on the microscope. This condenser consists of an optical system for use with low powers, and above it, fitting in a slide in the stage, is a second optical system which, when slid into position above the low power condenser, renders it suitable for high powers. An iris diaphragm and a focussing adjustment are provided to the condenser. From this condenser the light is passed through the specimen and through the microscope object glass and eyepiece and projected on to the screen.

The microscope itself has all necessary adjustments including coarse and fine focussing adjustments. Standard object glasses and eyepieces are used. The object glasses can be fitted into a double, triple or quadruple revolving nosepiece. The microscope is hinged so that it can be used either horizontal or vertical. For ordinary objects it is used in its horizontal position, but where objects in fluids are being examined, it is placed in its vertical position. A mirror is then fitted below the stage which reflects the light through the microscope and a prism is fitted over the eyepiece to project the picture forward upon the screen. Adjustment is given to the arc lamp for its accurate centring. The arc lamp is rated at 5-10 amps. and in No. 4954 is hand fed, independent adjustments being provided



to each carbon. This considerably simplifies the working of the lamp, as due to the variation of the rate of burning of individual carbons, it is often required to make adjustments to one carbon only. In No. 4956 the lamp is of the same pattern with the addition of a clockwork feed which moves the carbons at approximately the rate at which they burn. In No. 4957 the arc lamp is of the same rating and is magnetically controlled.

Special attention has been given to the question of the fading of stains, and to overcome this one window of the cooling trough consists of a special glass which cuts out the rays of light which are responsible for this fading.

A model of No. 4957 is made for alternating current, particulars on application.

No. 4954.	**University microprojector** with hand feed arc lamp and duplex substage condenser	£38	17	6
No. 4956.	**Clockwork feed for lamp** on No. 4954	3	5	0
No. 4957.	**As No. 4954,** but with magnetically controlled automatic arc lamp 5-10 amps. for direct current	52	0	0
No. 4955.	**Mirror and prism** for using microscope vertically ..	2	2	0
No. 3637.	**Adjustable resistance** for Nos. 4954 and 4956 for voltages 100-250 D.C. or A.C.	2	10	0
No. 3329 A.	**Resistance** for No. 4957, 5 amps. for D.C. 200-240 volts	2	17	9
No. 3329B.	**Resistance** for No. 4957, 5 amps. for D.C. 100-120 volts	1	10	9
No. 3329 C.	**Resistance** for No. 4957, 10 amps. for D.C. 200-240 volts	2	12	6
No. 3329 D.	**Resistance** for No. 4957, 10 amps. for D.C. 100-120 volts	1	10	0

CARBONS.

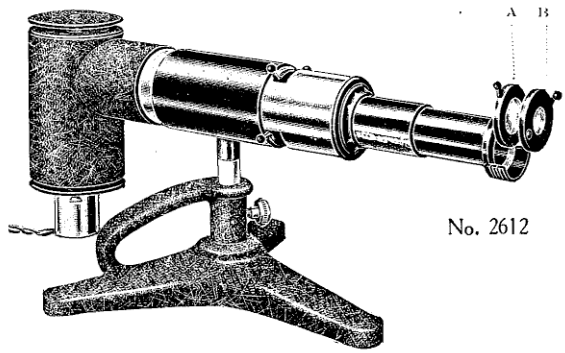
No. 2171. Carbons for Nos. 4954, 4956 and 4957, 6 in. long :—

	Per doz.		Per doz.	
5 m/m. solid ..	£0 2 0	5 m/m. cored ..	£0	2 3
6 m/m. solid ..	0 2 3	6 m/m. cored ..	0	2 6
7 m/m. solid ..	0 2 6	7 m/m. cored ..	0	2 9
8 m/m. solid ..	0 3 3	8 m/m. cored ..	0	3 6
10 m/m. solid ..	0 4 6	10 m/m. cored ..	0	5 0

No. 2174.	Carbons, best quality 5 m/m. solid for No. 4957 (5 amps.)	0	3	6
No. 2175.	Carbons, best quality 5 m/m. cored for No. 4957 (5 amps.)	0	1	10
No. 2176.	Carbons, best quality 9 m/m. solid for No. 4957 (10 amps.)	0	8	3
No. 2177.	Carbons, best quality 9 m/m. cored for No.4957 (10 amps.)	0	6	0

SCHOOL MICRO PROJECTOR

The orthodox microscope stand is not with ease satisfactorily adapted for projection work, especially when working with low or medium magnifications, and to meet this requirement we have designed an apparatus on entirely new lines.



No. 2612

The general design of the instrument can be seen from the illustration. The base is heavy and rigid with handle for lifting, on to which is fitted the main tube of the projector with adjustment for raising, lowering and rotating. The projector consists of a projection lens and two supplementary lenses of different powers. Thus four magnifications are provided, the lowest with the projection lens only, the second and third with the supplementary lenses A and B, and the fourth by using the two supplementary lenses together. The following table gives the magnifications and circle of illumination working at a distance of 10 feet from the screen :—

	Magnification	Circle of illumination
Projection lens only	100	2′ 6″
Projection lens and supplementary lens A	150	3′ 6″
Projection lens and supplementary lens B	200	3′ 9″
Projection lens and supplementary lenses A and B	275	4′ 6″

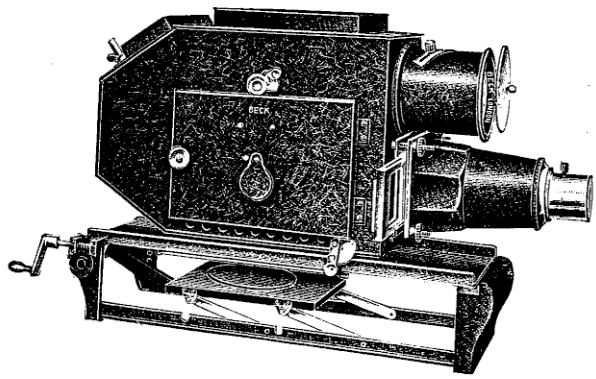
The specimen is held in a spring stage. Two illuminants are supplied, No. 2612 being fitted with a 48 watt, 12 volt projection lamp, and No. 2612A with a 200 watt, 50 volt lamp which gives greatly increased brilliancy. The lamp is contained in a well ventilated housing and has adjustments for its centration. A smooth and accurate focussing motion is fitted.

For the projection of specimens in the teaching of entomology, parasitology, botany, it is most satisfactory, and it is also useful for showing the general structure in zoology.

No. 2612 Micro projector with 48 watt lamp... ... ... £11 11 0
No. 2614 Projector lamp 48 watt for replacement ... ... 4 6¶
No. 2612A Micro projector with 200 watt lamp 13 16 6
No. 2614A Projector lamp 200 watt for replacement ... ... 1 1 0¶

Transformers and resistances quoted, on particulars of electric supply being furnished.

BECK EPIDIASCOPE.



No. 4935.

For lecturing and teaching the use of an epidiascope has become increasingly popular. An epidiascope projects an image of a print, photograph or map, saving the trouble of making lantern slides, as was necessary when only an optical lantern was available. Also it gives a projected picture of an opaque object magnified on to the screen, so that characteristics of such an object can be pointed out to a class or audience with ease. As the epidiascope also projects lantern slides, it may be considered a universal projection apparatus for the ready illustration of lectures and lessons.

The Beck epidiascope has been designed to produce an instrument to combine the essentials in opaque projection, viz., critical definition and brilliancy of image, with simplicity of operation. In order to obtain the finest results in projection a lens of the highest quality is necessary. Our long experience of producing optical systems has enabled us to produce for the opaque projection, a lens of very large aperture rendering on the screen a perfect image with brilliant definition from corner to corner.

The construction of the apparatus is particularly rigid and sound in all details and we would draw attention to the following particular features :—

The method of operating the table holding the objects, which is raised and lowered by a worm spindle on parallel link motion which is always at right angles to the axis at any portion of its travel, This motion can also be used as an additional means of focussing the objects.

The revolving table which fits into the main object table is an extremely useful fitment, as the ability to orientate the object being examined, is at times most convenient.

The mirror is now silvered by an entirely new process and the silvering does not tarnish as in the case of the old process. This is a great advantage as the intensity of the illumination remains constant, the loss of light due to tarnishing being overcome.

Special attention has been paid to ventilation so as to prevent the overheating of objects being examined.

The change over from opaque to transparent projection is easily manipulated, the movement of a lever and the closing of the shutter of the episcope lens effecting the change.

The main body of the instrument is arranged on runners giving a travel of 9 inches which enables a large object to be traversed.

Either one or two lamps can be employed. For the very best results we advise the use of two 500 watt lamps, though where only a small screen, 4 feet to 5 feet, is used, the one lamp will be found sufficient. Both lamps have controls so that when showing a small screen or projecting transparent slides, one lamp can be switched off.

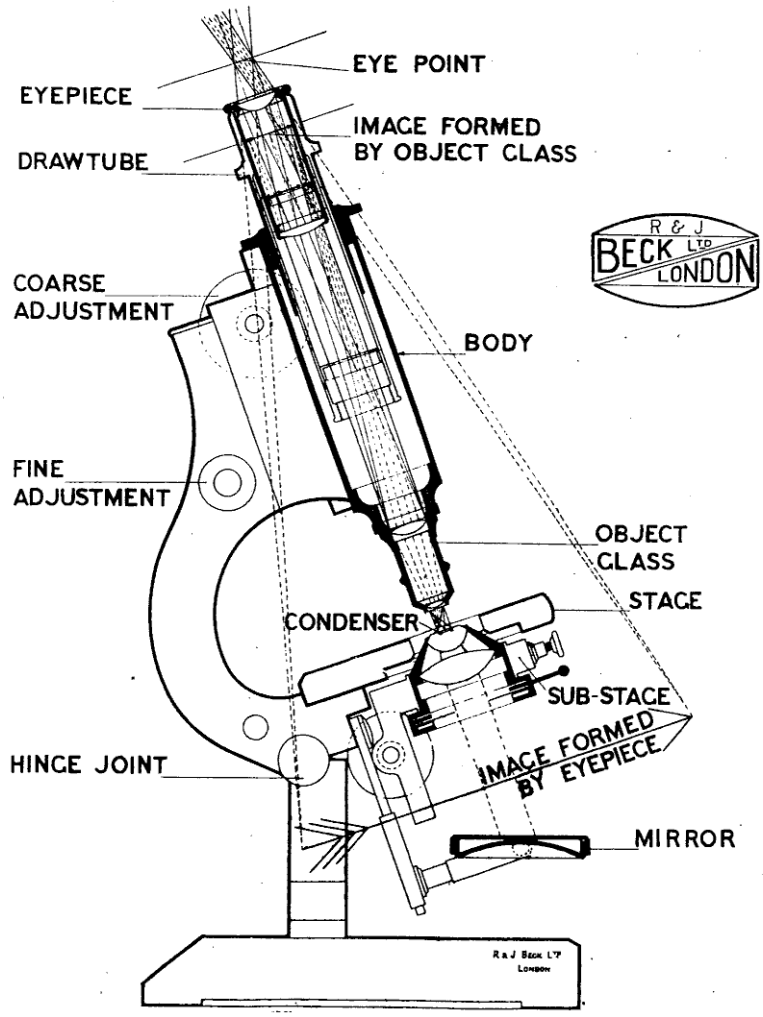
The instrument can be run from the main electric supply.

For those who require to project only opaque objects we can supply the instrument omitting the diascopic attachment.

An attachment for projecting microscopic slides is supplied. It fits in the same position as is occupied by the diascopic lens. A range of four powers is obtainable from 100 to 275 working at a distance of 10 feet. The optical principle of this attachment is the same as the micro projector described on page 45.

No. 4935.	**Epidiascope**—complete without lamp	£36 0 0
No. 4936.	**Episcope** only, without lamp	31 0 0
No. 4940.	**Auxiliary lamphouse**	2 5 0
No. 4941.	**500 watt lamp**	1 5 0
No. 4948.	**Micro projection attachment**	7 10 0
No. 4945.	**Metal carrying case**	1 1 0
No. 4946.	**Rigid stand** in oak with tilting table	1 15 0

Electric supply available should be specified when ordering.



Magnification and Field of View

at 160 m.m. tube length

Object Glass		Eyepiece X 6		Eyepiece X 10		Eyepiece X 15	
inches	m.m.	Magnification	Field of View (inches)	Magnification	Field of view (inches)	Magnification	Field of view (inches)
1½	32	25	175	45	·125	65	·10
⅝	16	62	·066	110	·047	155	·04
⅓	8	115	·038	200	·028	285	·025.
¼	4	285	·015	490	·010	690	·009
⅛ in.	3	380	·012	650	·009	950	·008
1/12 in.	2	530	·007	900	·005	1275	·0045

Facsimile of Wall Chart 20 in. × 30 in.

INDEX.

Abbe Camera Lucida 29
Achromatic Magnifiers, Dissecting 22
„ „ Folding Pocket .. 24
„ Object Glasses, Microscope .. 26
Angular Eyepiece Attachment 27
Apparatus, Polarising 28
Attachment, High Power Binocular .. 20
Bi-convex and Bi-concave Lenses 41
Binomax Microscope 21
Bi-quartz Polarimeter 42
Blow-pipes 36
Bone Cutting Forceps 36
Boxes, Slide 34
Bull's Eye Condenser 29
Cabinets, Slide 34
Camera Lucidas 29
„ Photomicrographic 32, 33
Case of Dissecting Instruments 36
Cells for Mounting 35
Chain Hooks 36
Condenser, Bull's Eye 29
Convex and Concave Lenses 41
Cornex Dissecting Microscope 22
Cover Glasses, Microscope 35
Crescent Dissecting Microscope 21
Demonstration Eyepiece 27
Diffraction Gratings 40
„ Spectroscopes 37
Dissecting Arms 22
„ Instruments 36
„ Magnifiers 22
„ Microscopes 21, 22
Double Nosepiece 28
Entomological Magnifier 25
Epidiascope 46
Eyeglass, Watchmaker's 25
Eyepiece Micrometers 26
Eyepieces, Microscope 26
Eyeshade 29
Focostat Magnifier 25
Folding Magnifiers 24
Forceps 36
„ Stage 29
Glass Plates, Squared and Crossline .. 26
„ Slides, Covers and Cells 35
Glasses, Reading 25
Gratings, Diffraction 40
High Power Binocular Attachment .. 20
Hone, Metallic 36
Illuminating Magnifiers, Luminex .. 23
Intensity Lamp 30
Labels 35
Lamps, Microscope 30, 31
Lenses 41
Live Box 29
Magnifiers, Dissecting 22
„ Entomological 25
„ Focostat 25
„ Folding Pocket 24
„ Illuminating Luminex 23
Mechanical Stage 28
Metallurgical Microscope 18, 19
Micro-Projectors 43, 44, 45
Micrometer Gauge 35
Micrometers, Stage and Eyepiece 26
Microscope Lamps 30, 31
„ Binomax Dissecting 21
„ Cornex „ 22
„ Crescent „ 21
„ Dissecting 21, 22
„ Eyepieces 26
„ London No. 10 4
„ „ No. 22 .. ..5, 6, 7
„ „ No. 29 8, 9, 10, 11, 12, 13, 14, 15
„ No. 22 Metallurgical 18, 19
„ No. 22 Petrological 16, 17
„ Object Glasses 26
„ Simplex 2, 3
Microtomes 35
Needles 36
Nicol's Prisms 41
Nosepieces, Double, Triple and Quadruple 28
No. 10 London Microscope 4
No. 22 „ „ 5, 6, 7
No. 29 „ „ 8, 9, 10, 11, 12, 13, 14, 15
No. 22 Metallurgical Microscope 18, 19
No. 22 Petrological Microscope 16, 17
Object Glasses, Microscope 26
Petrological Microscope 16, 17
Photomicrographic Cameras 32, 33
Pipettes 36
Platinum Needles 36
Pocket Magnifiers 24, 25
Polarimeters 42
Polarising Apparatus 28
Prism Spectroscopes 37, 38
Prisms 41
Quadruple Nosepiece 28
Quartz Double Plate 41
Razor 36
Reading Glasses 25
Reflex Lamp 31
Scalpels 36
School Microprojector 45
Scissors 36
Seekers 36
Simplex Microscope 2, 3
„ Lamp 31
Slide Cabinets, Boxes and Trays 34
Slides, Microscope 35
Spectroscopes and Spectrometers ..37, 38, 39, 40
Spinthariscope 40
Stage Forceps 29
„ Mechanical 28
„ Micrometers 26
Stands for Spectroscopes 37, 38
Test Tube Holder for Spectroscopes .. 37
Trays, slide 34
Triple Nosepiece 28
Ultra Violet Spectroscope 38
University Microprojector 43, 44
Watchmaker's Eyeglass 25
Wavelength Spectroscope 38