

Telephone { LONDON, 6979 CENTRAL.  
EDINBURGH, 252 Y5.

Telegraphic Addresses { "OPTICS," LONDON.  
"CAMERA," EDINBURGH.

SEPTEMBER, 1905.

AWARDED 42 GOLD & OTHER MEDALS AT INTERNATIONAL EXHIBITIONS.



NINE TIMES PLACED HIGHER  
THAN ANY OTHER COMPETITOR.

DESCRIPTION OF

# W. WATSON & SONS

## New Model Microscopes.

### THE "PRAXIS."

An instrument of unique construction, designed especially for Students' use.

### THE "BACTIL."

An instrument of unique construction, designed especially for high-power and bacteriological work.

THE MOST STRONGLY-FRAMED MICROSCOPES YET PRODUCED.

These Instruments are provided with

## Watson's Standard Coarse and Fine Adjustments,

And in every respect the working parts are of the same high quality as in their most costly Microscopes.

MANUFACTURED BY

# W. WATSON & SONS,

Opticians to His Majesty's Government.

313, HIGH HOLBORN, LONDON, W.C.

Branches { 16, FORREST ROAD, EDINBURGH.  
2, EASY ROW, BIRMINGHAM.

Depôts { GLASGOW—W. W. SCOTT & CO., 180, SAUCHIEHALL STREET.  
MELBOURNE, AUSTRALIA—78, SWANSTON STREET.

SOUTH WALES REPRESENTATIVE: T. LLEWELLYN HUGHES, 3, Arcade Chambers, St. John's Square, Cardiff.

W. WATSON & SONS' NEW MICROSCOPES,

## The "Praxis" and the "Bactil"

(Registered),

Embodying a new and highly advantageous method of construction, resulting in increased strength in the weakest parts, less deterioration with constant and rough usage, together with highest efficiency in working parts—the movements, both coarse and fine, being of our regular standard patterns, as supplied with our best microscopes.

---

One of the great factors that has given to our well-known Van Heurck Instrument the premier position amongst high-class microscopes, is the method introduced by us of dovetailing the parts together instead of merely screwing them in the usual manner. The result has been that it has not only proved to be stronger, but there is a freedom from the peculiar spring which is usually so obvious and objectionable when working with high power objectives.

In these new microscopes we have, however, been able to carry the system to a greater degree of perfection, for by the use of **specially constructed moulds** we have produced **solid castings** which replace the separate pieces screwed together. **The foot and upright pillar are cast in one solid piece,** and the **stage and limb are cast in one solid piece.**

A strong knuckle joint, upon which the instrument is inclinable to the horizontal, connects these two, and forms the **most strongly framed microscope yet produced.**

The screws which ordinarily fix the pillar to the foot, and the stage to the limb, and which are so liable to loosen, are therefore no longer required, but are replaced by the added strength of solid metal.

These microscopes will be found ideal for all purposes involving constant and rough usage, and particularly for the laboratory, for students, medical men and those who travel.

It should be particularly remembered that the coarse and fine adjustments are of the best possible description, being of the standard patterns employed by us in our most costly microscopes, while the design of the stands generally has been carefully studied to give the fullest working convenience.

We can, with the fullest confidence, recommend these new microscopes to all who require a thoroughly efficient instrument that will bear rough treatment and still retain its working qualities, so as to satisfy the requirements of high power work. The perfection of the movements and the accuracy of the building are such that these microscopes in every way fulfil the conditions necessary for bacteriology, photo-micrography, and work with high-power objectives generally.

Although the price is low for such an instrument, it is in consequence of the special arrangements we have made for its construction in quantities, and not as the result of the lowering of the quality of any of the working parts.

## SPECIFICATION.

**The Coarse Adjustment** is of our well-known spiral rack and pinion form, for the exquisitely smooth working of which our instruments are world famed.

**The Fine Adjustment** is of our Standard lever pattern, exactly the same as is fitted to all our most expensive microscopes. Each complete turn of the milled head imparts a movement to the body of  $\frac{1}{100}$ th of an inch.

**The Body Tube** when closed is 145 mm. ( $5\frac{1}{4}$  in.) long; and when the draw tube is extended, 225 mm. long. With a revolving nosepiece in position, the total length would be approximately the full English length. It carries eyepieces of the ordinary continental size.

**The Stage** is  $3\frac{1}{2}$  in. square, is covered with ebonite, and fitted with our "grip" object spring clip. The distance from the middle of the stage to the front of the limb is  $2\frac{1}{4}$  in., giving ample room for Petri's dishes, etc.

**The Fitting for Understage Apparatus**, as usually supplied, is attached to a strong and shapely plate, which is mounted, so that it and the apparatus contained in it may be turned aside from the optical axis when desired.

**A choice of various Condenser Carriers and Fittings** can be made from those described and illustrated on page 10.

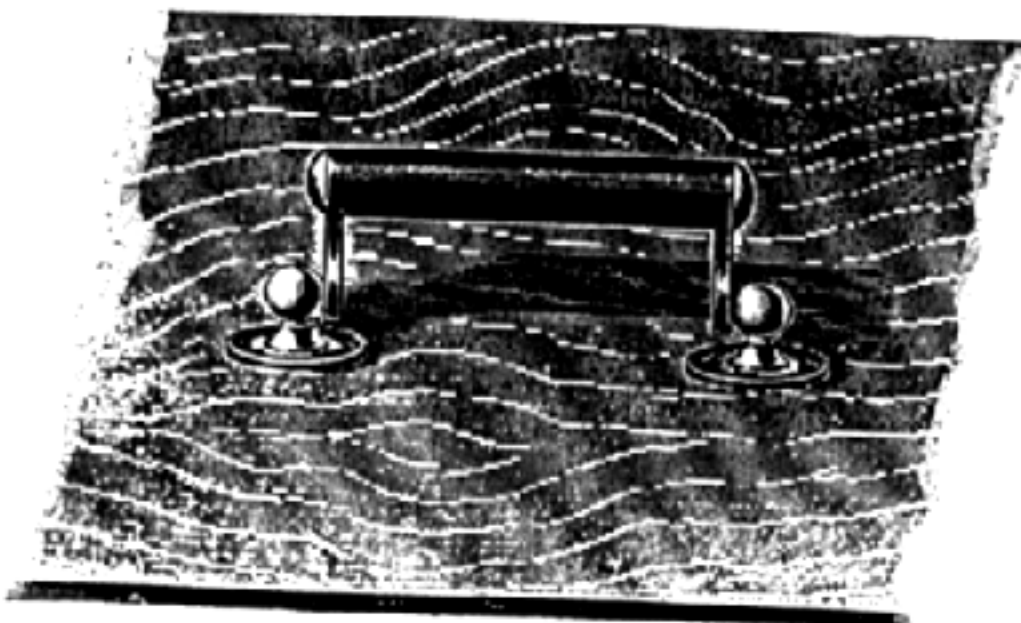
**An Inclining Joint** is included.

**The Mirrors** are plane and concave. They are mounted on a swinging arm, with sliding adjustment.

**All the working parts** are provided with spring fittings and screws, by means of which the user can re-adjust for wear and tear.

**The Lenses and Eyepieces** supplied with this instrument are of our regular Parachromatic series, and of the highest class.

**The Case** is a mahogany one, strongly made, fitted with lever lock and new pattern solid metal handle, as illustrated, of large and most comfortable size.

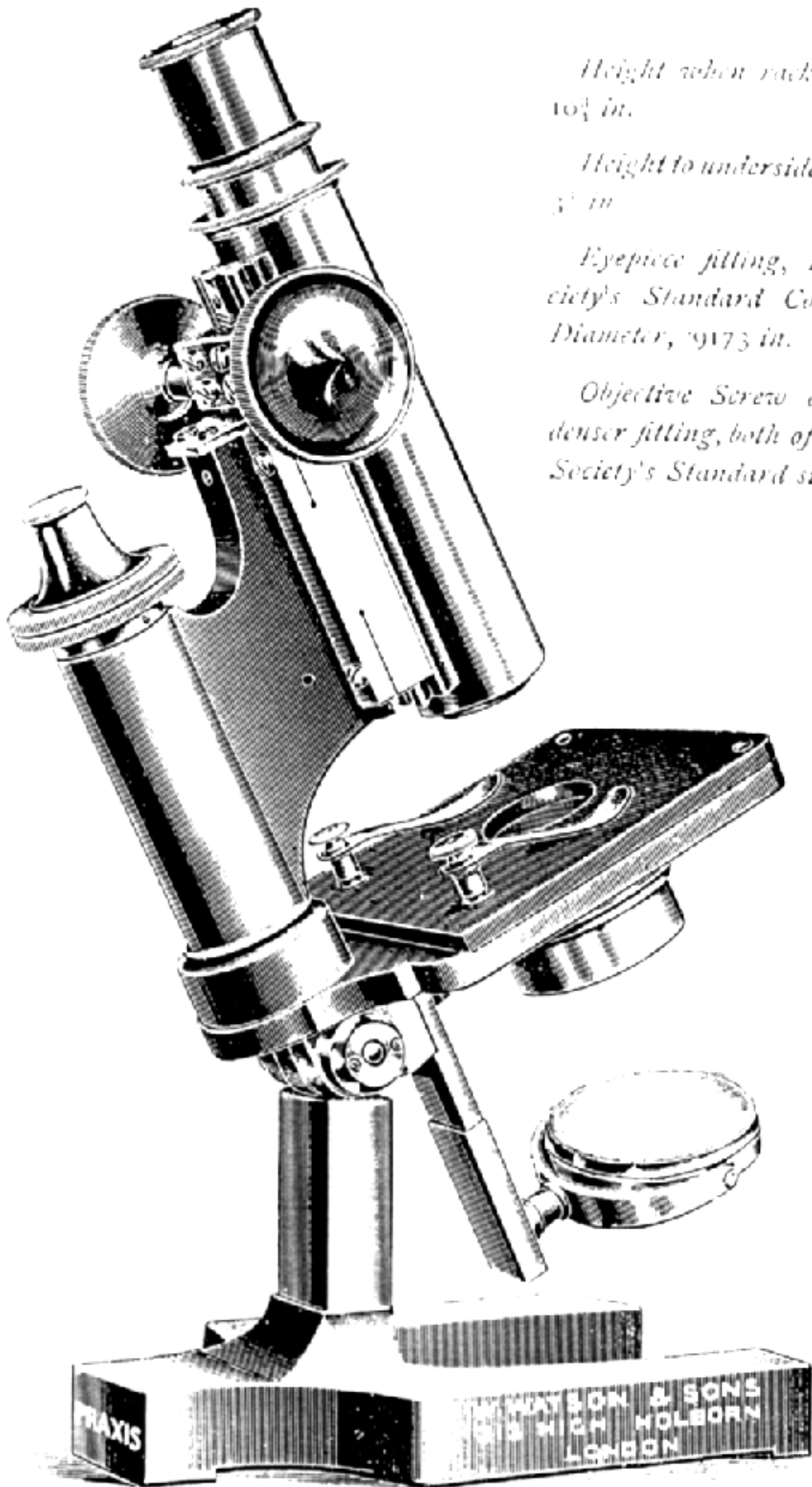


**New Pattern, Solid Metal Handle.**

This new handle will for the future be fitted to all our Microscope Cases. The space for the hand is 4 inches clear, and the diameter round gripping portion is just over  $\frac{3}{4}$  in. It can be supplied separately at a cost of 2s.

WATSON & SONS'

# "PRAXIS" MICROSCOPE.



*Height when racked down,  
10 $\frac{1}{4}$  in.*

*Height to underside of Stage,  
5 $\frac{1}{2}$  in.*

*Eyepiece fitting, R.M. So-  
ciety's Standard Continental  
Diameter, 9 $\frac{1}{16}$  in.*

*Objective Screw and Con-  
denser fitting, both of the R.M.  
Society's Standard sizes.*

The most strongly framed microscope yet produced.  
The working movements are of Watson's standard patterns, as fitted to  
their most costly instruments.  
The fine adjustment is Watson's celebrated Lever pattern, and not of the  
unsatisfactory direct-acting type.

## PRICE LIST

OF

W. WATSON &amp; SONS'

## "PRAXIS" MICROSCOPE.

As described pages 2 and 3, and figured page 4.

The "Praxis" Microscope is supplied in the following Sets at the inclusive price quoted against each Set. A Mahogany Case, with lever lock and key and improved metal handle, is included.

Set. No.	Objectives.	Eyepieces.	Nosepiece.	Condenser.	Price.
P 1	Two—Choice of 1 in. or $\frac{1}{2}$ in. (Argus series), and $\frac{1}{4}$ in. (Parachromatic series)	One—No. 1, 2, 3 or 4	.....	.....	5 15 0
P 2	Two—(Parachromatic series) Choice of 1 in., $\frac{1}{2}$ in., or $\frac{1}{4}$ in. and $\frac{1}{4}$ in.	One—No. 1, 2, 3 or 4	.....	.....	6 10 0
P 3	Do.	Two—Nos. 2 & 3 or 4	Double	.....	7 2 6
P 4	Do.	Two—Nos. 2 & 3 or 4	.....	Scop, as per page 10.	7 12 6
P 5	Do.	Two—Nos. 2 & 3 or 4	Double	Scop, with spiral focussing screw	8 12 6
P 6	Do.	Three—Nos. 1, 2 & 3 or 4	Double	Cone Iris Condenser, as per page 11.	10 7 6
P 7	Do.	Do.	Triple	Compound sub-stage, with condenser No. 523, as per pages 10 and 12.	10 15 0
FOR BACTERIOLOGY.					
P 8	Three—Choice of 1 in., $\frac{1}{2}$ in., or $\frac{1}{4}$ in., also $\frac{1}{4}$ in. or $\frac{1}{4}$ in., with $\frac{1}{8}$ in. 1.10 oil immersion	Two—Nos. 2 & 3 or 4	Triple	Scop, with spiral focussing screw	13 0 0
P 9	Do. but with $\frac{1}{8}$ in. 1.30 oil immersion	Do.	Do.	Do.	14 0 0
P 10	Three—Choice of 1 in., $\frac{1}{2}$ in., and $\frac{1}{4}$ in., also $\frac{1}{4}$ in. or $\frac{1}{4}$ in., with $\frac{1}{8}$ in. 1.30 N.A. oil immersion	Two—Nos 2 & 3 or 4	Triple	Cone Iris Condenser, as per page 11.	15 10 0
P 11	Do.	Three—Nos. 1, 2 & 3 or 4	Triple	Compound sub-stage, with condenser No. 523, as per pages 10 and 12.	15 15 0

## W. WATSON & SONS'

# “BACTIL” MICROSCOPE.

---

This microscope is as described on pages 2 and 3, that is, the foot and pillar are cast in one solid piece, and the stage bracket and limb—which latter carries the body of the microscope—are also cast in one piece.

The important feature in this microscope is the incorporation of a new form of **mechanical stage**, which has a very free and long range of travel—viz., horizontally 2 inches and vertically  $1\frac{1}{2}$  inches.

We have frequently emphasised the desirability of having the mechanical stage built permanently and as an integral part of the instrument. In no other way can the accuracy of movement that is desirable be provided. The attachable mechanical stage, on the other hand, has many claims to favour on account of the long range of movement which it can afford.

This stage is, to all intents and purposes, built as a permanent part of the instrument, but so that the whole surface of the stage— $3\frac{1}{2}$  in. square—shall be available when desired, the horizontal movement, which is entirely contained in the fittings which stand above the level of the stage at the back, can be removed by unscrewing two thumb-screws. It will be noted that when

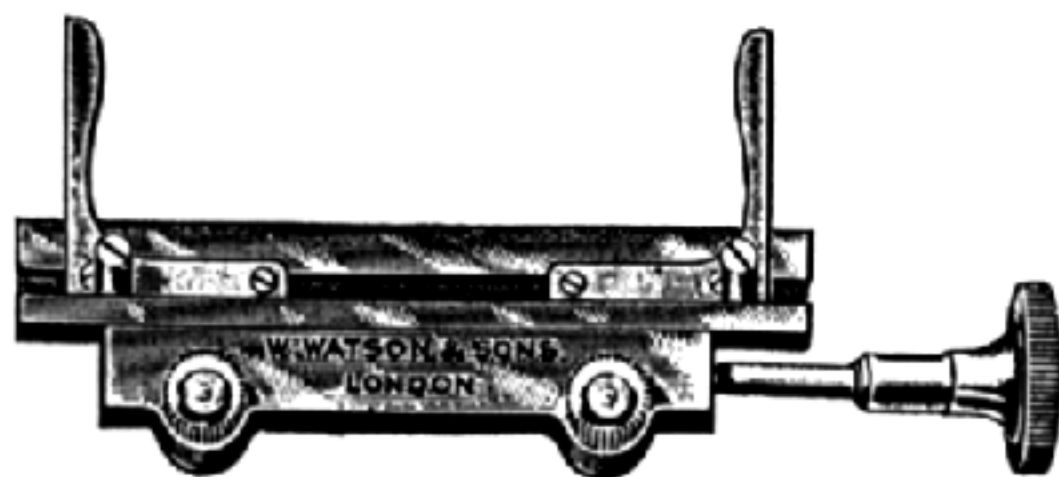


Fig. 4.

Fittings for Horizontal Movement of Mechanical Stage.

this is taken away, the vertical movement is still in position. Fig. 5 shows the surface of the stage without the mechanism for the horizontal movement. This latter is shown in Fig. 4. The complete stage is shown with the microscope on page 8.

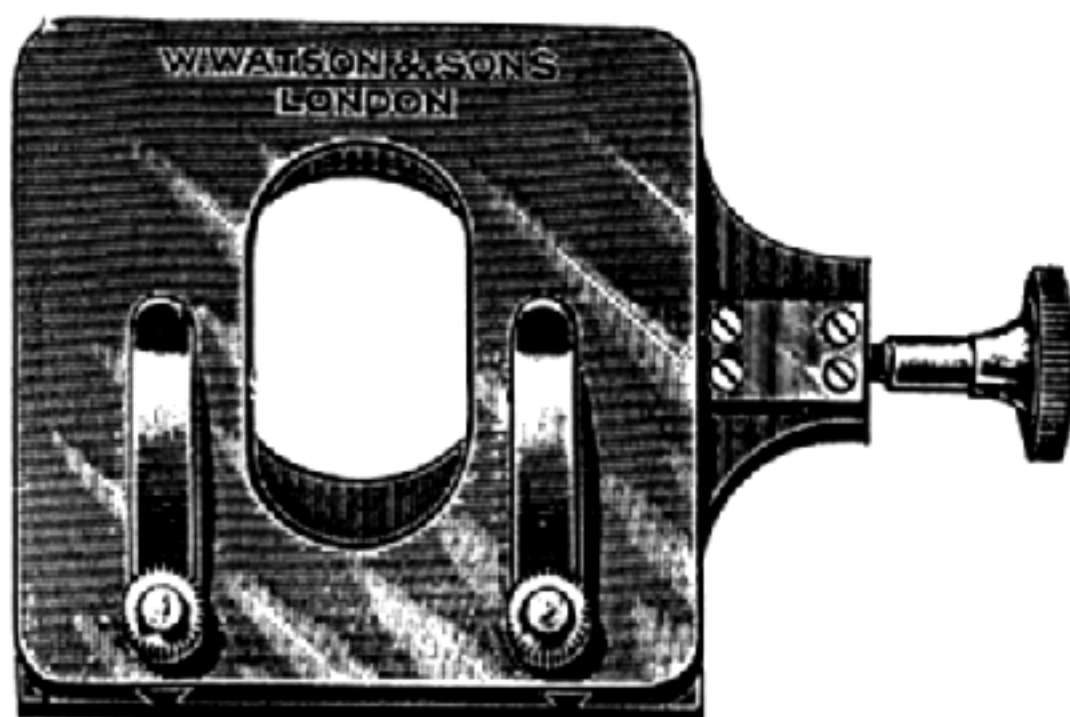


Fig. 8.

**Surface View of Stage of "Bautil" Microscope,**

With fittings for the Horizontal Movement of Mechanical Stage removed. Note the clear surface.

No stage previously constructed has so efficiently combined the perfect rigidity of the permanent mechanical stage, with the long range of movement of the attachable form. It is an advantage which is sure to be greatly appreciated, and only requires to be worked experimentally for its qualities to be at once made apparent.

The **Condenser Carrier** usually supplied with this microscope is the Compound Substage, Fig. 7, as described on page 10, with rack-work to focus and screws to centre. It can be turned aside out of the optic axis when desired. Either of the other forms of substage can be provided instead, if preferred.

Those workers in laboratories who prefer a microscope of the continental type will find in this instrument points superior to any of that class, and we offer it with the full confidence of its giving the highest satisfaction. It is in every way suited for high power work and bacteriology; all the movements being of the best description, while the rigidity of the whole stand is unequalled.

W. WATSON & SONS'  
"BACTIL" MICROSCOPE.

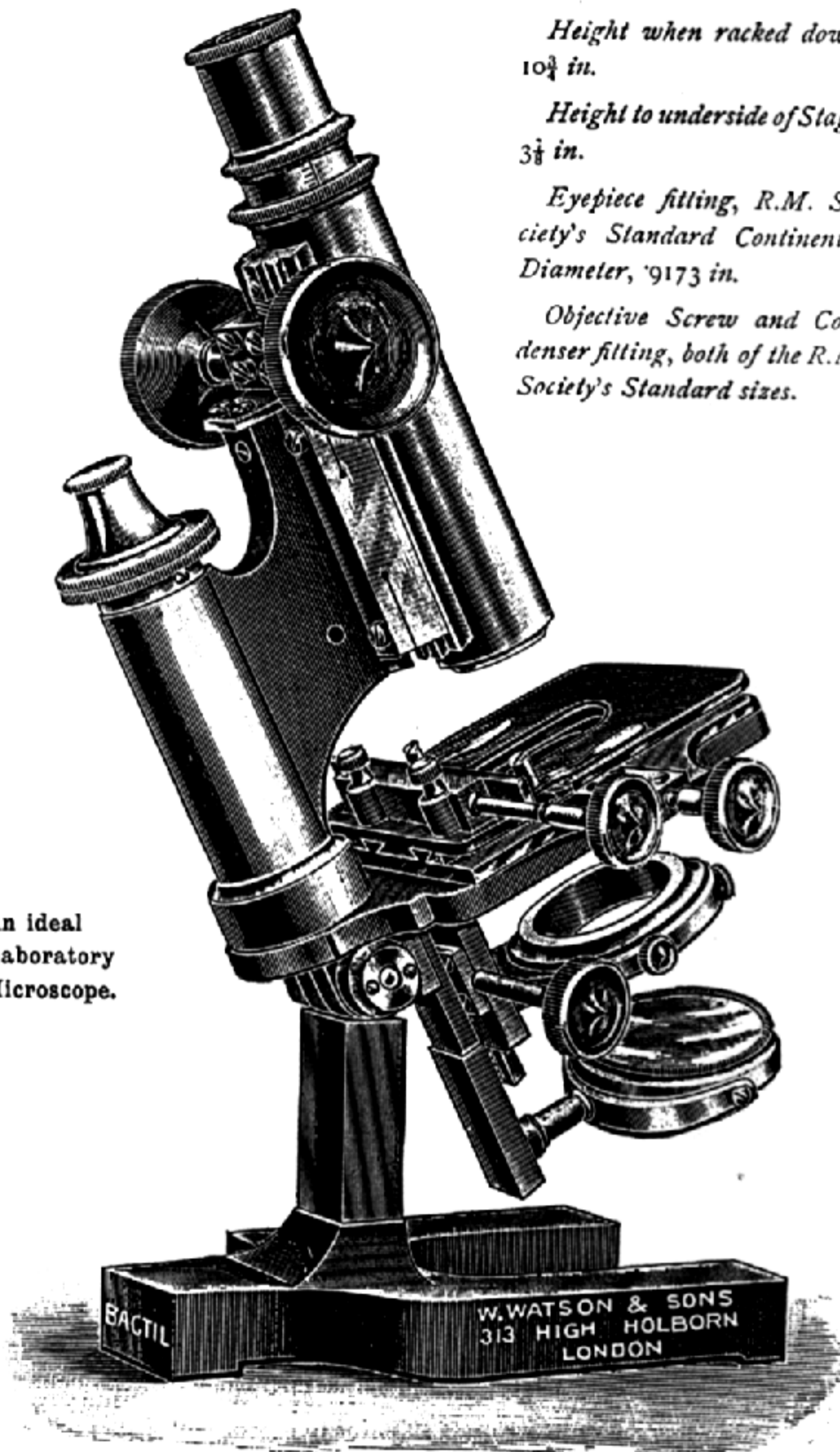
*Height when racked down,  
10 $\frac{1}{4}$  in.*

*Height to underside of Stage,  
3 $\frac{1}{8}$  in.*

*Eyepiece fitting, R.M. So-  
ciety's Standard Continental  
Diameter, '9173 in.*

*Objective Screw and Con-  
denser fitting, both of the R.M.  
Society's Standard sizes.*

An ideal  
Laboratory  
Microscope.



The Mechanical Stage and all the working parts are carried to the highest degree of perfection.

**NOTE PARTICULARLY—**

That the range of movement of the Stage screws is 2 inches horizontally and 1 $\frac{1}{2}$  inches vertically.

That the fittings which carry the horizontal movement can be removed by turning two screws, and that the Stage has then a large free surface and a vertical mechanical movement only.

**PRICE LIST**  
OF  
**W. WATSON & SONS'**  
**"BACTIL" MICROSCOPE.**

"BACTIL" MICROSCOPE, as described pages 6 and 7, and figured page 8, with mechanical movements to Stage, Compound Substage with rackwork to focus and screws to centre, as figured page 10, without Eyepieces or Objectives ... £10 0 0

Mahogany Case ... .. 17s. 6d.

The "Bactil" Microscope is supplied in the following sets at the inclusive price quoted against each item. A mahogany case, with lever lock and key and improved metal handle, as figured on page 3, is included

Set No.	Objectives.	Eyepieces.	Nosepiece.	Condenser.	Price.
B 19	Two—(Parachromatic series) Choice of 1 in., $\frac{3}{4}$ in., or $\frac{1}{2}$ in., and $\frac{1}{4}$ in. or $\frac{1}{8}$ in.	One—Nos. 1, 2, 3 or 4.		Compound Substage without Condenser.	£ s. d. 13 0 0
B 20	Do.	Two—Nos. 2 and 3 or 4.	Double.	Do.	13 12 6
B 21	Do.	Two—Nos. 1, 2 and 3 or 4.	Double.	Compound Substage and Abbe Illuminator, with Iris diaphragm, No. 521. See page 12.	15 12 6
<b>FOR BACTERIOLOGY.</b>					
B 22	Three—(Parachromatic series) Choice of 1 in., $\frac{3}{4}$ in., or $\frac{1}{2}$ in., with $\frac{1}{4}$ in. or $\frac{1}{8}$ in. and $\frac{1}{2}$ in. oil immersion, 1.25 N.A.	Two—Nos. 2 and 3 or 4.	Triple.	Do.	21 0 0

The  $\frac{1}{4}$  in. Objective (Oil immersion) 1.10 N.A. may be supplied with Set B 22 at 20s. less.

**WITH HOLOSCOPIC OBJECTIVES.**

B 23	Two—16 mm. ( $\frac{3}{4}$ in.) 4 mm. .95 N.A. ( $\frac{1}{2}$ in.)	Two—Holo- scopic, Nos. 7 and 10.	Double.	Compound Substage and Parachromatic or Universal Achromatic. See complete Catalogue, pages 97 and 98.	22 5 0
B 24	Three—16 mm. ( $\frac{3}{4}$ in.) 4 mm. .95 N.A. ( $\frac{1}{2}$ in.) 2 mm. 1.35 N.A. oil immersion.	Two—Holo- scopic, Nos. 7 and 10.	Triple.	Do.	30 10 0

The  $\frac{1}{2}$  in. 1.25 of the Parachromatic series may be included in Set B 24 at £3 less.

**EXTRAS.**

Divisions to movements of Stage reading by vernier to $\frac{1}{15}$ m/m. ... ..	£1 0 0
The <b>Universal or Parachromatic Condenser</b> may be supplied instead of the Abbe Illuminator in Sets B 21 and B 22 at an extra cost of ... ..	1 2 6
The <b>Coned Iris Condenser</b> (page 11) may be supplied with the "Bactil" Stand or with Sets B 19 or B 20, in place of the Compound Substage, at an extra cost of ... ..	2 0 0
It can be supplied with Sets B 21 & B 22 instead of the Compound Substage and Abbe Illuminator at the same cost.	
The <b>Spiral Focussing Screw</b> with Scop Condenser, as figured page 10, can be supplied to the "Bactil" Stand or with Sets B 19 or B 20, at a reduction of ... ..	0 7 6

## Fittings for "Praxis" and "Bactil" Microscopes.

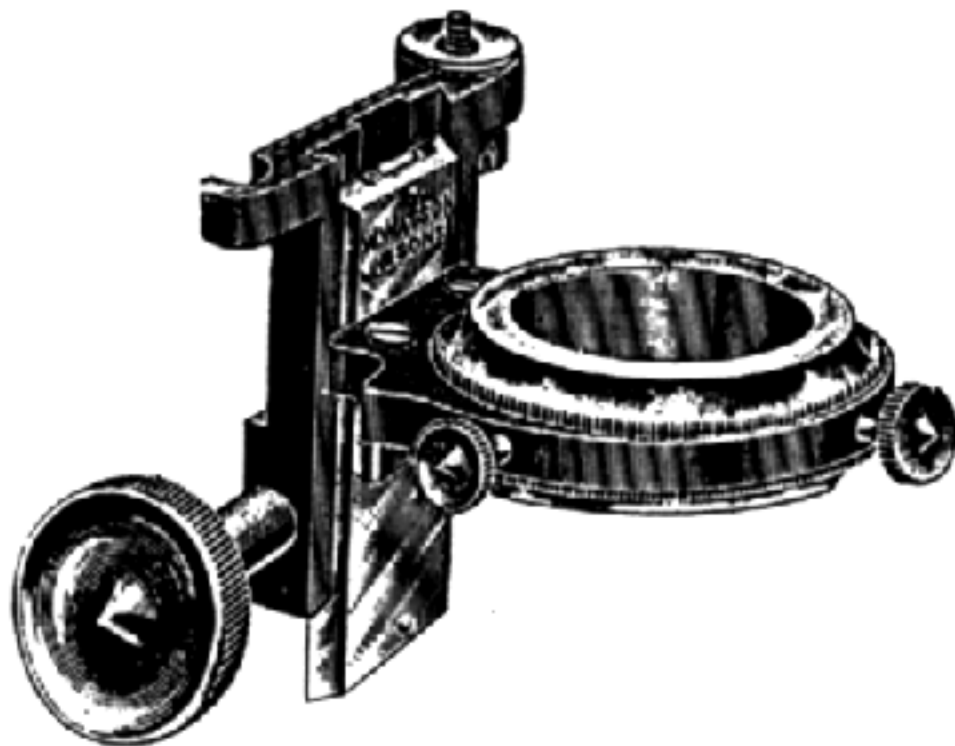
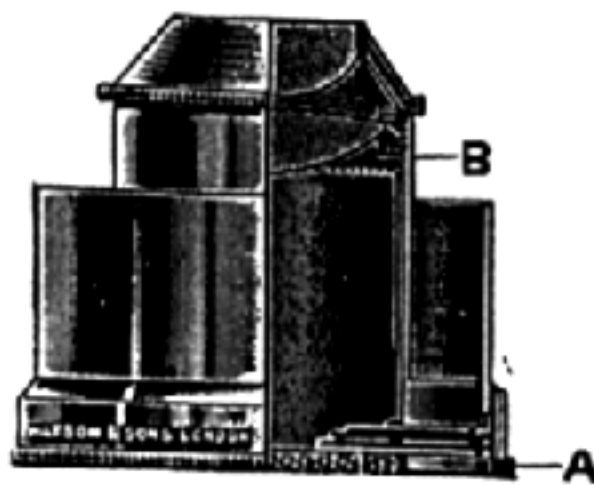


Fig. 7.

**COMPOUND SUBSTAGE** as fitted to the "Bactil" Microscope.

It has rackwork to focus, screws to centre, and being mounted on a strong joint, can be turned aside from the optic axis when desired.

This may be fitted to almost any Microscope at a cost of **£2 2s. 0d.**



**THE SCOP CONDENSER.**

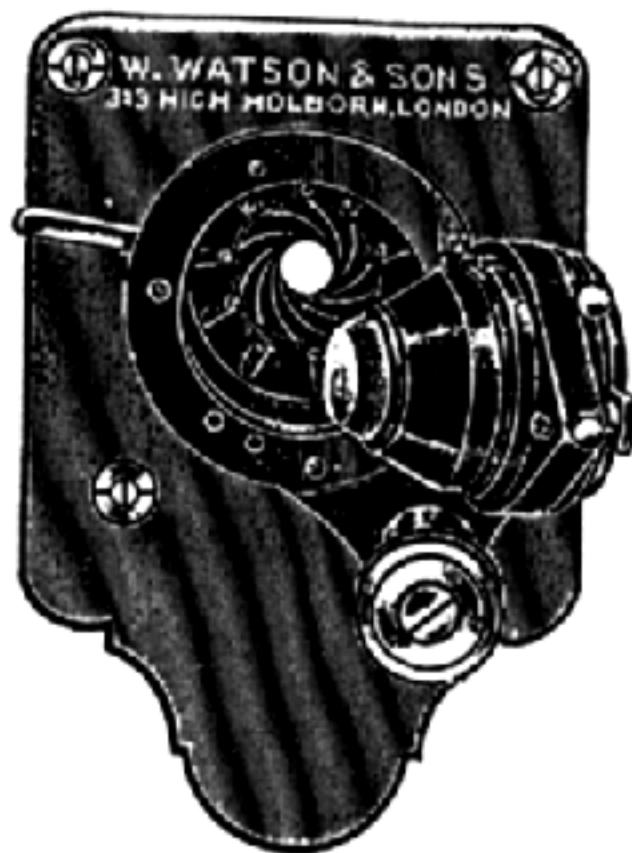
This Condenser is the one that is usually included with the "Praxis" Microscope. It has an Iris diaphragm, which can be used independently by removing the optical portion of the Condenser. This will fit any Microscope having an understage of the universal size.

**Price** ... .. **17s. 6d.**

The Iris diaphragm portion of the above may be purchased by itself at a cost of 6s. 6d., and the optical part of the Abbe Illuminator added subsequently at a cost of 11s.

# Fittings for "Praxis" and "Bactil" Microscopes.

(Continued.)



## CONED IRIS CONDENSER,

Which may be fitted either to the "Praxis" or "Bactil" Microscopes.

It is fitted with a spiral focussing screw, and the whole can be lowered and turned aside from the optic axis. When the Condenser is turned down and outwards out of the way, as shown in the figure above, a cone-shaped Iris diaphragm can be operated in the plane of the stage surface. When the Condenser is in use, this coned Iris diaphragm must be opened to its fullest extent. The Condenser itself has the usual Iris diaphragm beneath the back lens, and a cell to carry coloured glasses or stops.

This is only adaptable to certain Microscopes, and a separate quotation would be given after viewing the instrument.

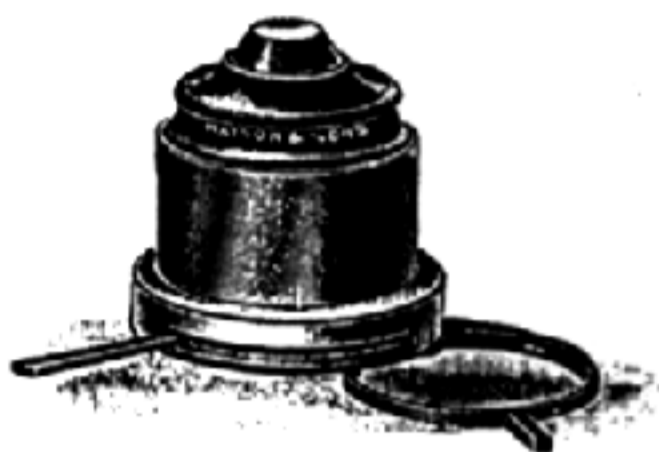
# Abbe Illuminators.



**No. 521.—Abbe Illuminator for Compound Substage,**

as supplied with the "Bactil" Microscope. It is of best quality, has Iris diaphragm, and a swing-out cell to carry Coloured Glasses or Stops.

Price ... £2 2 6



**No. 523.—Abbe Illuminator for Understage Fitting,**

suitable for the "Praxis" Microscope. It is of best quality, has Iris diaphragm, and a swing-out cell to carry Coloured Glasses or Stops.

Price ... £1 12 6

In addition to the above, any of the accessories, Objectives, or Students' Eyepieces quoted in our full Catalogue of Microscopes can be supplied to fit the "Praxis" and "Bactil" Instruments.

EXTRA EYEPIECES, Nos. 1 to 4	...	...	...	...	5s. each.
" " Nos. 5 and 6	...	...	...	10s. 6d.	"

## EXTRA OBJECTIVES (Parachromatic Series).

1½ in.	...	...	£1 2 0	½ in.	...	...	£1 5 0
1 in.	...	...	1 2 0	⅜ in.	...	...	1 10 0
¾ in.	...	...	1 2 0	⅝ in.	...	...	1 10 0
½ in.	...	...	1 2 0	⅜ in.	...	...	2 5 0

## Oil Immersion.

⅜ in.	...	1.10 N.A.	...	£4 0 0
½ in.	...	1.25 N.A.	...	5 0 0