The cover features a central, ornate gold-tooled decorative border. This border is shaped like a vertical oval with elaborate, symmetrical scrollwork and floral motifs extending from the top and bottom. The text is contained within the central oval space.

THE BRITISH JOURNAL  
PHOTOGRAPHIC  
ALMANAC  
1894.



P2219, 1894

ROSS' CARTE AND CABINET LENSES GIVE FINEST DEFINITION, WITH EXTREME RAPIDITY.

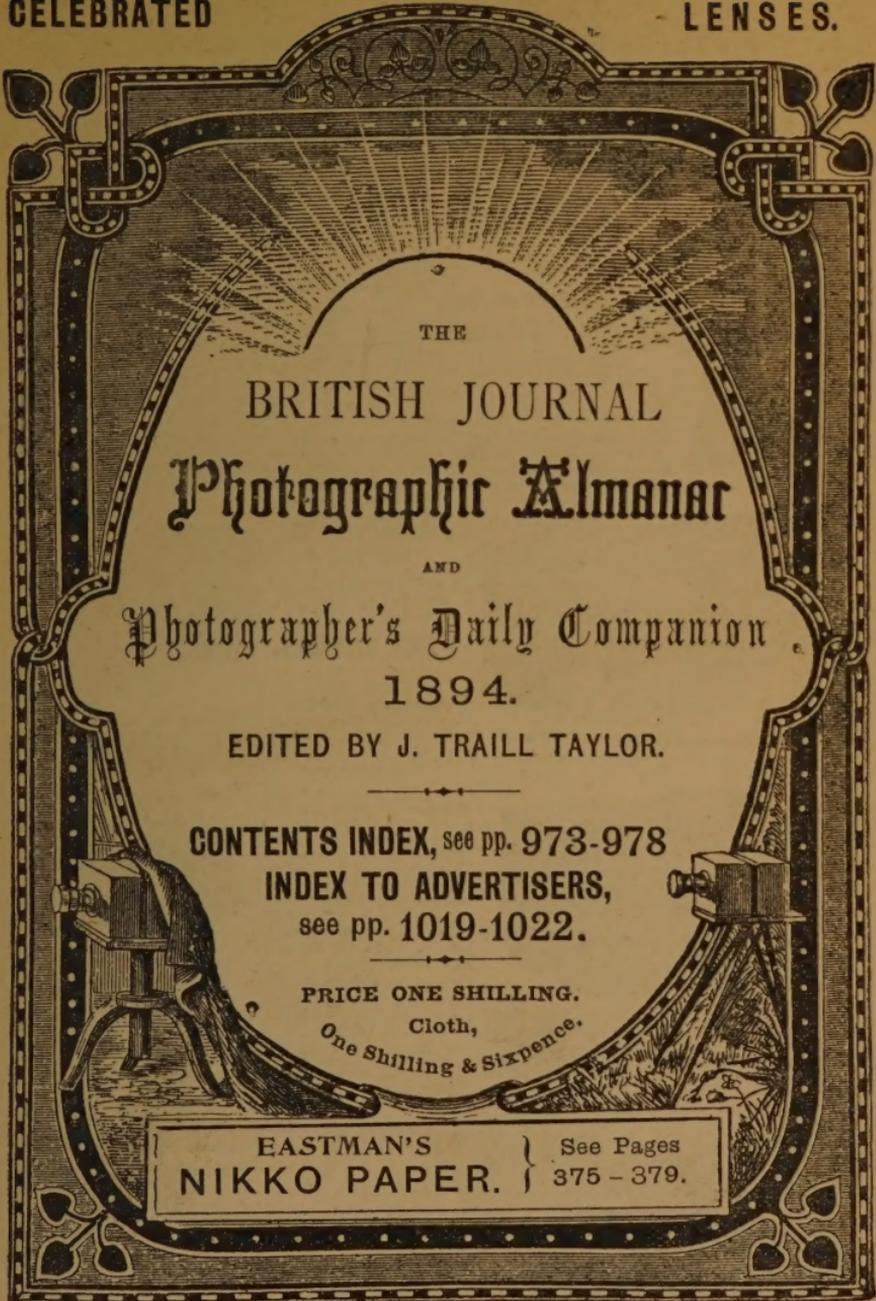
CELEBRATED

ROSS'

LENSES.

ROSS' CARTE AND CABINET LENSES GIVE FINEST DEFINITION, WITH EXTREME RAPIDITY.

ROSS' SYMMETRICAL AND RAPID SYMMETRICAL LENSES FOR GROUPS, VIEWS, &c.



THE  
BRITISH JOURNAL  
**Photographic Almanac**

AND  
Photographer's Daily Companion  
1894.

EDITED BY J. TRAILL TAYLOR.

CONTENTS INDEX, see pp. 973-978

INDEX TO ADVERTISERS,  
see pp. 1019-1022.

PRICE ONE SHILLING.  
Cloth,  
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ROSS & CO., 111 NEW BOND STREET.

Manufactory—Clapham Common, London, S.W. [See pages 35-66.]

LONDON: HENRY GREENWOOD & CO., PUBLISHERS, 2 YORK ST., COVENT GARDEN.  
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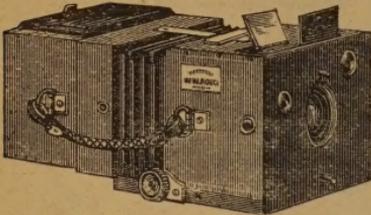


# ROUCH'S EUREKA HAND CAMERA.

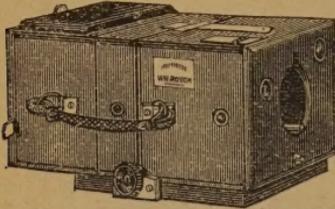
Awarded the  
**ONLY Medal**  
for Hand  
Cameras at the  
Crystal Palace  
Exhibition,  
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THE 'Eureka' is, without exception, the **Most Portable Hand Camera in existence.** It is specially adapted to meet the requirements of Artists, Military or Naval Officers, Travellers, Special Correspondents, Engineers, Surveyors, Architects, Tourists, Cyclists. It is in daily use by the Artists of the *Illustrated London News, Graphic, Black and White,* & other illustrated papers.  
 $\frac{1}{2}$ -pl., £6 12s. 6d.; 5x4, £8 10s.

The following is typical of the letters we are constantly receiving:—  
 'I have already won two Silver Medals and one Bronze Medal, in addition to two other Medals, for Lantern Slides of Negatives taken in your "Eureka" Detective Camera.—J. WHITE, Photographic Society of Ireland, Dublin.'



Excelsior' Camera, fully extended. For use with Long-focus Lens. Lens aperture open.



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## ROUCH'S PATENT 'Excelsior' HAND CAMERA.

Fitted with  
Rouch's Patent  
'Eureka' Changing  
Back.

PRICE:—

For  $\frac{1}{2}$ -pl., with 2 Lenses,  
12 gs.; 5 by 4, 14 gs.

This Instrument surpasses all other Cameras of the Hand or 'Detective' class in the wide range of its powers, combining as it does a perfect Hand Camera, with an equally efficient one for general purposes.

Intending purchasers are warned against Imitations of the above Changing Backs.

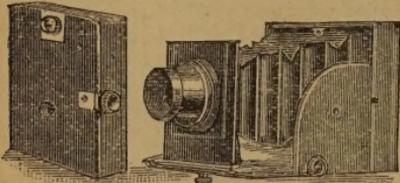


'Eureka' Patent Changing Back with lid shut, concealing the bag.



Detachable Patent 'Eureka' Changing Back, showing Index.

C. W. CAMPBELL, Esq., of H.B.M. Legation, Peking, writes under date, July 30, 1898:—'I am thoroughly satisfied with the "Excelsior" Camera and Lenses. It seems to me the most compact I have come across, and I have lately been able to rely on very good pictures with it.'



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(PATENT APPLIED FOR).

This Camera possesses the acme of portability and lightness, a quarter-plate measuring  $5\frac{1}{4}$  by  $4\frac{1}{4}$  by  $1\frac{1}{2}$  inches, and weighing 11 ozs. It is of extremely simple form and easily set up, and is intended to be used with either dark slides or a changing back. It can also be used either in the hand or on a stand, and is the beau ideal of a pocket camera.

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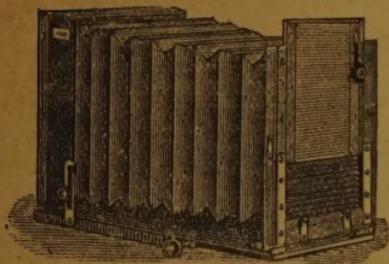
**W. W. ROUCH & CO.** (Contractors to H.M. Government), 180 STRAND.

MANUFACTORY:—43 NORFOLK STREET, STRAND, LONDON, W.C.

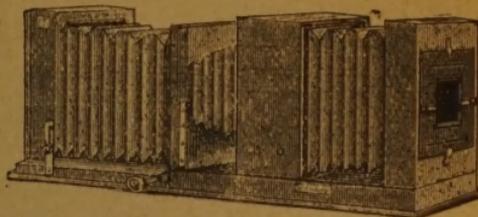
[See following page.]

❖\* ROUCH'S ❖\*  
 COMBINED FIELD, STUDIO, ENLARGING  
 AND REDUCING APPARATUS.

(PATENT.)



Camera for Landscape and Portrait work.



Camera with Attachment for Enlarging, Copying, and Lantern work.

**R**OUCH'S COMBINED CAMERA will be found of the greatest use and convenience to Photographers, as it comprises in a portable form a series of cameras specially suitable for various kinds of photographic work. The SINGLE LANDSCAPE and PORTRAIT CAMERA is our New Patent Portable Camera, which is supplied with every modern improvement and adjustment, and can be fitted with moveable partition for Stereoscopic work. With the Enlarging and Reducing Attachment as shown, it undoubtedly forms a perfect COMBINED FIELD AND STUDIO CAMERA, such as Photographers have long required. It is of the finest workmanship throughout.

## PRICES.

Camera, with One Double Back and Reversing Frame.

6½×4½, £5 15s. 7½×5, £6. 8½×6½, £6 15s. 10×8, £7 10s. 12×10, £9 10s.

Copying, Enlarging, and Reducing Attachment.

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**WOOD'S 'EDDYSTONE' ROCKER** (Patent applied for), from its continuous action, permits of the Operator leaving the Dark-room while Developing is going on, and will carry one 12×10 or two 8½×6½ Dishes. It is a most valuable aid to all Photographers. Price 7s. 6d.

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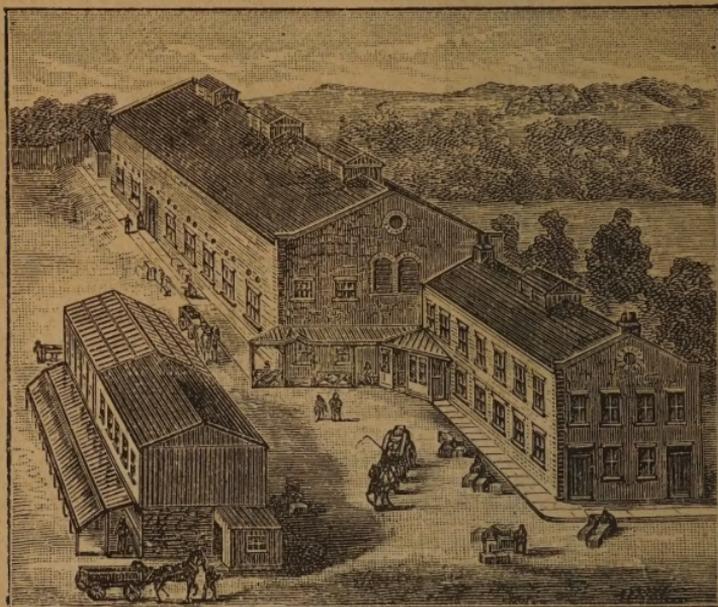
Manufacturers of High-class Photographic Apparatus,  
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B

[See preceding page and pages 1330, 1331.]

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Made at their Factory, Southgate, Middlesex.



Made in Four Rapidities, each of which have different characteristics.

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**IN ALL SIZES AT POPULAR PRICES.**

Each packet marked according to the Hurter and Driffield System, so that correct Exposures can always be obtained.

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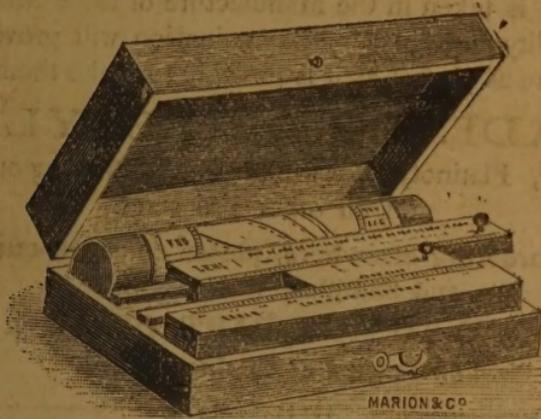
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[See following pages.]

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*An Instrument for calculating the correct Photographic Exposure for any hour on any day of the year in all parts of the world.*

IF USED IN CONJUNCTION WITH

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A PHOTOGRAPHER TAKING PHOTOGRAPHS AWAY FROM HOME WOULD FIND IT INVALUABLE.

*Photographers would also find the speed numbers of great use in the Studio.*

Pamphlet, either in French or English, sent free on application.

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Made at their Factory, Courbevoie, near Paris.

Great care is taken in the Manufacture of these Mounts, both in quality and finish, and examination will prove they are as perfect as it is possible to make them.

## MADE IN ALL STYLES

For Silver, Platinotype, Bromide, and Printing-out Papers and all other Processes.

Before ordering elsewhere, please compare our Prices and Samples, which will be

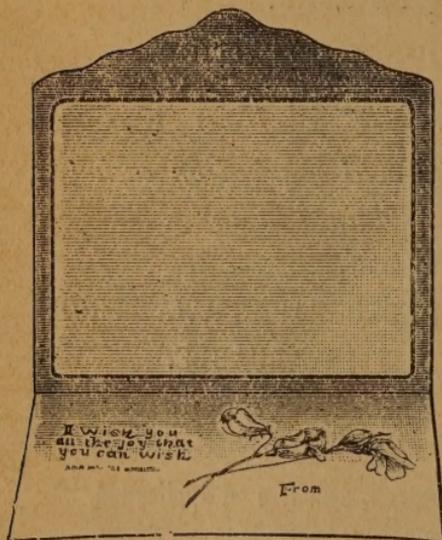
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## A NOVELTY.

Several New Patterns of Christmas Mounts and Frames,  
With Suitable Mottoes and Designs.

These will also do for Painting or  
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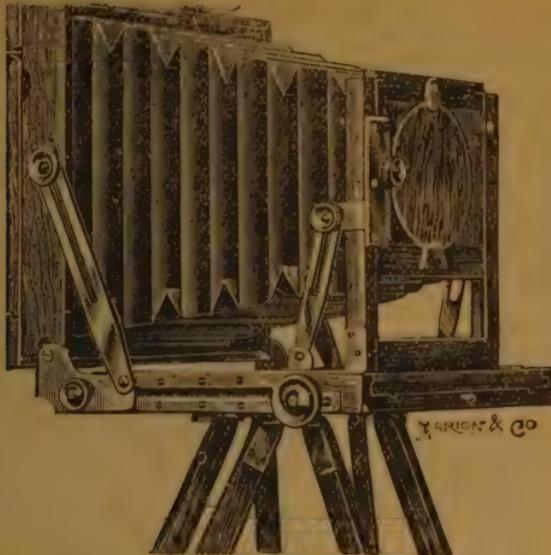


A full detailed List free  
on application.

MARION & CO., 22 & 23 Soho Sq., London, W.

[See preceding and following pages.

**MARION'S CAMERAS.**



**THE 'PERFECTION.'**

**OF THE BEST WORKMANSHIP AND FINISH.**

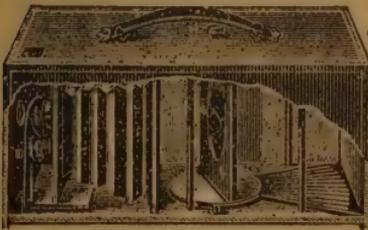
Fitted with Turntable Base, and all the latest improvements.

Prices include Turntable, 3 Double Backs, and Tripod.

For Plates  $6\frac{1}{2} \times 4\frac{3}{4}$     $8\frac{1}{2} \times 6\frac{1}{2}$     $10 \times 8$     $12 \times 10$     $15 \times 12$   
 £8 5s.   £9 15s.   £12 5s.   £14 10s.   £18 5s. 6d. Complete.

A Discount to the Trade.

**THIS CAMERA COMBINES STRENGTH, LIGHTNESS, AND COMPACTNESS.**



**MARION'S HAND CAMERA:  
THE 'RADIAL.'**

Now made in Five Sizes:

$3\frac{1}{2} \times 3\frac{1}{2}$ ,  $4\frac{1}{2} \times 3\frac{1}{2}$ ,  $5 \times 4$ ,  $6\frac{1}{2} \times 4\frac{3}{4}$ ,  
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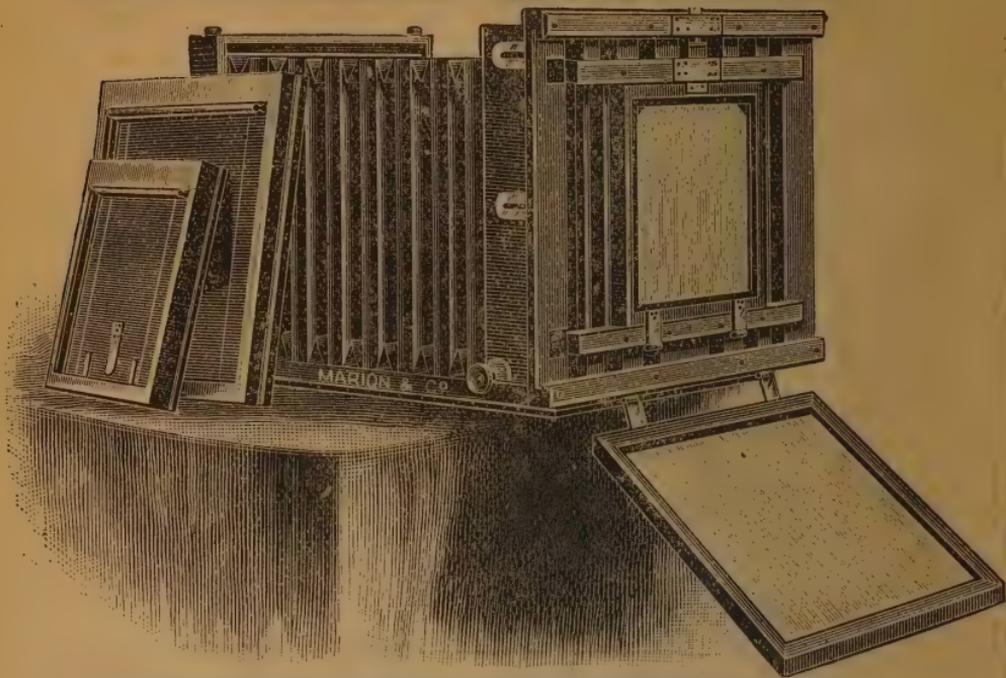
Prices from £5 15s. to £13.

Will stand any climate; the interior being made of metal.

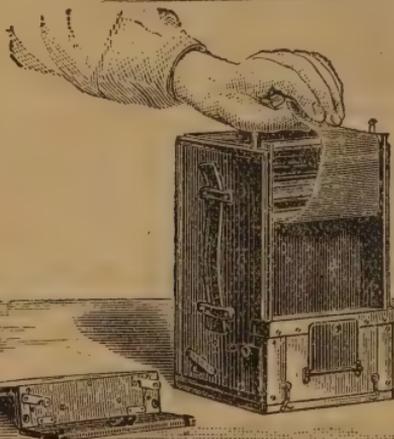
Full descriptive list of Cameras, Hand, Studio, and Field, free on application.

**MARION & CO., 22 & 23 Soho Square, London, W.**

[See preceding and following pages.]

**MARION'S CAMERAS.**

**MARION'S ADAPTABLE STUDIO CAMERA**, 12 in. square, and with an extra back for  $8\frac{1}{2}$  in., thus doing the work of 2 Cameras, also having a Leather Bellows of 40 in. extension, will do for copying purposes. Made from best Spanish mahogany, and best finish. Price, with 2 Slides with Roller Shutter, and adapter, £13 10s.

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PATENT.

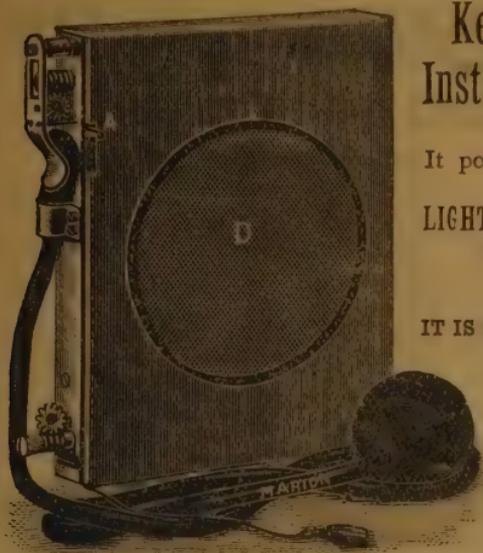
Carries 50 Cut Films  
12×9 cms.

Price £8 15s.

**FULL DESCRIPTIVE LIST OF ALL CAMERAS FREE ON APPLICATION.**

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*[See preceding and following pages.]*



## Kershaw's Time and Instantaneous Shutter.

It possesses the following advantages:—

**LIGHTNESS, NOISELESSNESS,  
NO VIBRATION,  
SPEED, DURABILITY.**

**IT IS SIMPLE AND YET EFFICIENT**

Prices, complete with pneumatic release.

For hood of lens $1\frac{1}{2}$ and under	17/-
"    "    2    "	19/-
"    "    2½    "	22/-
"    "    3    "	27/-
"    "    4    "	37/-
"    "    5    "	47/-

Working noiselessly, it is very suitable for Studio Work.

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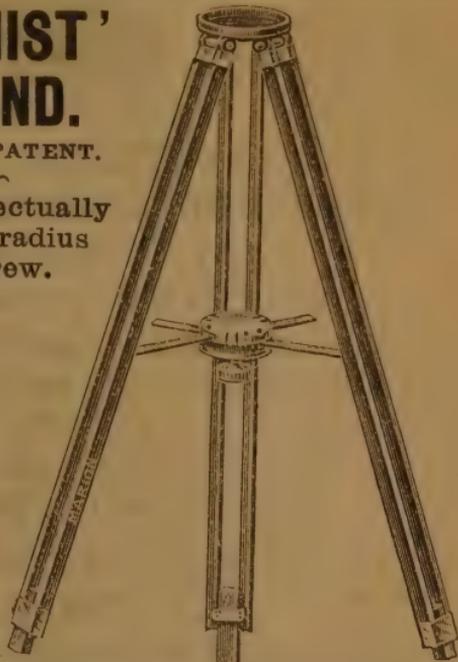
GOLDING & WEBSTER'S PATENT.

The Legs can be effectually fixed at any angle or radius by a turn of the screw.

A Ball and Socket Top can be supplied suitable for Cameras,  $\frac{1}{2}$ -plate up to  $12 \times 10$ .

Height 5 feet. Price 30/-  
Ball and Socket, 4/- extra.

Combines great strength and rigidity with compactness.



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# THE 'BROMIDE' LAMP.

(GROOM'S PATENT.)

VERY  
POWERFUL  
LIGHT

PRINTS  
BROMIDE  
PAPERS  
QUICKLY.



FOR CONTACT PRINTING  
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Fitted with three different coloured Glasses, White, Yellow, and Ruby, any of which may be used separately or combined as desired by sliding them in and out at will.

It has a **SPECIAL BURNER** for consuming Kerosine without the use of a Glass Chimney.

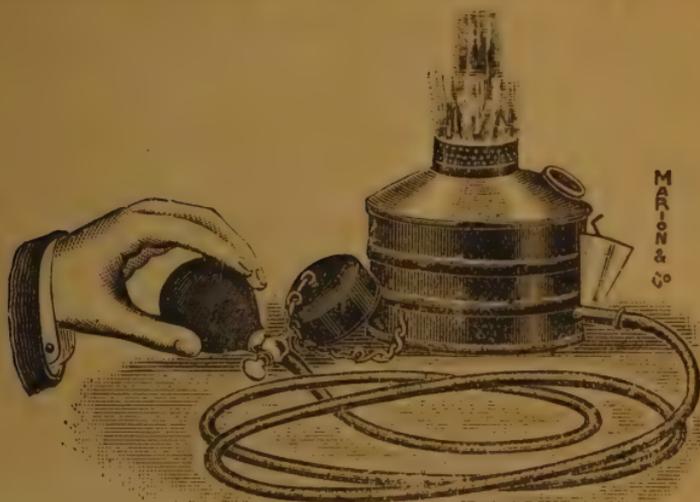
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[See preceding and following pages.]

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Photos can now be taken with ease. Dinners, Balls,  
Concerts, or At Homes.

This subject is practically treated by R. Slingsby in his book,  
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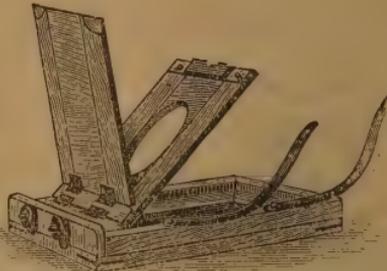
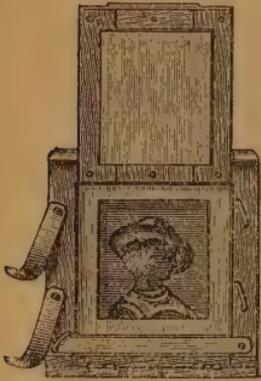
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Comprising Portable Stand, 8 Lamps with I.R. Tubing and  
Strong Bellows, £9 7s. 6d.

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# SPECIAL PRINTING FRAME FOR PRINTING-OUT OPALS.



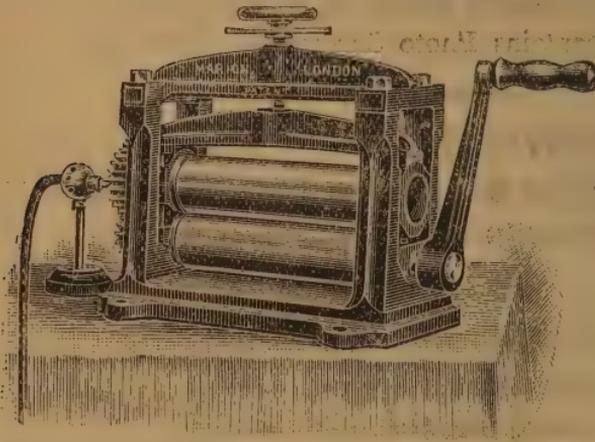
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The Opal may be examined during printing without altering position of Negative. Also allows of various thicknesses Opal Plates and Negatives without fear of breakage.

Size of Frame.

$8\frac{1}{2} \times 6\frac{1}{2}$	for printing size smaller than	$8\frac{1}{2} \times 6\frac{1}{2}$	...	...	4/- each.
10 x 8	" "	10 x 8	...	...	5/6 "
12 x 10	" "	12 x 10	...	...	7/6 "
14 x 12	" "	14 x 12	...	...	10/- "

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OF BEST  
ENGLISH  
WORKMANSHIP.

Gives a fine, rich glaze without the aid of any lubricator, and does not scratch the prints.

Made in two sizes.

10-inch, price  
**£7 0.**

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**£10 10.**

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[See preceding and following pages.]

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A safe and simple means of storing Negatives for easy inspection and exhibition.



Any Negative may be inspected and removed without disturbing the others.

The Negatives are held in independent grooves, and they cannot injure each other

For 12 $\frac{1}{2}$ -plates, in Box complete	... ..	2/6 each.
For 6 $\frac{1}{2}$ -plates, " " "	... ..	2/6 "

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The merits of this new Starch consist in its superior adhesiveness, smoothness in working, and freedom from any chemical reaction or the influence of damp. Used by all the leading Photographers.

## TISSUES.

Fine Silk surface, in White and Rose, for facing the fronts of Photographs. Printed with elegant designs lithographed, not common block printing.

C.-D.-V. ...	2/6 per 1000.		Cabinet ...	4/6 per 1000.
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Printed with Name and Address.

C.-D.-V. ... ..	16/- per 1000	... ..	By 5000	... ..	15/6 per 1000.
Cabinet ... ..	26/- "	... ..	"	... ..	25/- "

MARION & CO., 22 & 23 Soho Square, London, W.

[See preceding and following pages.]

UNPARALLELED SUCCESS.

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THIRD SERIES NOW READY.

Each Series contains 6 Pictures, size of print  $11\frac{1}{2} \times 8\frac{1}{2}$ , on fine Ivory Cardboard  $22 \times 15$ .

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SHOW SCREENS AND EASELS  
IN VERY LARGE VARIETY.

Three Fold, Oak Oxford, as Illustration. Price 28/-

BROMIDE ENLARGEMENTS  
ON PAPER AND OPAL, ALSO CARBON,

Finished in best style and workmanship, and framed in any style.

*Full particulars free on application with Trade Card.*

MARION & CO., 22 & 23 Soho Square, London, W.

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THE LARGEST VARIETY OF  
**PHOTOGRAPHIC ALBUMS**  
IN THE TRADE.

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ALBUMS FOR  
UNMOUNTED PRINTS,  
AND ALSO WITH  
PLATE-MARK AND TINTED CENTRES  
FOR  
PLATINOTYPE PRINTS.

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*ONE QUALITY AND FINISH—THE BEST.*

*Also the Cheapest.*

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Photographers should send for Full Lists.

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**T**HE foregoing Pages show some  
of the principal Lines, but we would  
remind the Photographic Public that we  
have the **LARGEST PHOTOGRAPHIC**  
Warehouse in the Trade, and have the  
Largest Variety of all Photo Requisites.

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*[See preceding pages,*

‡ J. R. GOTZ ‡

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Specialties for 1894.

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**APLANATIC LENSES**

*The Manufacture of these Instruments has passed  
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**TWELVE THOUSAND.**

THE

**PORTRAIT APLANAT**

*Aperture F/5.5,*

*Is the favourite Lens of the Profession, and equals the  
Portrait Lens for Rapidity and Brilliancy.*

THE

**ZEISS ANASTIGMATS**

*Are now manufactured by Licence in 6 series at the aper-  
tures of F/4.5, F/6.3, F/7, F/9, F/12, and F/18. Wonderful  
flatness of Field. Great covering power.*

*Remarkable Definition.*

**PRICES FROM ABOVE ADDRESS.**

[See following pages.]

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→\* J. R. GOTZ' \*←  
PHOTOGRAPHIC † SPECIALTIES  
For 1894.

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→\* JANUS \*←  
STEREO CAMERA  
For HAND or TRIPOD.

*Focus by 'SCALE' or 'SCREEN' for two quarter  
plates, independently or as pairs.*

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THE NEW  
OBERNETTER-PERUTZ  
CELLULOID † POSITIVE † FILMS  
(Gelatino-Chloride).  
TRANSPARENCIES, SINGLE and STEREOSCOPIC,  
And IVORY POSITIVE.

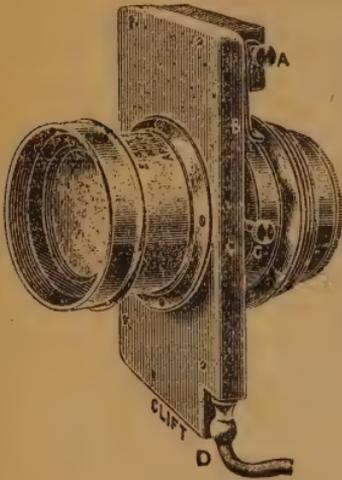
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→\* GOTZ'S \*←  
OBERNETTER-PERUTZ  
CELLULOID NEGATIVE FILMS  
ORDINARY and ISOCHROMATIC.

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...  
GOTZ'S 'KANGAROO' FILM CARRIER.  
*[See preceding and following pages.]*

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SPECIALTIES for 1894.



The 'ARIEL'  
AND  
'Bijou' Shutters

*Atmospheric Constant Action.*

STEREOSCOPIC  
AND STUDIO SHUTTERS.

IRIS DIAPHRAGMS.

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*Brass or Aluminium Fittings,*

WITH

"ATLAS" TRIPOD STAND.

*The Best and most Rigid.*

GOTZ'S "KANGAROO" CHANGING-BOX  
FOR FILMS.

Carrying from 24 to 48 Films in Carriers.

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Specialties for the Season of 1894.

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GOTZ'S  
OBERNETTER PAPER,  
GELATINO-CHLORIDE.

FIRST PRODUCED IN 1885.

NO SPOTS, NO STREAKS, NO HOLES.

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MATT-SURFACE PAPER, Chlorotype.

*Superior to any other.*

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EXCELSIOR AND LUXAUR.

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FOR

*Transparencies or Lantern Slides.*

*[See preceding and following pages.]*

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*Should reproduce their  
Tracings, Plans, and Elevation Drawings*

ON

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HELIOGRAPHIC PAPERS

BEST. Obtainable Everywhere.

**FERRO - GALLIC (New Process).**

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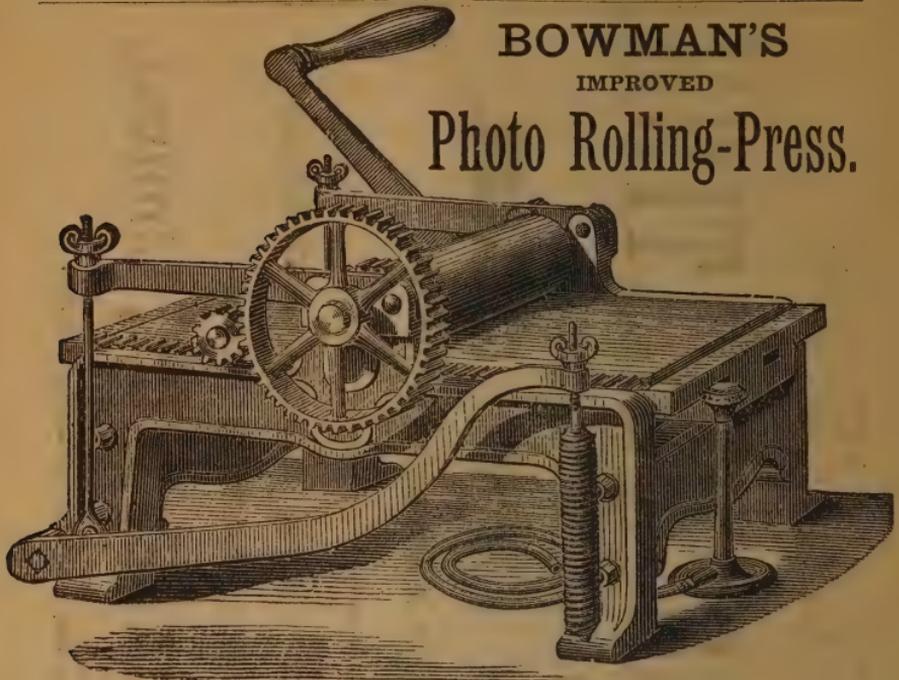
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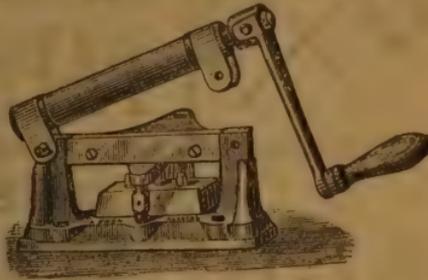
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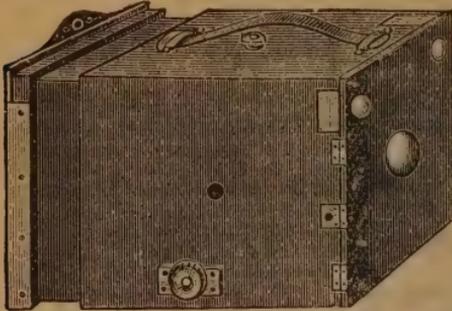
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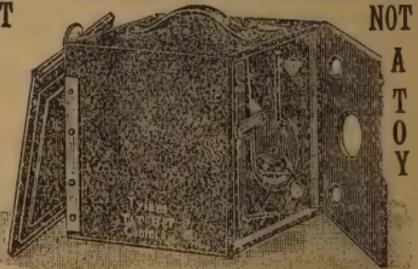
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| 18 × 14½       | 12 × 10  | 17/-     |
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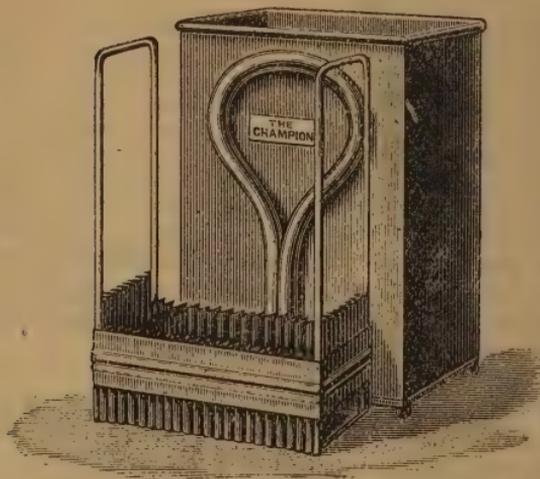


Fig. 3.

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Fig 8.

Note especially  
Fig. 7a (under).

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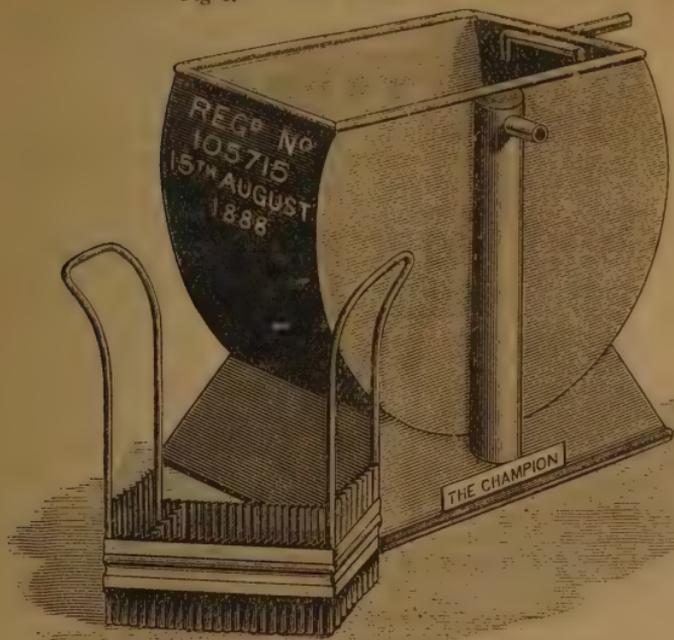


Fig. 7A.

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| U.S. Nos. ....       | 1             | 2                 | 4             | 8                | 16             | 32               | 64             | 128              | 256            |
| Ratio of Stops ..... | $\frac{f}{4}$ | $\frac{f}{5.657}$ | $\frac{f}{8}$ | $\frac{f}{11.3}$ | $\frac{f}{16}$ | $\frac{f}{22.6}$ | $\frac{f}{32}$ | $\frac{f}{45.2}$ | $\frac{f}{64}$ |

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| " 4 ... .. 2½ "                | " 9 ... .. 3½ "      | " 14 ... .. 4½ "     |
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**CONCENTRIC LENSES.**

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# ROSS' PATENT CONCENTRIC LENSES



The most perfect Lenses for  
Landscapes, Architecture.  
Copying, &c.

Ratio of Stops :

\* $f/16$ ,  $f/22$ ,  $f/27$ ,  $f/32$ ,  $f/38$ ,  $f/45$ .

THE Concentric Lenses are the most perfect ever introduced, being absolutely free from distortion, astigmatism, flare, and other imperfections incidental to all lenses of ordinary construction.

The Concentric Lenses give uniformly perfect definition with equal illumination over an absolutely flat field of a circle of about  $75^\circ$ , the extreme oblique rays coming to focus with the same remarkable sharpness as the central pencils ; and, therefore, these lenses will cover a larger plate when desired than those specified.

The Concentric defines perfectly with its full aperture, and does not require the use of stops to obtain marginal definition as in other lenses ; the stops, therefore, need only be used to regulate the time of exposure and the depth of focus.

\* For landscape purposes, where uniformly soft and artistic effects over the entire field, not necessitating critically sharp definition, are required, these lenses are frequently used by eminent photographers at the aperture of  $f/16$ , with which the lens is fitted ; but in all cases when exposure is made with this stop, it is recommended that the focus be obtained with  $f/22$  or a smaller stop.

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| No. | Size of Plate. | Circle of Light about 80 dia. | Equivalent Focus. | PRICES.                    |                            |                       |
|-----|----------------|-------------------------------|-------------------|----------------------------|----------------------------|-----------------------|
|     |                |                               |                   | Roty. Stops, Brass Setgts. | Roty. Stops, Alum. Setgts. | Extra for Iris Diaph. |
| 1   | 3 × 3          | 3 inches.                     | 3 inches.         | £3 5 0                     | £4 0 0                     | £0 10 0               |
| 2   | 4½ × 3½        | 6'7 "                         | 4 "               | 3 10 0                     | 4 5 0                      | 0 10 0                |
| 3   | 5 × 4          | 5'4 "                         | 5 "               | 4 10 0                     | 5 5 0                      | 0 10 0                |
| 4   | 6½ × 4½        | 10'8 "                        | 6 "               | 5 10 0                     | 6 5 0                      | 0 10 0                |
| 5   | 8 × 5          | 11'8 "                        | 7 "               | 6 10 0                     | 7 5 0                      | 0 10 0                |
| 6   | 8½ × 6½        | 13'4 "                        | 8 "               | 7 10 0                     | 8 10 0                     | 0 15 0                |
| 7   | 9 × 7          | 15 "                          | 9 "               | 8 10 0                     | 9 10 0                     | 0 15 0                |
| 8   | 10 × 8         | 16'8 "                        | 10 "              | 9 10 0                     | 10 15 0                    | 0 15 0                |
| 9   | 12 × 10        | 20 "                          | 12 "              | 11 10 0                    | 12 15 0                    | 0 15 0                |
| 10  | 15 × 12        | 25 "                          | 15 "              | 14 0 0                     | 16 0 0                     | 1 0 0                 |
| 11  | 18 × 16        | 30 "                          | 18 "              | 17 0 0                     | 20 0 0                     | 1 10 0                |

FIVE PER CENT DISCOUNT FOR CASH.

ROSS & CO., Opticians, 111 New Bond Street, LONDON, W.  
(CORNER OF BROOK STREET).

Manufactory—CLAPHAM COMMON.

# ROSS'

## Portable SYMMETRICAL LENSES



ROSS' PORTABLE SYMMETRICAL.

|                   |                |                  |                |                  |                |
|-------------------|----------------|------------------|----------------|------------------|----------------|
| U.S. Nos. ....    | 16             | 32               | 64             | 128              | 256            |
| Ratio of Stops... | $\frac{f}{16}$ | $\frac{f}{22.6}$ | $\frac{f}{32}$ | $\frac{f}{45.2}$ | $\frac{f}{64}$ |

Since their introduction, perhaps no Lens has had so great a share of popularity as the Portable Symmetricals. They are still used by many of our most eminent Photographers. This is, doubtless, attributable to their extraordinary definition and flatness of field, as well as to the exceedingly portable form in which they are made. The adoption of the Jena Glass in their construction has still further increased their brilliancy, depth of focus, and general excellence.

### Revised Prices, Sizes, &c., of the Portable Symmetrical Lenses.

| No. | Size of Plate with Large Stop.    | Size of Plate with Medium Stop.   | Diameters of Lenses. | Equiv. Focus. | PRICE.          |                     |                           |
|-----|-----------------------------------|-----------------------------------|----------------------|---------------|-----------------|---------------------|---------------------------|
|     |                                   |                                   |                      |               | Brass Settings. | Aluminium Settings. | Extra for Iris Diaphragm. |
| *1  | 3 X 3                             | 4 X 3                             | $\frac{1}{10}$ inch. | 3 ins.        | £3 0 0          | £3 15 0             | £0 10 0                   |
| *2  | 4 X 3                             | 5 X 4                             | $\frac{1}{8}$ "      | 4 "           | 3 0 0           | 3 15 0              | 0 10 0                    |
| *3  | 5 X 4                             | 6 $\frac{1}{2}$ X 4 $\frac{1}{2}$ | $\frac{7}{16}$ "     | 5 "           | 3 5 0           | 4 0 0               | 0 10 0                    |
| *4  | 6 $\frac{1}{2}$ X 4 $\frac{1}{2}$ | 8 X 5                             | $\frac{7}{8}$ "      | 6 "           | 3 10 0          | 4 10 0              | 0 10 0                    |
| 5   | 8 X 5                             | 8 $\frac{1}{2}$ X 6 $\frac{1}{2}$ | $\frac{7}{8}$ "      | 7 "           | 4 10 0          | 5 10 0              | 0 10 0                    |
| 6   | 8 $\frac{1}{2}$ X 6 $\frac{1}{2}$ | 9 X 7                             | $\frac{7}{8}$ "      | 8 "           | 5 10 0          | 6 10 0              | 0 10 0                    |
| 7   | 9 X 7                             | 10 X 8                            | 1 "                  | 9 "           | 6 10 0          | 7 10 0              | 0 10 0                    |
| 8   | 10 X 8                            | 12 X 10                           | $1\frac{1}{8}$ "     | 10 "          | 7 10 0          | 8 10 0              | 0 10 0                    |
| 9   | 12 X 10                           | 13 X 11                           | $1\frac{1}{8}$ "     | 12 "          | 8 10 0          | 9 15 0              | 0 10 0                    |
| 10  | 13 X 11                           | 15 X 11                           | $1\frac{1}{8}$ "     | 15 "          | 9 10 0          | 10 15 0             | 0 10 0                    |
| 11  | 15 X 12                           | 18 X 16                           | $1\frac{1}{8}$ "     | 18 "          | 11 10 0         | 13 0 0              | 0 15 0                    |
| 12  | 18 X 16                           | 22 X 20                           | $1\frac{1}{8}$ "     | 21 "          | 14 0 0          | 16 0 0              | 0 15 0                    |

\* These Lenses are supplied accurately paired for Stereoscopic purposes.

The first ten lenses of the above series fit into the same flange (No. 1 on list, page 36), and are so very light and portable that they can conveniently be transmitted by post. Nos. 11 and 12 fit into flanges No. 4 on list, page 36.

Nos. 1 to 8 have Rotating Diaphragms.

Nos. 9 to 12, Waterhouse Diaphragms.

Any lenses of the series are supplied with Ross' Improved 'Iris' Diaphragm without any increase in the outside dimensions of the Body Tube.

FIVE PER CENT DISCOUNT FOR CASH.

**ROSS & CO.,** Opticians, 111 New Bond Street, LONDON, W.

(CORNER OF BROOK STREET).

**MANUFACTORY—CLAPHAM COMMON.**

# Ross' Wide-Angle Symmetrical Lenses

(NEW SERIES)

FOR LANDSCAPES, ARCHITECTURE, AND USE  
IN CONFINED SITUATIONS.



ROSS' WIDE-ANGLE SYMMETRICAL.

|           |                |                |                |                 |                 |
|-----------|----------------|----------------|----------------|-----------------|-----------------|
| U.S. Nos. | 16             | 32             | 64             | 128             | 256             |
| Ratio of  | $\frac{f}{16}$ | $\frac{f}{32}$ | $\frac{f}{64}$ | $\frac{f}{128}$ | $\frac{f}{256}$ |
| Stops.    | 16             | 22.6           | 32             | 45.2            | 64              |

These Lenses, like the Symmetricals of the Rapid and Extra-Rapid Series, are remarkably free from distortion and flare, and give sharp definition. They are constructed for 90° and upwards, a wider angle, perhaps, than given by any wide-angle lenses hitherto issued, giving equal definition at the margin of the plate. These Lenses are confidently recommended for architectural subjects, for all wide-angle work, and for use in confined situations.

REVISED PRICES, SIZES, &c., OF THE WIDE-ANGLE SYMMETRICAL LENSES.

| No. | Size of Plate. | Diameters of Lenses. | Equ. Focus. | PRICE.          |                     | Flanges. See page 36.                                                        |
|-----|----------------|----------------------|-------------|-----------------|---------------------|------------------------------------------------------------------------------|
|     |                |                      |             | Brass Settings. | Aluminium Settings. |                                                                              |
| *1  | 5 x 4          | $\frac{1}{16}$ in.   | 3 ins.      | £3 0 0          | £3 15 0             | This Series cannot be fitted with Iris Diaphragms. See note at foot of page. |
| *2  | 7½ x 4½        | $\frac{1}{16}$ "     | 4 "         | 3 5 0           | 4 0 0               |                                                                              |
| *3  | 8½ x 6½        | 1 "                  | 5 "         | 3 15 0          | 4 10 0              |                                                                              |
| 4   | 10 x 8         | 1½ "                 | 6 "         | 4 10 0          | 5 10 0              |                                                                              |
| 5   | 12 x 10        | 1¾ "                 | 7 "         | 6 0 0           | 7 0 0               |                                                                              |
| 6   | 13 x 11        | 2 "                  | 8 "         | 7 0 0           | 8 0 0               |                                                                              |
| 7   | 15 x 12        | 2½ "                 | 9 "         | 9 0 0           | 11 0 0              |                                                                              |
| 8   | 18 x 16        | 2¾ "                 | 12 "        | 13 0 0          | 15 10 0             |                                                                              |
| 9   | 22 x 18        | 3 "                  | 14 "        | 17 0 0          | 22 0 0              |                                                                              |
| 10  | 25 x 22        | 3½ "                 | 16 "        | 24 0 0          | 30 0 0              |                                                                              |

\* These Lenses are supplied accurately paired for Stereoscopic purposes.

Rotary Diaphragms only are supplied, as there is not sufficient space between the front and back combinations to introduce the Iris diaphragm.

FIVE PER CENT DISCOUNT FOR CASH.

ROSS & CO., Opticians, 111 New Bond Street, LONDON, W.  
(CORNER OF BROOK STREET).  
MANUFACTORY—CLAPHAM COMMON.

## ROSS' NEW SINGLE WIDE-ANGLE LANDSCAPE LENSES.

|                    |                |                  |                |                  |                |
|--------------------|----------------|------------------|----------------|------------------|----------------|
| U. S. Nos. ....    | 16             | 32               | 64             | 128              | 256            |
| Ratio of Stops ... | $\frac{f}{16}$ | $\frac{f}{22.6}$ | $\frac{f}{32}$ | $\frac{f}{45.2}$ | $\frac{f}{64}$ |



ROSS' SINGLE LANDSCAPE LENS.

**T**HIS SERIES is constructed to meet the demand for Lenses purely for Landscape purposes. They are made of the New Jena Glass, and are composed of three single Lenses cemented together to form one combination, with only two reflecting surfaces. They have a working aperture of  $f/16$  (which can be increased for special purposes if desired), with a flat field. They give brilliant pictures, and embrace a wide angle of view.

### REVISED PRICES AND SIZES OF SINGLE WIDE-ANGLE VIEW LENSES.

| Size of Plate. | Dia. of Lens. | Equiv. Focus. | PRICE.                 |                        | Flanges. See page 36. |
|----------------|---------------|---------------|------------------------|------------------------|-----------------------|
|                |               |               | With Rotary Diaphragm. | In Aluminium Settings. |                       |
| 5 × 4 ...      | 1½ inch       | 5 ins.        | £ s. d.<br>3 0 0       | £ s. d.<br>4 5 0       | No. 3                 |
| 6½ × 4½ ...    | 1¾ "          | 6½ "          | 3 5 0                  | 4 10 0                 | " 4                   |
| 8½ × 6½ ...    | 2 "           | 8 "           | 4 0 0                  | 5 10 0                 | " 5                   |
| 10 × 8 ...     | 2½ "          | 10 "          | 5 5 0                  | 7 0 0                  | " 6                   |
| 12 × 10 ...    | 2¾ "          | 12 "          | 6 5 0                  | 9 0 0                  | " 7                   |
| 15 × 12 ...    | 3½ "          | 15 "          | 8 0 0                  | 12 0 0                 | " 8                   |
| 18 × 16 ...    | 3 "           | 18 "          | 9 10 0                 | 14 10 0                | " 9                   |

### OTHER SIZES TO ORDER.

The above Lenses are not recommended for Architectural subjects, having the slight curvature of the marginal lines inherent to all single Lenses; but when judiciously used, by placing the architectural subject in the centre of the picture, this defect will be wholly overcome, or scarcely observable.

They are furnished with ordinary Diaphragms, or with Ross' Improved Iris, as desired, but are only kept in stock with the Rotary Diaphragms.

FIVE PER CENT DISCOUNT FOR CASH.

**ROSS & CO.,** Opticians, 111 New Bond Street, LONDON, W.  
(CORNER OF BROOK STREET).

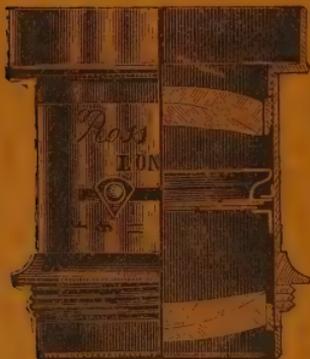
**MANUFACTORY—CLAPHAM COMMON.**

# ROSS' RAPID SYMMETRICAL LENSES

(New Formula) for Groups, Views, Interiors, Copying, &c.

|                      |               |                  |                |                  |                |                  |                |
|----------------------|---------------|------------------|----------------|------------------|----------------|------------------|----------------|
| U. S. Nos. ....      | 4             | 8                | 16             | 32               | 64             | 128              | 256            |
| Ratio of Stops ..... | $\frac{f}{8}$ | $\frac{f}{11.3}$ | $\frac{f}{16}$ | $\frac{f}{22.6}$ | $\frac{f}{32}$ | $\frac{f}{45.2}$ | $\frac{f}{64}$ |

THE Rapid Symmetricals, being aplanatic, work with full aperture, and on account of their varied capabilities are, perhaps, the most useful Lenses an Amateur or Professional Photographer can possess for general purposes. The use of special optical glass and improved formulæ have greatly enhanced the properties of these Lenses.



ROSS' RAPID SYMMETRICAL.

With smaller Stops each Lens covers the next size larger plate than that given, thereby greatly increasing the angle of view. The Rapid Symmetricals are not so suited for Portraits and Groups as Lenses with larger apertures, but excellent results are obtained in a good light in the open air. They are furnished with Waterhouse Diaphragms, or with Ross' improved Iris Diaphragm, without any increase in the outside dimensions of the mount.

## REVISED PRICES AND SIZES OF THE RAPID SYMMETRICAL LENSES.

| Size of View. | Size of Group. | Diams. of Lenses. | Equ. Focus. | PRICE IN RIGID FITTING.    |                     |                           | Flanges. See page 36. |
|---------------|----------------|-------------------|-------------|----------------------------|---------------------|---------------------------|-----------------------|
|               |                |                   |             | With Waterhouse Diaphragm. | Aluminium Settings. | Extra for Iris Diaphragm. |                       |
| 3½ × 3½       | ...            | 5 inch            | 3 ins.      | £3 5 0                     | £4 0 0              | £0 10 0                   | No. 1                 |
| * 4½ × 3½     | Stereo.        | 5 ½ "             | 4 ½ "       | 3 10 0                     | 4 5 0               | 0 10 0                    | " 1                   |
| * 5 × 4       | 4½ × 3½        | 6 "               | 6 "         | 3 15 0                     | 4 15 0              | 0 10 0                    | " 1                   |
| 6 × 5         | 5 × 4          | 7 1/10 "          | 7 ½ "       | 4 15 0                     | 6 0 0               | 0 10 0                    | " 1                   |
| 8 × 5         | 7½ × 4½        | 8 1/10 "          | 9 "         | 5 5 0                      | 6 10 0              | 0 15 0                    | " 2                   |
| 8½ × 6½       | 8 × 5          | 9 1/10 "          | 10 ½ "      | 6 0 0                      | 7 10 0              | 0 15 0                    | " 3                   |
| 9 × 7         | 8½ × 6½        | 10 1/10 "         | 12 "        | 7 0 0                      | 8 15 0              | 0 15 0                    | " 4                   |
| 10 × 8        | 9 × 7          | 11 1/10 "         | 14 "        | 8 0 0                      | 9 15 0              | 0 15 0                    | " 5                   |
| 12 × 10       | 10 × 8         | 12 "              | 16 "        | 9 15 0                     | 12 10 0             | 1 0 0                     | " 6                   |
| 13 × 11       | 11 × 9         | 13 1/10 "         | 18 "        | 10 15 0                    | 14 0 0              | 1 5 0                     | " 7                   |
| 15 × 12       | 13 × 11        | 15 1/10 "         | 20 "        | 13 10 0                    | 17 0 0              | 1 10 0                    | " 8                   |
| 18 × 16       | 15 × 12        | 18 "              | 24 "        | 17 10 0                    | 22 10 0             | 2 0 0                     | " 11                  |
| 22 × 18       | 18 × 16        | 22 1/10 "         | 30 "        | 23 10 0                    | 29 0 0              | 2 15 0                    | " 12                  |
| 25 × 22       | 22 × 18        | 25 1/10 "         | 34 "        | 28 10 0                    | 35 0 0              | 3 10 0                    | " 15                  |

\* These Lenses are supplied accurately paired for Stereoscopic purposes.  
FIVE PER CENT DISCOUNT FOR CASH.

ROSS & CO., Opticians, 111 New Bond Street, LONDON, W.  
(CORNER OF BROOK STREET).  
MANUFACTORY—CLAPHAM COMMON.

# Ross' Universal Symmetrical Lenses.

(NEW SERIES, EXTRA RAPID)

For Landscapes, Portraits, Groups, and Instantaneous Pictures,

And every description of Outdoor Photography.

|                        |                   |               |                  |                |                  |                |                  |                |
|------------------------|-------------------|---------------|------------------|----------------|------------------|----------------|------------------|----------------|
| U.S. Nos.              | 2                 | 4             | 8                | 16             | 32               | 64             | 128              | 256            |
| Ratio of<br>Stops... } | $\frac{f}{5.657}$ | $\frac{f}{8}$ | $\frac{f}{11.3}$ | $\frac{f}{16}$ | $\frac{f}{22.6}$ | $\frac{f}{32}$ | $\frac{f}{45.2}$ | $\frac{f}{64}$ |



ROSS' UNIVERSAL SYMMETRICAL.

These Lenses work with double the rapidity of the Rapid Symmetricals. They are the result of exhaustive calculations, are constructed of Special Jena Glass, are perfectly aplanatic, giving brilliant portraits, groups, and other suitable subjects, with full aperture. They are therefore adapted for Studio work, and when stopped down to the same extent as the Rapid Symmetricals are suitable for all kinds of Outdoor Photography, Copying, and Enlarging. Their great rapidity renders them specially useful for obtaining fully exposed instantaneous pictures with rapid shutters, and the smaller sizes are invaluable for use in Detective Cameras.

These Lenses are furnished with Waterhouse Diaphragms, or with Ross' Improved 'Iris,' without any increase in the outside dimensions of the mount.

## REVISED PRICES, SIZES, &c., OF THE UNIVERSAL SYMMETRICAL LENSES.

| Size of View with Medium Stop. | Size of Group. | Diameters of Lenses. | Equiv. Focus. | PRICE IN RIGID SETTINGS.   |                     |                           | Flanges. See page 36. |
|--------------------------------|----------------|----------------------|---------------|----------------------------|---------------------|---------------------------|-----------------------|
|                                |                |                      |               | With Waterhouse Diaphragm. | Aluminium Settings. | Extra for Iris Diaphragm. |                       |
| 4½ × 3½                        | 3 × 3          | 1 inch               | 4½ ins.       | £4 10 0                    | £5 10 0             | £0 10 0                   | No. 1                 |
| 5 × 4                          | 4½ × 3½        | 1 7/8                | 6 "           | 6 0 0                      | 7 10 0              | 0 15 0                    | " 2                   |
| 6 × 5                          | 5 × 4          | 1 7/8                | 7 1/2 "       | 7 0 0                      | 8 10 0              | 0 15 0                    | " 3                   |
| 8 × 5                          | 6 × 5          | 1 7/8                | 9 "           | 8 0 0                      | 9 10 0              | 0 15 0                    | " 4                   |
| 8½ × 6½                        | 8 × 5          | 2 "                  | 10 1/2 "      | 9 0 0                      | 11 0 0              | 1 0 0                     | " 5                   |
| 9 × 7                          | 8½ × 6½        | 2 1/8                | 12 "          | 11 0 0                     | 14 0 0              | 1 5 0                     | " 6                   |
| 10 × 8                         | 9 × 7          | 2 1/8                | 14 "          | 13 0 0                     | 17 0 0              | 1 10 0                    | " 8                   |
| 12 × 10                        | 10 × 8         | 2 1/8                | 16 "          | 16 0 0                     | 21 0 0              | 2 0 0                     | " 9                   |
| 13 × 11                        | 12 × 10        | 3 1/8                | 18 "          | 18 0 0                     | 25 0 0              | 2 10 0                    | " 11                  |
| 15 × 12                        | 13 × 11        | 3 1/8                | 20 "          | 23 0 0                     | 32 0 0              | 2 15 0                    | " 14                  |
| 18 × 16                        | 15 × 12        | 4 1/8                | 24 "          | 30 0 0                     | 42 0 0              | 3 10 0                    | " 16                  |
| 22 × 18                        | 18 × 16        | 5 1/8                | 30 "          | 50 0 0                     | 65 0 0              | 4 0 0                     | " —                   |

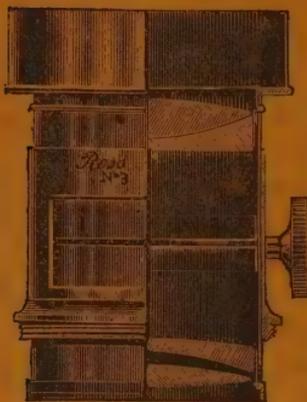
FIVE PER CENT DISCOUNT FOR CASH.

ROSS & CO., Opticians, 111 New Bond Street, LONDON, W.

(CORNER OF BROOK STREET),

MANUFACTORY—CLAPHAM COMMON.

# ROSS' IMPROVED PORTRAIT LENSES.



ROSS' IMPROVED PORTRAIT LENS.

THESE LENSES are constructed on the Petzval formula to give all the sharpness that can be optically obtained, and enlargements from small negatives may be produced with them, which will compare favourably with others of the same size taken direct with a large lens. This is the most severe test of their defining power.

When a Portrait Lens is used for standing figures, it is desirable to employ one of longer focus than necessary to cover the plate, as it can be worked with a larger stop, and consequently with greater rapidity.

No. 1 and No. 2 Portrait Lenses are not now made, having been superseded by the Carte-de-Visite and Cabinet Lenses, which give a flatter field and better marginal definition.

- No. 3 Portrait Lens, lenses  $3\frac{1}{2}$  inches in diameter, back focus 10 inches. Produces fine Portraits on plates  $6\frac{1}{2} \times 4\frac{3}{4}$ . Price £16 10 0
- No. 3A Ditto ditto, lenses 4 inches diameter, 12 inches back focus, for pictures on plates  $8\frac{1}{2} \times 6\frac{1}{2}$  inches and under ... Price 26 0 0
- No. 4 Ditto ditto, lenses  $4\frac{1}{2}$  inches diameter, 15 inches back focus, for pictures on plates  $10 \times 8$  inches and under ... Price 36 0 0
- No. 5 Ditto ditto, lenses 5 inches diameter, 20 inches back focus, for portraits on plates  $15 \times 12$  and under... ... Price 40 0 0
- No. 6 Ditto ditto, lenses 6 inches diameter, 24 inches back focus, for portraits on plates  $18 \times 16$  and under... ... Price 50 0 0

*The above prices include a set of Waterhouse Diaphragms in morocco case.*

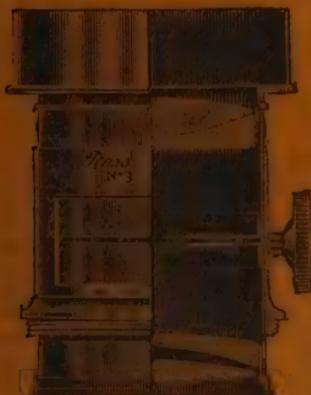
These Lenses are admirably adapted for Vignettes, Half-lengths, and Sitting Figures, but for Full-lengths the Cabinet and Carte Series are preferable, having a flatter field.

FIVE PER CENT DISCOUNT FOR CASH.

ROSS & CO., Opticians, 111 New Bond Street, LONDON, W.  
(CORNER OF BROOK STREET).  
MANUFACTORY—CLAPHAM COMMON.

# ROSS'

## Rapid 'Cabinet' and 'Carte-de-Visite' LENSES.



No. 3 CARTE-DE-VISITE LENS,  
QUARTER-SIZE.

**R**OSS' 'Cabinet' and 'Carte' Lenses differ from ordinary Portrait Lenses in being constructed to give as flat a field as is consistent with good marginal definition. They are invaluable for the production of either standing or sitting figures with full aperture, and give very rapid results with brilliancy and exquisite defining power.

### CABINET LENSES.

- |                                                                                                                              |         |
|------------------------------------------------------------------------------------------------------------------------------|---------|
| No. 1 Cabinet Lens, $2\frac{1}{2}$ inches clear aperture, 6 inches focus; should be placed 14 feet from the sitter ... ..    | £12 0 0 |
| No. 2 Ditto ditto, $3\frac{1}{4}$ inches clear aperture, 8 inches focus; should be placed at 18 feet from the sitter ... ..  | 16 10 0 |
| No. 3 Ditto ditto, $3\frac{1}{2}$ inches clear aperture, 10 inches focus; should be placed at 20 feet from the sitter ... .. | 18 10 0 |

*The above prices include a set of Waterhouse Diaphragms in morocco case.*

In choosing a Cabinet Lens the same rule applies as in the selection of a Carte Lens—viz., that for obtaining the best results it is desirable to use No. 3 when the Studio exceeds 20 feet in length. Many of the finest Cabinet portraits from the first Studios in Paris, London, and New York are taken with this Lens.

### CARTE-DE-VISITE LENSES.

- |                                                                                                                                               |         |
|-----------------------------------------------------------------------------------------------------------------------------------------------|---------|
| No. 1 Carte-de-Visite Lens, $1\frac{3}{4}$ inch diameter, $4\frac{1}{2}$ inches focus; requires 14 feet between the subject and Camera ... .. | £5 10 0 |
| No. 2 Ditto ditto, $2\frac{1}{8}$ inches diameter, $4\frac{3}{4}$ inches focus; requires 16 feet between the subject and Camera ... ..        | 6 0 0   |
| No. 3 Ditto ditto, $2\frac{1}{2}$ inches diameter, 6 inches focus; requires from 19 to 20 feet between the subject and Camera ... ..          | 11 0 0  |

In all cases where the length of Studio exceeds 20 feet it is desirable, to obtain the best results, to use the No. 3 C.-D.-V. Lens, in consequence of the pleasing pictures and correct perspective obtained; for short Studios (less than 20 feet) the No. 2, or even No. 1, will be found to give excellent results; but it is recommended that a Diaphragm be used, and care be taken that the Camera is placed at a proper elevation.

FIVE PER CENT DISCOUNT FOR CASH.

**ROSS & CO.,** Opticians, 111 New Bond Street, LONDON, W.  
(CORNER OF BROOK STREET).  
**MANUFACTORY—CLAPHAM COMMON.**

# UNIVERSAL LENSES

For Groups, Portraits, or Studies in the Studio, Interiors, Copying, &c. F 6.

The 'UNIVERSALS' are not designed to compete with the Rapid Portrait Lenses, which have about twice their intensity when used with full aperture, but on account of their excellent covering qualities and moderate cost, they will be much appreciated for taking large Portraits, Busts, and Groups in the open air or in well-lighted studios, when the expense of a large Portrait Lens is an objection.

| Nos.         | 1       | 2       | 3       | 4       | 5       | 6       | 7       |
|--------------|---------|---------|---------|---------|---------|---------|---------|
| Focus .....  | 8½-in.  | 10¾-in. | 13½-in. | 16½-in. | 20-in.  | 24-in.  | 30-in.  |
| Views .....  | 8½ × 6½ | 10 × 8  | 12 × 10 | 15 × 12 | 18 × 16 | 22 × 18 | 25 × 22 |
| Groups ..... | 7½ × 4½ | 8½ × 6½ | 10 × 8  | 12 × 10 | 15 × 12 | 18 × 16 | 22 × 18 |
| Prices ..... | £7 0 0  | £8 10 0 | £12 0 0 | £16 0 0 | £24 0 0 | £43 0 0 | £52 0 0 |

*The above prices include Waterhouse Stops.*

## Ross' Special Lenses for Hand Cameras.

| In Bronzed Mounts.<br>Can be supplied accurately paired<br>when required. | Working at F 8.                 |                          | Working at F 6.667.             |                          |
|---------------------------------------------------------------------------|---------------------------------|--------------------------|---------------------------------|--------------------------|
|                                                                           | With<br>Ordinary<br>Diaphragms. | With Iris<br>Diaphragms. | With<br>Ordinary<br>Diaphragms. | With Iris<br>Diaphragms. |
| 3-inch focus ... ..                                                       | £2 15 0                         | £3 5 0                   | £4 0 0                          | £4 10 0                  |
| 4 " " ... ..                                                              | 3 0 0                           | 3 10 0                   | 4 5 0                           | 4 15 0                   |
| 5 " " ... ..                                                              | 3 5 0                           | 3 15 0                   | 4 10 0                          | 5 0 0                    |
| 6 " " ... ..                                                              | 3 10 0                          | 4 0 0                    | 5 0 0                           | 5 15 0                   |

FIVE PER CENT DISCOUNT FOR CASH.

ROSS & CO., Opticians, 111 New Bond Street, LONDON, W.  
(CORNER OF BROOK STREET).

MANUFACTORY—CLAPHAM COMMON.

## ROSS' COMPOUND STEREO LENSES.

COMPOUND LENS, for Stereo Portraits, Groups, and Views.

Diameter of front Lens  $1\frac{3}{8}$  inch; back ditto,  $1\frac{1}{8}$  inch,

$3\frac{1}{2}$  inch focus, with Rack and Pinion and Diaphragms... £4 10 0

Ditto, ditto, without Rack and Pinion ... .. 4 0 0

This Lens gives a brilliant image, and is used in Studios where there is not sufficient room to work Lenses of longer focus. Being very rapid it is well adapted for Portraits of Children, Animals, &c., as well as Marine and Street views. Can be had in pairs, accurately matched.

## ROSS' SYMMETRICAL STEREO LENSES.

ACCURATELY PAIRED.

No. 1 SYMMETRICAL STEREO, 3-inch focus, per pair ... £6 0 0

No. 2 Ditto, ditto, 4-inch " " ... 6 0 0

No. 3 Ditto, ditto, 5-inch " " ... 6 10 0

No. 4 Ditto, ditto, 6-inch " " ... 7 0 0

## ROSS' SINGLE STEREO VIEW LENSES.

STEREO SINGLE LENS,  $4\frac{1}{2}$ -inch focus,  $1\frac{1}{2}$ -inch diameter... £1 7 6

Ditto, ditto, ditto, with Rack and Pinion ... 2 0 0

Ditto, ditto, 6-inch focal length,  $1\frac{1}{2}$ -inch diameter 1 7 6

Ditto, ditto, ditto, with Rack and Pinion ... 2 0 0

THE WILSONIAN SINGLE LENS, 6-inch focus,  $1\frac{1}{2}$ -inch diameter ... .. 1 17 6

Ditto, ditto, with Rack and Pinion ... .. 2 7 6

ROSS' POWERFUL FOCUSING MAGNIFIER ... 0 15 0

INSTANTANEOUS SHUTTERS or SKY SHADES, from 0 7 6

FIVE PER CENT DISCOUNT FOR CASH.

## CAUTION.

*EVERY* Lens sent out is engraved 'ROSS & LONDON,' with its stock number, by which it can be verified in Ross & Co.'s Register. Large numbers of Lenses purporting to be of Ross' manufacture, but which are worthless imitations, are frequently palmed off on the unwary. Ross & Co. therefore find it necessary to caution Amateur and Professional Photographers to beware of such fraudulent imitations, and to purchase from the manufacturers direct or through respectable recognised dealers.

ROSS & CO., Opticians, 111 New Bond Street, LONDON, W.  
(CORNER OF BROOK STREET).

MANUFACTORY—CLAPHAM COMMON.

ZEISS' PATENT  
ANASTIGMATIC LENSES,

MANUFACTURED BY

→⌘ ROSS & CO. ⌘←

Sole Manufacturing Licensees for the British Empire.

---

**T**HESE Lenses are the result of calculations with the new Jena Glass, and differ in principle from all other Lenses hitherto constructed.

The Lenses are chromatically corrected for both the axial and extra-axial portions of the field; the photographic image is coincident with the visually focussed image, and both are of equal magnitude. They are, therefore, free from difference of focus and chromatic difference of magnification.

They are spherically corrected for the aperture of the largest of the diaphragms supplied with each Lens, and a sharp image is, therefore, obtainable even with this largest diaphragm. Focussing is, accordingly, not affected by interchange of diaphragms, and the *subject may be focussed with any diaphragm other than that which is to be actually employed during exposure.*

In computing the formulæ particular attention has been paid to compensating, as far as possible, the evil effects arising from reflexions. All the images due to reflexion have successfully been brought into such positions as not to exercise any prejudicial influence on the 'brilliance' of the image. In this respect the new doublets are hardly inferior to single lenses.

The 'flare-spot' does not show itself with any of these Lenses; it does not even appear when dazzling light enters the Lens.

The glasses used for these Lenses are exclusively very colourless SILICATE glasses; and are in a high degree transparent to actinic rays. The Lenses are, therefore, *rapid in proportion to their effective aperture*, and thus satisfy one of the great wishes of photographers—viz., combination of *rapidity with depth of focus.*

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ROSS & CO., Opticians, 111 New Bond Street, LONDON, W.  
(CORNER OF BROOK STREET).

MANUFACTORY—CLAPHAM COMMON.

SERIES II.

**ZEISS' ANASTIGMAT, 1:6.3.**

MANUFACTURED BY ROSS & CO.

OUTDOOR INSTANTANEOUS LENS FOR SHORTEST POSSIBLE EXPOSURE.

(Doublet of 5 Lenses, Field over 80 degrees).

| NO. | Equiv. focus. Inches. | Largest effective diameter of Lens. Inches. | Size of Plate covered at $\frac{1}{9}$ . Inches. | PRICES.                                  |                                    |                                      |
|-----|-----------------------|---------------------------------------------|--------------------------------------------------|------------------------------------------|------------------------------------|--------------------------------------|
|     |                       |                                             |                                                  | Brass Mounts with Waterhouse Diaphragms. | Brass Mounts with Iris Diaphragms. | Alumin. Mounts with Iris Diaphragms. |
| 1   | 3 $\frac{1}{2}$       | 1                                           | 2 $\frac{1}{2}$ X 3 $\frac{1}{4}$                | £4 0 0                                   | £4 15 0                            | £5 5 0                               |
| 2   | 4 $\frac{1}{2}$       | 1                                           | 3 $\frac{1}{2}$ X 4                              | 4 10 0                                   | 5 5 0                              | 5 15 0                               |
| 3   | 5 $\frac{1}{2}$       | 1                                           | 3 $\frac{1}{2}$ X 4 $\frac{1}{4}$                | 5 10 0                                   | 6 5 0                              | 6 15 0                               |
| 4   | 6 $\frac{1}{2}$       | 1 $\frac{1}{2}$                             | 4 $\frac{1}{2}$ X 6                              | 7 0 0                                    | 7 15 0                             | 8 5 0                                |
| 5   | 8 $\frac{1}{2}$       | 1 $\frac{1}{2}$                             | 5 $\frac{1}{2}$ X 7 $\frac{1}{4}$                | 9 0 0                                    | 9 15 0                             | 10 5 0                               |
| 6   | 10                    | 2                                           | 5 $\frac{1}{2}$ X 8 $\frac{1}{2}$                | 11 0 0                                   | 11 15 0                            | 12 10 0                              |
| 7   | 12                    | 2                                           | 6 $\frac{1}{2}$ X 8 $\frac{1}{2}$                | 15 0 0                                   | 16 0 0                             | 16 15 0                              |
| 8   | 14 $\frac{1}{2}$      | 2 $\frac{1}{2}$                             | 7 $\frac{1}{2}$ X 9 $\frac{1}{2}$                | 21 0 0                                   | 22 0 0                             | 23 0 0                               |
| 9   | 17 $\frac{1}{2}$      | 2 $\frac{1}{2}$                             | 8 $\frac{1}{2}$ X 10 $\frac{1}{2}$               | 27 0 0                                   | 28 0 0                             | 29 0 0                               |
| 10  | 20 $\frac{1}{2}$      | 3                                           | 9 $\frac{1}{2}$ X 12                             | 34 0 0                                   | 35 0 0                             | 36 5 0                               |
| 11  | 23 $\frac{1}{2}$      | 3 $\frac{1}{2}$                             | 10 $\frac{1}{2}$ X 14                            | 42 10 0                                  | 43 10 0                            | 44 15 0                              |

THE ABOVE PRICES ARE NET.

**SERIES IIIa. ANASTIGMAT. 1:9.**

Manufactured by ROSS & CO.

INSTANTANEOUS OUTDOOR LENS AND GROUP LENS.

(Doublet of 5 Lenses, Field over 90 degrees).

| NO. | Equiv. focus. Inches. | Largest effective diameter of Lens. Inches. | Size of Plate covered at $\frac{1}{12.5-13}$ . Inches. | PRICES.                                 |                                    |                                      |
|-----|-----------------------|---------------------------------------------|--------------------------------------------------------|-----------------------------------------|------------------------------------|--------------------------------------|
|     |                       |                                             |                                                        | Brass Mounts with Revolving Diaphragms. | Brass Mounts with Iris Diaphragms. | Alumin. Mounts with Iris Diaphragms. |
| 1   | 4 $\frac{1}{2}$       | 1                                           | 3 $\frac{1}{2}$ X 4 $\frac{1}{2}$                      | £4 0 0                                  | £ —                                | £ —                                  |
| 2   | 6                     | 1                                           | 4 $\frac{1}{2}$ X 6                                    | 4 10 0                                  | —                                  | —                                    |
| 3   | 6 $\frac{1}{2}$       | 1                                           | 5 $\frac{1}{2}$ X 7 $\frac{1}{2}$                      | 5 5 0                                   | 6 0 0                              | 6 10 0                               |
| 4   | 7 $\frac{1}{2}$       | 1                                           | 5 $\frac{1}{2}$ X 8 $\frac{1}{2}$                      | 6 0 0                                   | 6 15 0                             | 7 5 0                                |
| 5   | 9 $\frac{1}{2}$       | 1 $\frac{1}{2}$                             | 6 $\frac{1}{2}$ X 8 $\frac{1}{2}$                      | 7 10 0                                  | 8 5 0                              | 8 15 0                               |
| 6   | 10 $\frac{1}{2}$      | 1 $\frac{1}{2}$                             | 7 $\frac{1}{2}$ X 9 $\frac{1}{2}$                      | 9 0 0                                   | 9 15 0                             | 10 5 0                               |
| 7   | 12 $\frac{1}{2}$      | 1 $\frac{1}{2}$                             | 8 $\frac{1}{2}$ X 10 $\frac{1}{2}$                     | 12 0 0                                  | 12 15 0                            | 13 10 0                              |
| 8   | 16 $\frac{1}{2}$      | 2                                           | 9 $\frac{1}{2}$ X 12                                   | 17 10 0                                 | 18 10 0                            | 19 5 0                               |
| 9   | 20 $\frac{1}{2}$      | 2 $\frac{1}{2}$                             | 10 $\frac{1}{2}$ X 13 $\frac{1}{2}$                    | 22 10 0                                 | 23 10 0                            | 24 10 0                              |
| 10  | 24                    | 2 $\frac{1}{2}$                             | 12 X 16                                                | 30 0 0                                  | 31 0 0                             | 32 0 0                               |
| 11  | 27 $\frac{1}{2}$      | 3                                           | 13 $\frac{1}{2}$ X 18                                  | 37 10 0                                 | 38 10 0                            | 39 15 0                              |
| 12  | 65                    | 3 $\frac{1}{2}$                             | 16 X 20                                                | 45 0 0                                  | 46 0 0                             | 47 5 0                               |

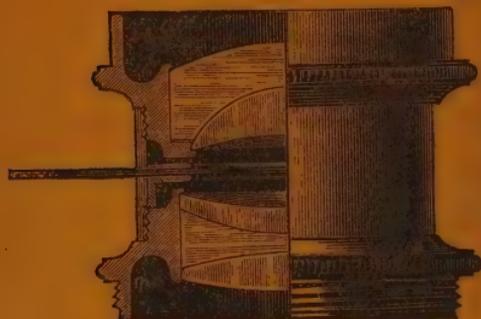
THE ABOVE PRICES ARE NET.

ROSS & CO., Opticians, 111 New Bond Street, LONDON, W.

(CORNER OF BROOK STREET).

MANUFACTORY—CLAPHAM COMMON.

SERIES III. (Patent).  
**ZEISS' ANASTIGMAT 1:7.2.**  
**(RAPID LENS)**



ZEISS, Series III.

MANUFACTURED BY  
**ROSS & CO.,**  
 SOLE LICENSEES  
 FOR THE BRITISH EMPIRE.

RATIO OF STOPS :

1/7:2, 1/9, 1/12, 1/18, 1/25, 1/36,  
 1/50, 1/71.

**T**HIS ANASTIGMAT consists of a double front lens and a triple back lens. It is intended for Portraits, Groups, Copying, and General Outdoor Work. The combinations being brought closely together, gives them great illuminating power. They have an angular aperture of from  $85^\circ$  to  $90^\circ$ , and can therefore be used as wide-angle lenses when desired.

In consequence of the peculiar system of correction for oblique pencils adopted in these lenses they behave somewhat differently from the usual types with regard to the mode of compensating the effect of the resulting aberrations between centre and margin of the field. This is, of course, only possible in the case of perfectly plane objects. In all other cases (landscape, instantaneous work, or interiors), the centre should be focussed, and rather for objects at a distance than for near objects.

| No. | Equivalent Focus. |                | Free diameter of largest lens. |                | Size of plate covered with stop $f/12.5$ . |                                      | Diameter of image circle at $80^\circ$ . |                 | Price with Waterhouse Stops. | Price with Aluminium Mounts and Iris Diaphragms. |
|-----|-------------------|----------------|--------------------------------|----------------|--------------------------------------------|--------------------------------------|------------------------------------------|-----------------|------------------------------|--------------------------------------------------|
|     | mm.               | in.            | mm.                            | in.            | cm.                                        | in.                                  | cm.                                      | in.             |                              |                                                  |
| 1   | 96                | $3\frac{3}{4}$ | 16                             | $\frac{5}{8}$  | 8 × 10                                     | $3\frac{1}{4} \times 4$              | 16                                       | $6\frac{1}{8}$  | £3 10 0                      | £5 5 0                                           |
| 2   | 120               | $4\frac{3}{4}$ | 19.5                           | $\frac{3}{4}$  | 9 × 12                                     | $3\frac{1}{2} \times 4\frac{3}{4}$   | 20                                       | $7\frac{7}{8}$  | 4 0 0                        | 5 15 0                                           |
| 3   | 148               | $5\frac{7}{8}$ | 25                             | 1              | 12 × 15                                    | $4 \times 5\frac{1}{2}$              | 25                                       | $9\frac{7}{8}$  | 4 10 0                       | 6 5 0                                            |
| 4   | 195               | $7\frac{1}{2}$ | 31                             | $1\frac{1}{4}$ | 13 × 18                                    | $5\frac{1}{2} \times 7$              | 33                                       | 13              | 6 0 0                        | 8 0 0                                            |
| 5   | 220               | $8\frac{3}{4}$ | 36                             | $1\frac{1}{2}$ | 13 × 21                                    | $5\frac{1}{2} \times 8\frac{1}{2}$   | 38                                       | 15              | 7 10 0                       | 9 10 0                                           |
| 6   | 250               | 9              | 42                             | $1\frac{3}{4}$ | 16 × 21                                    | $6\frac{1}{2} \times 8\frac{1}{2}$   | 42                                       | $16\frac{1}{2}$ | 9 0 0                        | 11 5 0                                           |
| 7   | 315               | 12             | 51.5                           | 2              | 18 × 24                                    | $7 \times 9\frac{3}{4}$              | 53                                       | $20\frac{1}{8}$ | 12 0 0                       | 15 0 0                                           |
| 8   | 442               | 17             | 71                             | 2              | 24 × 30                                    | $9\frac{1}{2} \times 11\frac{1}{2}$  | 74                                       | $29\frac{1}{8}$ | 19 0 0                       | 22 10 0                                          |
| 9   | 586               | 23             | 94                             | 3              | 30 × 40                                    | $11\frac{1}{4} \times 15\frac{1}{4}$ | 98                                       | $38\frac{3}{8}$ | 27 0 0                       | 31 0 0                                           |

Cost of pairing two Lenses for Stereo work, 8/-.

Nos. 1 to 6 inclusive can be fitted with Iris Diaphragms at a cost of 15/- each, and Nos. 7 and 8 for £1 each. *The above prices are net.*

**ROSS & CO.,** Opticians, 111 New Bond Street, LONDON, W.  
 (CORNER OF BROOK STREET).  
**MANUFACTORY—CLAPHAM COMMON.**

SERIES IV.

# ZEISS' ANASTIGMAT

1:12.5.

RAPID WIDE ANGLE AND COPYING LENS.



ZEISS. Series IV.

MANUFACTURED BY

**ROSS & Co.,**

*Sole Licensees for the British Empire.*

RATIO OF STOPS.

|      |    |    |    |    |    |
|------|----|----|----|----|----|
| I    | I  | I  | I  | I  | I  |
| 12.5 | 18 | 25 | 36 | 50 | 71 |

**T**HIS Anastigmat consists of four lenses cemented to form two combinations. The field with the smaller numbers measures about 100°, with the larger numbers over 85°. It is sufficiently rapid for instantaneous pictures out of doors, and at the same time a very fine Wide Angle Lens. Since its introduction this series has met with great favour, and it is confidently recommended for Landscapes, Architecture, Seascapes, and interiors.

| No. | Equivalent focus. |        | Free diameter of largest lens. |       | Size of plate covered with stops. $f/18-f/25$ . |                 | Diameter of image circle at 96° |        | Price with Ordinary Stops. | Price with Aluminium Mounts. Ordinary Stops. |
|-----|-------------------|--------|--------------------------------|-------|-------------------------------------------------|-----------------|---------------------------------|--------|----------------------------|----------------------------------------------|
|     | mm.               | in.    | mm.                            | in.   | cm.                                             | in.             | cm.                             | in.    |                            |                                              |
| 1   | 62                | 2 1/8  | 6                              |       | 8 x 10                                          | 3 1/4 x 4       | 14                              | 5 1/2  | £3 4 0                     | £4 5 0                                       |
| 2   | 98                | 3 7/8  | 9                              |       | 9 x 12                                          | 3 1/2 x 4 1/2   | 22                              | 8 3/8  | 3 4 0                      | 4 5 0                                        |
| 3   | 119               | 4 3/4  | 12                             |       | 12 x 15                                         | 4 1/2 x 5 1/2   | 27                              | 10 3/8 | 3 4 0                      | 4 5 0                                        |
| 4   | 154               | 6 1/8  | 15.5                           |       | 13 x 21                                         | 5 1/2 x 8 1/2   | 34                              | 13 3/8 | 4 0 0                      | 5 0 0                                        |
| 5   | 196               | 7 7/8  | 20                             |       | 18 x 24                                         | 7 x 9 1/2       | 44                              | 17 1/2 | 5 0 0                      | 6 0 0                                        |
| 6   | 260               | 10 1/2 | 26                             | 1     | 24 x 30                                         | 9 1/2 x 11 1/2  | 58                              | 22 3/4 | 7 10 0                     | 8 15 0                                       |
|     |                   |        |                                |       | with stop $f/36$                                |                 | at 85°                          |        |                            |                                              |
| 7   | 386               | 15 1/2 | 33                             | 1 1/8 | 30 x 40                                         | 11 1/2 x 15 1/2 | 71                              | 28     | 10 0 0                     | 11 10 0                                      |
| 8   | 605               | 23 3/4 | 51                             | 2     | 40 x 50                                         | 15 1/2 x 19 1/2 | 110                             | 43 1/2 | 17 10 0                    | 19 10 0                                      |
| 9   | 906               | 35 3/4 | 75                             | 3     | 50 x 60                                         | 19 1/2 x 23 1/2 | 163                             | 64 1/2 | 40 0 0                     | 42 10 0                                      |
| 10  | 1228              | 49     | 99                             | 3 7/8 | 60 x 75                                         | 23 1/2 x 29 1/2 | 219                             | 86     | 90 0 0                     | 92 10 0                                      |

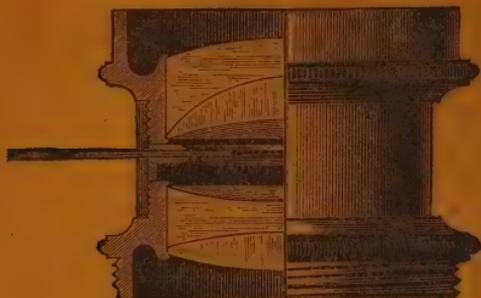
The cost of pairing two lenses for stereos is 8/- Nos. 5 to 7 can be supplied with Iris for 15/- extra, and No. 8 for £1. The smaller sizes will not admit the Iris arrangement.

THE ABOVE PRICES ARE NET.

**ROSS & CO.,** Opticians, 111 New Bond Street, LONDON, W.  
(CORNER OF BROOK STREET).  
Manufactory—CLAPHAM COMMON.

## SERIES V. (Patent.)

## ZEISS' ANASTIGMAT, 1:18



ZEISS. Series V.

WIDE ANGLE & COPYING  
LENS.

MANUFACTURED BY

ROSS &amp; CO.,

*Sole Licensees for the British  
Empire.*

RATIO OF STOPS.

1/18, 1/25, 1/36, 1/50, 1/71.

**T**HIS Doublet consists of four single lenses cemented to form two combinations. The field measures with the smaller numbers about  $108^\circ$ , with the larger ones about  $90^\circ$ . The first seven sizes are specially useful for interiors or work in confined situations. The five larger sizes are specially intended for the reproduction of maps, plans, and drawings, they yield a perfectly flat and anastigmatic image, and are perfectly free from distortion.

| No.                     | Equivalent focus. |                  | Free diameter of largest lens. | Size of plate covered with stop $f/36$ . |          | Diameter of image circle at $104^\circ$ . |                  | Price with Ordinary Stops. | Price with Aluminium Mounts. Ordinary Stops. |         |          |
|-------------------------|-------------------|------------------|--------------------------------|------------------------------------------|----------|-------------------------------------------|------------------|----------------------------|----------------------------------------------|---------|----------|
|                         | mm.               | in.              |                                | mm.                                      | in.      | cm.                                       | in.              |                            |                                              |         |          |
| 1                       | 86                | 3 $\frac{3}{8}$  | 7'5                            | $2\frac{1}{2}$                           | 12 x 15  | 4 $\frac{1}{2}$                           | 5 $\frac{7}{8}$  | 22                         | 8 $\frac{5}{8}$                              | £3 4 0  | £4 5 0   |
| 2                       | 112               | 4 $\frac{1}{2}$  | 9'5                            | $2\frac{3}{4}$                           | 13 x 18  | 5 $\frac{1}{2}$                           | 7 $\frac{1}{2}$  | 28                         | 11                                           | 3 4 0   | 4 5 0    |
| 3                       | 141               | 5 $\frac{3}{8}$  | 12                             | 3                                        | 16 x 21  | 6 $\frac{1}{4}$                           | 8 $\frac{1}{4}$  | 36                         | 14 $\frac{1}{2}$                             | 4 0 0   | 5 0 0    |
| 4                       | 182               | 7 $\frac{1}{8}$  | 14'5                           | 3 $\frac{1}{2}$                          | 20 x 26  | 7 $\frac{1}{2}$                           | 10 $\frac{1}{2}$ | 40                         | 15 $\frac{3}{4}$                             | 5 0 0   | 6 0 0    |
| 5                       | 212               | 8 $\frac{3}{8}$  | 17'5                           | 4                                        | 24 x 30  | 9 $\frac{1}{2}$                           | 11 $\frac{1}{2}$ | 54                         | 21 $\frac{1}{2}$                             | 6 0 0   | 7 5 0    |
| 6                       | 265               | 10 $\frac{1}{2}$ | 20'5                           | 4 $\frac{1}{2}$                          | 26 x 35  | 10 $\frac{1}{2}$                          | 13 $\frac{3}{4}$ | 68                         | 26 $\frac{3}{4}$                             | 7 10 0  | 8 15 0   |
| 7                       | 315               | 12 $\frac{1}{2}$ | 23'5                           | 5                                        | 30 x 40  | 11 $\frac{1}{2}$                          | 15 $\frac{1}{2}$ | 80                         | 31 $\frac{1}{2}$                             | 9 10 0  | 10 10 0  |
| Reproductions of charts |                   |                  |                                |                                          |          | at $85^\circ$ .                           |                  |                            |                                              |         |          |
| 8                       | 460               | 18 $\frac{1}{2}$ | 26                             | 1                                        | 30 x 40  | 11 $\frac{3}{4}$                          | 15 $\frac{3}{4}$ | 84                         | 33 $\frac{1}{2}$                             | 12 0 0  | 14 0 0   |
| 9                       | 632               | 24 $\frac{1}{2}$ | 35                             | 1 $\frac{1}{2}$                          | 40 x 50  | 15 $\frac{3}{4}$                          | 19 $\frac{3}{4}$ | 116                        | 46                                           | 17 10 0 | 19 15 0  |
| 10                      | 947               | 37 $\frac{1}{2}$ | 54                             | 2 $\frac{1}{2}$                          | 50 x 65  | 19 $\frac{3}{4}$                          | 25 $\frac{1}{2}$ | 173                        | 68 $\frac{1}{2}$                             | 35 0 0  | 37 10 0  |
| 11                      | 1310              | 51 $\frac{1}{2}$ | 76                             | 3                                        | 70 x 86  | 27 $\frac{1}{2}$                          | 34               | 240                        | 94 $\frac{1}{2}$                             | 60 0 0  | 62 10 0  |
| 12                      | 1660              | 65 $\frac{1}{2}$ | 100                            | 4                                        | 90 x 110 | 35 $\frac{1}{2}$                          | 43 $\frac{1}{2}$ | 300                        | 118                                          | 100 0 0 | 102 10 0 |

The cost of pairing two lenses Diaphragms is 8/-

Nos. 5 to 9 inclusive can be fitted with Iris Diaphragm at a cost of 15/- extra.

The smaller sizes cannot be so fitted. The above prices are net.

ROSS & CO., Opticians, 111 New Bond Street, LONDON, W.  
(CORNER OF BROOK STREET).

Manufactory—CLAPHAM COMMON.

# GOERZ' PATENT Double Anastigmat Lenses

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**R. C. P. GOERZ** has the pleasure to announce that he has entered into arrangements with Messrs. ROSS & CO., the well-known Opticians, to be the Sole Manufacturers of his New Patent DOUBLE ANASTIGMAT LENSES for the British Empire.

The introduction of the DOUBLE ANASTIGMATS constitutes undoubtedly one of the greatest advances of late years in Photographic Lenses. They are absolutely free from astigmatism, covering perfectly with the largest stop (about F 8) the sizes indicated, the definition being equal over the whole plate. The DOUBLE ANASTIGMATS of the Series III. include an angle of over  $70^{\circ}$ , and excel all other lenses in marginal definition when so large an angle is included with the full aperture.

The DOUBLE ANASTIGMAT is characterised by complete absence of distortion and flare, while, from the universality of its capabilities, it will be found the most useful Lens either Amateur or Professional Photographer can possess.

The wide reputation of Messrs ROSS & CO. as leading Lens Makers for more than half a century is a guarantee that the ANASTIGMATS manufactured by them on this improved formula will give the finest possible results.

It has been arranged that the terms and prices for the DOUBLE ANASTIGMATS are exactly the same as those charged in Germany, and Price Lists and particulars will be forwarded free on application to

**ROSS & CO.,** Opticians, 111 New Bond Street, LONDON, W.  
(CORNER OF BROOK STREET.)

**MANUFACTORY—CLAPHAM COMMON.**

For Prices and Sizes see two following pages.

# THE DOUBLE ANASTIGMAT

(GOERZ' PATENT.)



SERIES III.

MANUFACTURED BY

## ROSS & CO.

### THE DOUBLE ANASTIGMAT, F 7.7, SERIES III.

This is a Universal Lens and is highly suitable for Portraits, Groups, Instantaneous Work, and Architecture. The Double Anastigmat permits the use of the largest stop without diminishing the sharpness of the image at the extreme margins of the plate up to an angle of  $70^\circ$ . By the use of a smaller stop an angle of  $90^\circ$  is obtained. Definition, brilliancy, and flatness of field are uniform all over the picture.

#### SIZES AND PRICES.

| No. | Equiv. Focus. | Plate covered. | Plate covered. | Plate covered. | Price with Waterhouse stops. | Price with Iris diaphragms. |    |
|-----|---------------|----------------|----------------|----------------|------------------------------|-----------------------------|----|
|     |               | F 8.<br>*      | F 16.<br>*     | F 64.<br>*     |                              |                             |    |
|     | ins.          | ins.           | ins.           | ins.           | £                            | s.                          | d. |
| 00  | 4             | 3 × 3          | 4½ × 3½        | 5 × 4          | 4                            | 5                           | 0  |
| 0   | 5             | 4½ × 3½        | 5 × 4          | 6½ × 4½        | 4                            | 10                          | 0  |
| 1   | 6             | 5 × 4          | 6½ × 4½        | 8 × 5          | 5                            | 5                           | 0  |
| 2   | 7             | 6½ × 4½        | 8 × 5          | 8½ × 6½        | 6                            | 10                          | 0  |
| 3   | 8½            | 8 × 5          | 8½ × 6½        | 9 × 7          | 8                            | 0                           | 0  |
| 4   | 9½            | 8½ × 6½        | 9 × 7          | 10 × 8         | 9                            | 15                          | 0  |
| 5   | 10½           | 9 × 7          | 10 × 8         | 12 × 10        | 12                           | 0                           | 0  |
| 6   | 12            | 10 × 8         | 12 × 10        | 15 × 12        | 14                           | 10                          | 0  |
| 7   | 14            | 12 × 10        | 15 × 12        | 18 × 16        | 18                           | 15                          | 0  |
| 8   | 19            | 15 × 12        | 18 × 16        | 22 × 18        | 30                           | 0                           | 0  |
| 9   | 24            | 18 × 16        | 22 × 18        | 25 × 22        | 45                           | 0                           | 0  |
| 10  | 30            | 22 × 18        | 25 × 22        | 30 × 24        | 75                           | 0                           | 0  |
| 11  | 35            | 25 × 22        | 30 × 24        | 36 × 28        | 150                          | 0                           | 0  |

\* The plates indicated as covered with F 8, F 16, and F 64, are rather under the Continental sizes given in the Patentee's list, and therefore the lenses may be advantageously used for the next larger sizes of plates under favourable conditions.

THE ABOVE PRICES ARE NET.

ROSS & CO., Opticians, 111 New Bond Street, LONDON, W.  
(CORNER OF BROOK STREET).

MANUFACTORY—CLAPHAM COMMON,

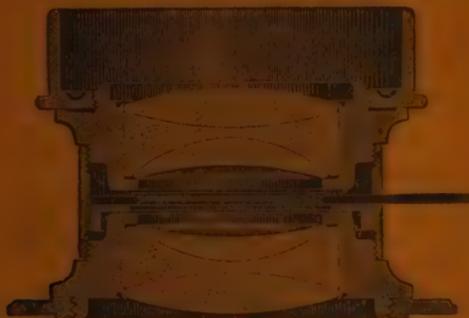
# THE DOUBLE ANASTIGMAT.

(GOERZ PATENT.)

SERIES IV.

MANUFACTURED BY

ROSS &amp; CO.



## THE DOUBLE ANASTIGMAT, *F* 11, Series IV.

This is a Wide-Angle Lens especially suitable for Copying, Enlarging, Architecture, Interiors, Groups, &c. The angle of clearly defined image, with the largest aperture, includes  $75^\circ$ , so that it may be employed for wide-angled instantaneous views, groups, and architectural work. With a smaller stop, it will define with uniform sharpness up to the margins of a plate whose diagonal is equal to twice the focus of the lens, thus including an angle of  $90^\circ$ .

### SIZES OF PLATES COVERED, AND PRICES.

| No. | Equiv. Focus. | For Reproduction, <i>F</i> 16- <i>F</i> 22. | For Enlarging, <i>F</i> 16- <i>F</i> 22. | For Groups, <i>F</i> 11. | With Smaller Stops. | Prices with Waterhouse Stops. | Prices with Iris. |
|-----|---------------|---------------------------------------------|------------------------------------------|--------------------------|---------------------|-------------------------------|-------------------|
|     | In.           | Inches.                                     | Inches.                                  | Inches.                  | Inches.             | £ s. d.                       | £ s. d.           |
| 6   | 12            | 18 × 16                                     | 12 × 10                                  | 12 × 10                  | 18 × 16             | 15 10 0                       | 16 5 0            |
| 7   | 14            | 22 × 18                                     | 15 × 12                                  | 15 × 12                  | 22 × 18             | 20 0 0                        | 20 15 0           |
| 8   | 19            | 25 × 22                                     | 18 × 16                                  | 18 × 16                  | 25 × 22             | 32 10 0                       | 33 5 0            |
| 9   | 24            | 30 × 24                                     | 22 × 18                                  | 22 × 18                  | 30 × 24             | 48 15 0                       | 49 15 0           |
| 10  | 30            | 36 × 28                                     | 25 × 22                                  | 25 × 22                  | 36 × 28             | 80 0 0                        | 81 0 0            |
| 11  | 35            | 44 × 34                                     | 30 × 24                                  | 30 × 24                  | 44 × 34             | 155 0 0                       | 156 0 0           |
| 12  | 47            | 60 × 40                                     | 36 × 28                                  | 36 × 28                  | 60 × 40             | 280 0 0                       | 283 0 0           |

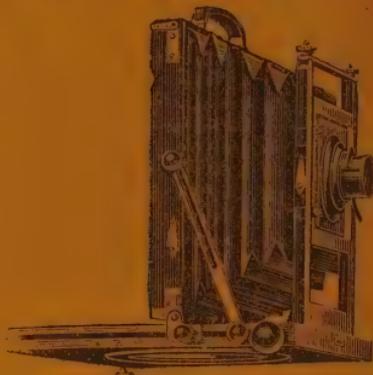
The note at bottom of page 54, respecting plates covered by Series III, applies equally to the Series IV. Lenses.

The above Prices are Net.

ROSS & CO., Opticians, 111 New Bond Street, London, W.  
(CORNER OF BROOK STREET).

MANUFACTORY—CLAPHAM COMMON,

# ROSS' NEW IMPROVED DRY-PLATE CAMERAS.



Pattern No. 1.



Pattern No. 2.

## EXTRA LIGHT & PORTABLE DOUBLE EXTENSION CAMERAS

*For Lenses of Long Focus, with Swing Back, Reversible Holder, Turntable, and Legs.*

**Pattern No. 1** closes to the smallest substance consistent with stability, and is the most Portable Camera affording every desirable motion.

**Pattern No. 2** closes like pattern No. 1, and being made for the new form of double backs is considerably LESS in its other dimensions. It is consequently the *Smallest and Lightest* Camera yet introduced.



| SIZE.   | Pattern No. 1.        |                         | Pattern No. 2.        |                         |                      |
|---------|-----------------------|-------------------------|-----------------------|-------------------------|----------------------|
|         | With one Double Back. | With three Double Backs | With one Double Back. | With three Double Backs | Turntable and Stand. |
| 6½ × 4½ | £6 11 0               | £8 15 0                 | £5 8 0                | £7 4 0                  | 1 17 6½              |
| 7½ × 5  | 7 9 0                 | 9 13 0                  | 5 16 0                | 7 12 0                  | 1 17 6               |
| 8½ × 6½ | 8 1 0                 | 10 11 0                 | 7 3 6                 | 9 5 6                   | 1 17 6               |
| 10 × 8  | 9 1 0                 | 12 5 0                  | 8 14 0                | 11 6 0                  | 2 0 0                |
| 12 × 10 | 11 10 0               | 15 10 0                 |                       |                         | 2 5 0                |
| 15 × 12 | 14 10 0               | 20 0 0                  |                       |                         | 2 10 0               |
| 18 × 16 | 22 0 0                | 29 10 0                 |                       |                         | 2 15 0½              |

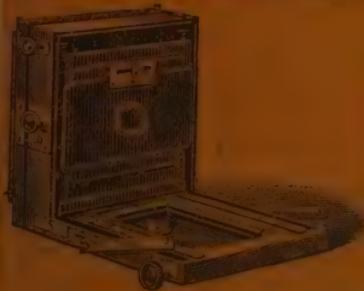
**NOTE.**—Owing to differences in form of construction, and the small size and reduced cost of the new form of Double Backs, the prices of the No. 2 Pattern will compare favourably with any Camera of the same class.

*Five per cent Discount when Remittance accompanies Order.*

**ROSS & CO.,** Opticians, 111 New Bond Street, LONDON, W.  
(CORNER OF BROOK STREET).

**MANUFACTORY—CLAPHAM COMMON.**

# ROSS' IMPROVED DRY-PLATE CAMERAS.



## Portable DOUBLE-EXTENSION CAMERAS,

For Lenses of Long Focus, with Double Swing Back, one Double Slide, and Extra Front. The  $7\frac{1}{2} \times 5$  size extends from 3 to  $17\frac{1}{2}$  inches.

| Size.   | Price.  | Highest Finish. | Square, with Reversible Holder. |                 |                |       |
|---------|---------|-----------------|---------------------------------|-----------------|----------------|-------|
|         |         |                 | Price.                          | Highest Finish. | Brass Binding. |       |
| 5 x 4   | £4 15 6 | £5 5 0          | £5 8 0                          | £6 0 0          | 18s.           | each. |
| 6½ x 4½ | 5 14 6  | 6 7 0           | 6 8 0                           | 7 2 0           | 20s.           | ..    |
| 7½ x 5  | 5 19 0  | 6 12 0          | 6 12 6                          | 7 10 0          | 20s.           | ..    |
| 8½ x 6½ | 7 2 0   | 7 18 0          | 8 2 0                           | 8 17 6          | 20s.           | ..    |
| 10 x 8  | 8 5 6   | 9 4 0           | 9 10 0                          | 10 10 0         | 25s.           | ..    |
| 12 x 10 | 9 12 0  | 10 13 0         | 10 12 6                         | 11 10 0         | 30s.           | ..    |
| 15 x 12 | 11 18 6 | 13 5 0          | 13 5 6                          | 14 15 0         | 40s.           | ..    |

DIVISION FOR STEREOSCOPIC VIEWS supplied with all  $8\frac{1}{2} \times 6\frac{1}{2}$  size and smaller Cameras, and with larger when desired.

RACK AND PINION ADJUSTMENT TO SWING BACK,  $8\frac{1}{2} \times 6\frac{1}{2}$  size and smaller, 5s. extra; larger, 10s. extra.

## Portable STEREOSCOPIC CAMERAS, IMPROVED FORM.



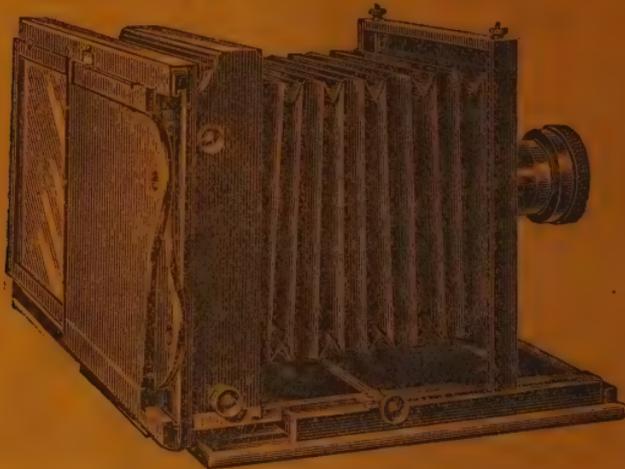
### PRICE.

| Size.                              | With one Double Slide. | With three Double Slides. |
|------------------------------------|------------------------|---------------------------|
| $6\frac{1}{2} \times 4\frac{1}{2}$ | £7 2 0                 | £9 6 0                    |
| $7\frac{1}{2} \times 5$            | 7 10 0                 | 9 14 0                    |
| $8\frac{1}{2} \times 6\frac{1}{2}$ | 8 17 6                 | 11 7 6                    |
| $10 \times 8$                      | 10 10 0                | 13 14 0                   |

Symmetrical, Rapid Symmetrical, or Single Stereoscopic Lenses, accurately paired for use with the above Cameras.

FIVE PER CENT DISCOUNT FOR CASH.

# ROSS' IMPROVED STUDIO CAMERAS.



## IMPROVED UNIVERSAL STUDIO CAMERAS

(AS ABOVE.)

For Lenses of long focus, with repeating back and inner frames.

| Size.              |       | Size.             | With Single<br>Swing Back. | With Double<br>Swing Back. | Brass<br>Binding. |
|--------------------|-------|-------------------|----------------------------|----------------------------|-------------------|
| 6½ × 6½ for Plates | ..... | 6½ × 4½ and under | £6 0 0                     | £7 0 0                     | £1 5 0            |
| 8½ × 8½            | "     | 8½ × 6½           | 7 5 0                      | 8 5 0                      | 1 5 0             |
| 9 × 9              | "     | 9 × 7             | 7 15 0                     | 8 15 0                     | 1 5 0             |
| 10 × 10            | "     | 10 × 8            | 8 15 0                     | 9 15 0                     | 1 10 0            |
| 12 × 12            | "     | 12 × 10           | 10 10 0                    | 11 15 0                    | 2 5 0             |
| 15 × 15            | "     | 15 × 12           | 15 10 0                    | 17 10 0                    | 2 15 0            |

Rack Adjustment to Swing Back, from 10s. extra.

## ➤\* PORTRAIT CAMERAS \*←

With Single Back and Two Inner Frames.

| For<br>Plates. | Square sliding body.   |                            | Screw adjustment.   |                        | BRASS<br>Binding. |
|----------------|------------------------|----------------------------|---------------------|------------------------|-------------------|
|                | Mahogany.<br>Honduras. | Mahogany.<br>Best Spanish. | With<br>Swing Back. | Without<br>Swing Back. |                   |
| 5 × 4          | £1 8 0                 | £1 18 0                    | —                   | £2 12 0                | £0 16 0           |
| 6½ × 4½        | 2 0 0                  | 2 15 0                     | £6 12 0             | 3 15 0                 | 1 0 0             |
| 8½ × 6½        | 3 10 0                 | 4 15 0                     | 10 10 0             | 6 10 0                 | 1 5 0             |
| 10 × 8         | 5 0 0                  | 7 0 0                      | 12 10 0             | 7 10 0                 | 1 10 0            |
| 12 × 10        | 6 15 0                 | 9 0 0                      | 14 0 0              | 9 10 0                 | 2 5 0             |
| 15 × 12        | 9 0 0                  | 12 0 0                     | 18 0 0              | 13 0 0                 | 2 15 0            |
| 18 × 16        | 14 10 0                | 18 0 0                     | 22 0 0              | 17 0 0                 | 3 15 0            |
| 24 × 20        | 18 0 0                 | 25 0 0                     | 30 0 0              | 25 0 0                 | 4 10 0            |

Repeating-backs for 2 or more pictures on one plate, from 42/- upwards.

Cones for copying, adapted, from 17/6 upwards.

**FIVE PER CENT** Discount when Remittance accompanies Order.

# THE 'BOND STREET' FOLDING CAMERA

FOR HAND OR STAND USE.

**THIS** Camera will specially commend itself to

Travellers and Explorers on account of its great Portability and Efficiency. It is constructed in the same style as the popular 'Ross' Divided Camera, only the best materials being used throughout. The exterior is covered with stout sewn leather, and the interior finished in a dead black, with bronze fittings. It is supplied with a sling to form a handle for carrying and to support the apparatus upon the chest when used as a Hand Camera. The back opening is fitted with a concealed full-size focussing screen, the front has horizontal and vertical sliding motions, and the focussing is effected by rack and pinion. The range of adjustment is sufficient for a long-focus lens, such as the Rapid Symmetrical, and the shortest focus wide-angle lenses can also be used. The reversing finder is made exactly to the scale of a quarter of an inch to the inch focus of lens. The tailboard folds up, and when closed conceals the lens and shutter, &c. This Camera is believed to be the most compact of its kind, the  $6\frac{1}{2} \times 4\frac{1}{2}$  size measuring only  $8\frac{1}{2} \times 4 \times 6\frac{1}{2}$  inches when closed, and it presents the appearance of a neat black leather hand case. A divided scale for various distances and two bushes for tripod screw are fitted to each Camera. Dark slides for plates or cut films, roll-holders or changing-boxes, may be used at will. The following prices include a Rapid Symmetrical Lens, a Thornton-Pickard Time and Instantaneous Shutter, and three black polished Dark Slides, or an Eastman Roll-holder. If a Changing-box is preferred the cost will be a little higher.



## — PRICES —

| Size of Plate.                     | Outside dimensions.                             | Focus of Lens.      | Price.  | Iris Diaph. extra. | Double Swing Back extra. |
|------------------------------------|-------------------------------------------------|---------------------|---------|--------------------|--------------------------|
| $5 \times 4$                       | $7 \times 3\frac{1}{2} \times 6$ in.            | $7\frac{1}{2}$ in.  | £17 0 0 | £0 10 0            | £1 12 6                  |
| $6\frac{1}{2} \times 4\frac{1}{2}$ | $8\frac{1}{2} \times 4 \times 6\frac{1}{2}$ in. | 9 in.               | 19 0 0  | 0 10 6             | 1 17 6                   |
| $7\frac{1}{2} \times 5$            | $\times \times$ in.                             | $10\frac{1}{2}$ in. | 21 0 0  | 0 14 0             | 2 0 0                    |
| $8\frac{1}{2} \times 6\frac{1}{2}$ | $\times \times$ in.                             | 12 in.              | 23 0 0  | 0 15 0             | 2 5 0                    |

*Any other suitable lens or shutter may be substituted at the difference in price.*

A cheaper form of the above Camera can be supplied, and, though slightly more bulky and less highly finished, is, nevertheless, an excellent and reliable apparatus. Prices include Camera with Sliding Bellows, and Swing Back and three Dark Slides, Fitted with Rapid Symmetrical Lens and Blind Shutter, all enclosed in neat leather case.

For Plates  $4\frac{1}{2} \times 3\frac{1}{2}$ , £10.  $5 \times 4$ , £12.

FIVE PER CENT DISCOUNT FOR CASH.

**ROSS & CO.,** Opticians, 111 New Bond Street, LONDON, W.

(CORNER OF BROOK STREET).

**MANUFACTORY—CLAPHAM COMMON.**

→\* ROSS' \*←

## NEW PORTABLE DIVIDED CAMERA

IS specially recommended for both Stand and Hand Work. It is supported on the chest by a strap passing around the neck, and has a rising front and auxiliary Double Swing Back for Architectural purposes, and screw for attaching to a tripod stand, for either vertical or horizontal pictures. Its simplicity and a general idea of the construction can be gathered from a glance at the illustration.



The design is based on a modification of the Cameras with full size Finders supplied for years past by Ross & Co., their aim being to produce, regardless of cost, a simple Hand Camera free from any mechanical complications, which would combine ALL the advantages and precision of an ordinary Camera upon a stand.

It is constructed throughout in the BEST possible manner, of Spanish mahogany, and covered with stout, SEWN leather. The whole of the Camera, Lenses, Shutter, Backs, and fittings being black, renders it very unobtrusive in appearance.

The instrument is divided by a bellows body into two compartments, each fitted with a ROSS' RAPID SYMMETRICAL LENS, of identical focus, covering the next size larger plate, to ensure crisp definition with full aperture, and giving from their length of focus perfect perspective.

The lower chamber is the actual Camera, the upper portion acting as a real VIEW METER and full size FINDER. The image, when focussed on the ground glass (conveniently placed

on the top or the instrument), is in an upright position, and an exact counterpart of the picture formed by the lower lens on the sensitive film. Both Lenses are simultaneously adjusted by the milled head on the right

**ROSS & CO.,** Opticians, 111 New Bond Street, LONDON, W.  
(CORNER OF BROOK STREET).

**MANUFACTORY—CLAPHAM COMMON.**

side of the Camera, which works smoothly and quickly, so that objects in rapid motion are readily followed and sharply defined.

The following important advantages are gained by this arrangement:—

- 1st. Each picture can be obtained with microscopic sharpness.
- 2nd. The composition and lighting of instantaneous pictures can be studied.
- 3rd. In photographing yachts and other large subjects there is an absolute certainty of the whole of the object being correctly centred, and contained within the limits of the plate.
- 4th. When used as an ordinary Camera on a Tripod Stand for obtaining portraits of children and animals, the many out of focus failures (due to the subject moving during the comparatively long interval that must elapse after focussing before the plate can be substituted for the screen) are by this system entirely avoided.

The under side of the flap, 'A,' is fitted with a mirror to reflect the image down to the operator's eye when the Camera is raised to the ordinary height on a Stand. Each instrument is supplied with a specially designed, light and compact, patent Wollaston Shutter, working with central opening between the combinations, and fitted with an Iris Diaphragm or a special Black Blind Shutter—either form giving time and instantaneous exposures at will, but any other suitable make would be substituted at the difference in price.

The price includes either 3 Double Dark Slides, or an Eastman Roll Holder for 48 exposures, or a changing box for 12 plates in sheaths.

The Lenses being accurately paired, and the form of the Camera lending itself readily to the adaptation, it could, at a small extra charge, be made convertible for stereoscopic photography.



**PRICES, WITH SPECIAL BLIND SHUTTER.**

| For Plates | Outside size. | Fitted with pair of Ross' Rap. Sym. Lens. |         |
|------------|---------------|-------------------------------------------|---------|
| 3½ × 3½    | 6 × 4½ × 7½   | 4 × 3, 4½ ins. focus                      | £16 0 0 |
| 4½ × 3½    | 7½ × 5½ × 7½  | 5 × 4, 6                                  | 18 0 0  |
| 5 × 4      | 8 × 6 × 8     | 6 × 5, 7½                                 | 21 10 0 |
| 6½ × 4½    | 9½ × 8 × 10   | 8 × 5, 9                                  | 23 10 0 |
| 7½ × 5     | 10 × 9 × 10½  | 8 × 5, 9                                  | 25 0 0  |

The Wollaston Special Shutter with Iris Diaphragm, £3 3s. extra.

Double Swing Back, 4½ × 3½, 25/-; 5 × 4, 32/6; 6½ × 4½, 37/6; 7½ × 5, 40/-.  
Iris Diaphragm from 10/- each.

**FIVE PER CENT DISCOUNT FOR CASH.**

*Numerous Testimonials have been received from Purchasers.*

**ROSS & CO., Opticians, 111 New Bond Street, LONDON, W.**  
(CORNER OF BROOK STREET).  
**MANUFACTORY—CLAPHAM COMMON.**

# NEW DETECTIVE CAMERAS.

## ROSS' NEW PATENT HAND CAMERA.



Prices, including Rapid Symmetrical Lens.

|                                                                                           |                |
|-------------------------------------------------------------------------------------------|----------------|
| Hand Camera, in stained black mahogany, for 24 plates, $4\frac{1}{4} \times 3\frac{1}{4}$ | £10 10 0       |
| Detective form, in leather bag, $4\frac{1}{4} \times 3\frac{1}{4}$                        | ... .. 12 0 0  |
| Hand Camera, for 24 plates, $5 \times 4$                                                  | ... .. 12 10 0 |
| Detective form, in leather bag, $5 \times 4$                                              | ... .. 14 0 0  |

FIVE PER CENT DISCOUNT FOR CASH.

FULLER PARTICULARS ON APPLICATION.

## 1894 'ADAMS' HAND CAMERA.



Fig. 3. Showing Camera open for use as an ordinary Hand Camera.



Fig. 2. Showing Camera Closed.

Takes 12 Plates, Roll-holder, or 24 Cut Films, is fitted with a focussing screen for use as an ordinary Camera, and weighs complete, with Changing Box,  $4\frac{1}{2}$  lbs. only. Ross's  $5 \times 4$  Rapid Symmetrical Lens. Plates can be changed in daylight. Has Rising and Cross Front, and Double Swing Back.

The Highest Class and Most Perfect Hand Camera it is possible to buy.

$\frac{1}{4}$ -plate, complete in case, £15 15s. net;  $5 \times 4$ , £18 18s. net.

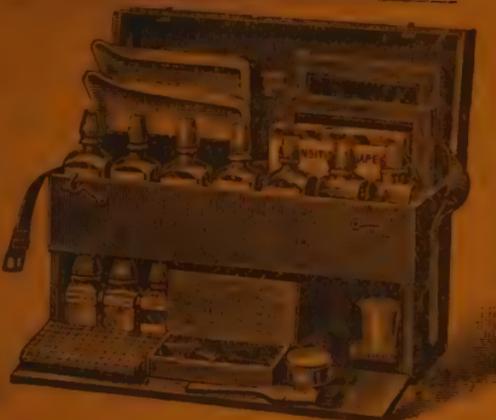
**ROSS & CO.,** Opticians, 111 New Bond Street, LONDON, W.  
(CORNER OF BROOK STREET).  
**MANUFACTORY—CLAPHAM COMMON.**

# ROSS' CHEMICAL CASES.

No. 1 Portable Case (not figured), about 12x5x6 inches, fitted with Stopped Bottles containing sufficient Chemicals and Solutions for the manipulation of about

- 12 dozen  $4\frac{1}{2} \times 3\frac{1}{2}$  or  $5 \times 4$  Dry Plates
- 8 ..  $7\frac{1}{2} \times 4\frac{1}{2}$  or 6 dozen  $8 \times 5$
- 4 ..  $8\frac{1}{2} \times 6\frac{1}{2}$  or 3 ..  $10 \times 8$

And three Glass Measures ... £1 1 0



## ESTIMATE No. 11. No. 12. No. 13.

No. 2 PORTABLE CASE. No. 3 DITTO. No. 4 DITTO.

Developing Case, as illustrated above, fitted with Stopped Bottles containing sufficient Chemicals for the manipulation of

|                               | 12 Doz.<br>5 by 4 Plates. |   |   | 8 Doz.<br>$6\frac{1}{2} \times 4\frac{1}{2}$ Plates. |   |    | 6 Doz.<br>$8\frac{1}{2} \times 6\frac{1}{2}$ Plates. |   |   |   |
|-------------------------------|---------------------------|---|---|------------------------------------------------------|---|----|------------------------------------------------------|---|---|---|
|                               | £                         | s | d | £                                                    | s | d  | £                                                    | s | d |   |
| Portable Lamp ... ..          | 0                         | 4 | 6 | 0                                                    | 4 | 6  | 0                                                    | 7 | 6 |   |
| Scales and Weights ... ..     | —                         | — | — | 0                                                    | 5 | 6  | —                                                    | 0 | 5 | 6 |
| Three Glass Measures ... ..   | 0                         | 2 | 7 | 0                                                    | 2 | 7  | —                                                    | 0 | 2 | 7 |
| Porcelain Dish, deep ... ..   | 0                         | 1 | 0 | 0                                                    | 1 | 6  | —                                                    | 0 | 2 | 0 |
| "    shallow ... ..           | 0                         | 0 | 9 | 0                                                    | 1 | 0  | —                                                    | 0 | 1 | 6 |
| Compo. Dish ... ..            | 0                         | 1 | 5 | 0                                                    | 1 | 10 | —                                                    | 0 | 3 | 0 |
| Varnish ... ..                | 0                         | 1 | 0 | 0                                                    | 1 | 0  | —                                                    | 0 | 2 | 0 |
| Brush ... ..                  | —                         | — | — | —                                                    | — | —  | —                                                    | 0 | 1 | 6 |
| Tin to contain Paper ... ..   | 0                         | 1 | 6 | 0                                                    | 1 | 9  | —                                                    | 0 | 2 | 6 |
| Glass Cloth ... ..            | —                         | — | — | 0                                                    | 0 | 6  | —                                                    | 0 | 0 | 6 |
|                               | <u>£1 15 0</u>            |   |   | <u>£2 4 8</u>                                        |   |    | <u>£2 19 3</u>                                       |   |   |   |
| Two Printing Frames ... ..    | 0                         | 5 | 0 | 0                                                    | 6 | 0  | —                                                    | 0 | 8 | 0 |
| One Tube Gold Chloride ... .. | 0                         | 2 | 0 | 0                                                    | 2 | 0  | —                                                    | 0 | 2 | 0 |
| Acetate of Soda ... ..        | 0                         | 0 | 6 | 0                                                    | 0 | 6  | —                                                    | 0 | 0 | 6 |
|                               | <u>£3 2 6</u>             |   |   | <u>£2 12 9</u>                                       |   |    | <u>£3 9 9</u>                                        |   |   |   |

## ESTIMATE No. 14.

### PRINTING REQUISITES.

|                                       |               |                        |                                                                                                          |
|---------------------------------------|---------------|------------------------|----------------------------------------------------------------------------------------------------------|
| One quire Sensitized Paper ... ..     | £0 15 0       | } SUFFICIENT FOR ABOUT | 2½ gross 5 x 4    2 gross 6½ x 4½<br>1½    "    7½ x 5    1    "    8½ x 6½<br>Or ¾ gross 10 x 8 Prints. |
| Tin for ditto ... ..                  | 0 1 6         |                        |                                                                                                          |
| Two Tubes Chloride of Gold ... ..     | 0 4 0         |                        |                                                                                                          |
| 3 ozs. Acetate Soda and Bottle ... .. | 0 0 6         |                        |                                                                                                          |
|                                       | <u>£1 1 0</u> |                        |                                                                                                          |

FIVE PER CENT Discount when Remittance accompanies Order.

**ROSS & CO.,** Opticians, 111 New Bond Street, LONDON, W.  
(CORNER OF BROOK STREET).  
MANUFACTORY—CLAPHAM COMMON.

## ROSS' COMPLETE OUTFITS (A).

APPARATUS INCLUDED, IS OF  
HIGHEST QUALITY AND WORKMANSHIP ONLY.

|                                                                       |     |
|-----------------------------------------------------------------------|-----|
| No. 1 Pattern Double Extension Camera and three Double Dark Slides... | ... |
| Turntable and Tripod Stand ... ..                                     | ... |
| Rapid Symmetrical Lens, with Iris Diaphragm ... ..                    | ... |
| Blind Shutter for Rapid Lens (other patterns at catalogue prices)     | ... |
| Focussing Cloth...                                                    | ... |
| Solid Leather Sling Case, with lock and key ... ..                    | ... |

If with Universal Symmetrical Lens (F5'657) in place of Rapid Symmetrical, extra

Brass-binding Camera and three Dark Slides, extra ... ..

W.-A. Sym. Lens, for Architecture, Interiors, and work in confined positions, extra

Chemical Case and Apparatus for Developing and Printing (see Estimate No. 11-14)

Totals (subject to 5 per cent discount for cash) ... ..

## ROSS' COMPLETE OUTFITS (B).

APPARATUS INCLUDED.

|                                                                             |     |
|-----------------------------------------------------------------------------|-----|
| No. 2 Pattern Extra Small and Light Camera and three Double Dark Slides ... | ... |
| Turntable and Tripod Stand ... ..                                           | ... |
| Rapid Symmetrical Lens, with Iris Diaphragm ... ..                          | ... |
| Shutter ... ..                                                              | ... |
| Focussing Cloth...                                                          | ... |
| Rigid Canvas Case, best quality ... ..                                      | ... |

If with Patent Concentric Lens for Landscapes, Interiors, &c., add ... ..

Chemical Case and Apparatus for Developing and Printing ... ..

Totals (subject to 5 per cent discount for cash) ... ..

Any articles in the above Estimates not required may be deducted, or others for the assistance of intending purchasers who may wish to spend a certain amount to Foreign and Colonial indents, and customers may rely upon receiving Apparatus

ROSS & CO., Manufacturing Opticians,  
MANUFACTORY—CLAPHAM COMMON.

## FOR GENERAL OUTDOOR WORK.

| ESTIMATE<br>No. 1.                                                | ESTIMATE<br>No. 2.                                              | ESTIMATE<br>No. 3.                                                | ESTIMATE<br>No. 4.                                               | ESTIMATE<br>No. 5.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | ESTIMATE<br>No. 6.                                                |
|-------------------------------------------------------------------|-----------------------------------------------------------------|-------------------------------------------------------------------|------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 6½ × 4½                                                           | 7½ × 5                                                          | 8½ × 6½                                                           | 10 × 8                                                           | 12 × 10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 15 × 12                                                           |
| £ s. d.<br>8 15 0<br>1 17 6<br>5 5 0<br>0 18 6<br>0 5 0<br>1 17 6 | £ s. d.<br>9 13 0<br>1 17 6<br>6 0 0<br>1 0 6<br>0 5 0<br>2 2 0 | £ s. d.<br>10 11 0<br>1 17 6<br>6 15 0<br>1 2 6<br>0 7 6<br>2 4 0 | £ s. d.<br>12 5 0<br>2 0 0<br>8 15 0<br>1 3 6<br>0 8 6<br>2 10 0 | £ s. d.<br>15 10 0<br>2 5 0<br>10 15 0<br>1 5 0<br>0 8 6<br>3 10 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | £ s. d.<br>20 0 0<br>2 10 0<br>15 0 0<br>1 12 6<br>0 8 6<br>5 0 0 |
| £18 18 6<br>3 0 0                                                 | 20 18 0<br>2 15 0                                               | 22 17 6<br>3 5 0                                                  | 27 2 0<br>5 15 0                                                 | 33 13 6<br>7 5 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 44 11 0<br>10 15 0                                                |
| £21 18 6<br>1 8 0                                                 | 23 13 0<br>1 8 0                                                | 26 2 6<br>1 9 0                                                   | 32 17 0<br>1 15 0                                                | 40 18 6<br>2 1 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 55 6 0<br>2 12 0                                                  |
| £23 6 6<br>3 5 0                                                  | 25 1 0<br>3 5 0                                                 | 27 11 6<br>3 15 0                                                 | 34 12 0<br>4 10 0                                                | 42 19 6<br>6 0 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 57 18 0<br>9 0 0                                                  |
| £26 11 6<br>2 12 9                                                | 28 6 0<br>2 12 9                                                | 31 6 6<br>3 9 9                                                   | 39 2 0<br>4 0 0                                                  | 48 19 6<br>4 10 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 66 18 0<br>5 10 0                                                 |
| £29 4 3                                                           | 30 18 9                                                         | 34 16 3                                                           | 43 2 0                                                           | 53 9 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 72 8 0                                                            |
| ESTIMATE<br>No. 7.                                                | ESTIMATE<br>No. 8.                                              | ESTIMATE<br>No. 9.                                                | ESTIMATE<br>No. 10.                                              | <p>Pattern No. 3 closes like pattern No. 1, and, being made for the new form of Double Backs, is a standard by LEES' in its other dimensions, it is, consequently, the <i>Smallest and Lightest</i> Camera yet introduced.</p> <p>Owing to differences in form of construction, and the small size and reduced cost of the new form of Double Backs, the prices of the No. 3 Pattern will compare favourably with any Camera of the same class.</p> <p>Larger sizes than 10 by 8 are not made in this pattern.</p> <p>For hot or very moist climates the No. 1 Pattern Cameras or the Double Extension Pattern, illustrated on page 31, are recommended. For such climates the Camera and Slides should be Brass-bound, and the Bellows of Russia Leather.</p> |                                                                   |
| 6½ × 4½                                                           | 7½ × 5                                                          | 8½ × 6½                                                           | 10 × 8                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                   |
| £ s. d.<br>7 4 0<br>1 17 6<br>5 5 0<br>0 18 6<br>0 5 0<br>1 0 0   | £ s. d.<br>7 12 0<br>1 17 6<br>6 0 0<br>1 0 6<br>0 5 0<br>1 1 0 | £ s. d.<br>9 5 6<br>1 17 6<br>6 15 0<br>1 2 6<br>0 7 6<br>1 3 6   | £ s. d.<br>11 6 0<br>2 0 0<br>8 15 0<br>1 3 6<br>0 8 6<br>1 5 6  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                   |
| £16 10 0<br>5 10 0                                                | 17 16 0<br>6 10 0                                               | 20 11 6<br>7 10 0                                                 | 24 18 6<br>9 10 0                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                   |
| £22 0 0<br>2 12 9                                                 | 24 6 0<br>2 12 9                                                | 28 1 6<br>3 9 9                                                   | 34 8 6<br>4 0 0                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                   |
| £24 12 9                                                          | 26 18 9                                                         | 31 11 3                                                           | 38 8 6                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                   |

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|          | 6                                    | 2/2                     | 2/6                                     | 3/3                                           | 3/3                                                                         | 4/3                          | 8/6  | 12/9 | 12/9                                | 25/6                   |
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| 40 × 30  | 3                                    | 13/6                    | 18/-                                    | 27/-                                          | 24/8                                                                        | 18/-                         | 36/- | 54/- | per special quotation.              | per special quotation. |
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| No. 4. | 12 × 10 Enlargement, in best quality Oval, Plush<br>Frame, with Gold-sunk Bevel Matt | 25/- |
| „ 5.   | 15 × 12 ditto ditto ditto                                                            | 37/6 |

### ON PAPER.

WELL FINISHED IN BLACK AND WHITE.

|        |                                                                                                                                                                                                                                                                          |      |
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| No. 6. | THE COURT SIZE—28 × 17 ins. ; a new Panel Size for<br>Half and Full-length Standing Figures; mounted<br>on India Tint Plates, sunk Mounts; outside<br>measurement, 43 × 29; highly finished in Black<br>and White, and framed in No. 27 very handsome<br>enriched Oak... | 72/6 |
| „ 6a.  | Ditto ditto ditto (unframed)                                                                                                                                                                                                                                             | 42/- |
| No. 7. | 23 × 17 Enlargement, on India Tint Plate-sunk<br>Mount, Frame in No. 20 2 in. Oak and Gold ...                                                                                                                                                                           | 28/6 |
| „ 7a.  | Ditto ditto ditto (unframed)                                                                                                                                                                                                                                             | 15/  |
| No. 8. | 23 × 17 Enlargement in Atlas Cut Mount and No. 20<br>2-in. Oak and Gold Frame...                                                                                                                                                                                         | 28/6 |
| „ 8a.  | Ditto ditto ditto (unframed)                                                                                                                                                                                                                                             | 15/- |
| No. 9. | 24 × 20 Enlargement, on India Tint Plate-sunk<br>Mount, Framed in No. 20 2 in. Oak and Gold...                                                                                                                                                                           | 35/- |
| „ 9a.  | Ditto ditto ditto (unframed)                                                                                                                                                                                                                                             | 20/- |



## MORGAN &amp; KIDD.



## FINISHED IN BLACK AND WHITE CRAYON.

Mounted on India Tint Plate-sunk Mount, Carefully and Skilfully Finished.

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| No. 11. | 15×12 Crayon Enlargement in No. 59 1½-in. Oak and Gold Frame ... | 25/6 |
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|         |                                                                                                                                                                                                                          |      |
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| 12 × 10                |                              |                             |                          |                                           |                                                         |                                               |                                                                                         |                                    |            |            |                                               |            |                                                                |                           |                                  |
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| 17 × 10½               | 12/-                         | 3/6                         | 13/-                     | 3/9                                       | -/9                                                     | 2/-                                           | 6/-                                                                                     | 12/-                               | 18/-       | 40/-       | 9/3                                           | 7/6        | 59                                                             | 1½ in.                    |                                  |
| 18 × 15                | 17/-                         | 6/-                         | 18/-                     | 6/3                                       | 1/3                                                     | 2/6                                           | 7/-                                                                                     | 14/-                               | 21/-       | 30/-       | 12/-                                          | 9/6        | 60                                                             | 2 in.                     |                                  |
| 20 × 16                | 17/6                         | 6/6                         | 19/-                     | 6/9                                       | 1/3                                                     | 2/6                                           | 7/6                                                                                     | 15/-                               | 22/6       | 40/-       | 12/-                                          | 9/6        | 60                                                             | 2 in.                     |                                  |
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| 24 × 18                | 21/-                         | 9/-                         | 23/6                     | 9/6                                       | 1/3                                                     | 3/6                                           | 10/-                                                                                    | 20/-                               | 30/-       | 50/-       | 19/-                                          | 15/-       | 60                                                             | 2 in.                     |                                  |
| 24 × 20                | 23/-                         | 10/-                        | 26/-                     | 11/-                                      | 1/3                                                     | 3/6                                           | 10/-                                                                                    | 20/-                               | 30/-       | 50/-       | 19/-                                          | 15/-       | 60                                                             | 2 in.                     |                                  |
| 30 × 22                | 36/6                         | 13/6                        | 40/-                     | 14/6                                      | 1/9                                                     | 4/-                                           | 12/6                                                                                    | 25/-                               | 37/6       | 55/-       | 21/-                                          | 18/-       | 60                                                             | 2 in.                     |                                  |
| 30 × 25                | 38/6                         | 15/6                        | 42/-                     | 16/6                                      | 2/6                                                     | 5/-                                           | 15/-                                                                                    | 30/-                               | 45/-       | 67/-       | 26/6                                          | 23/-       | 92A                                                            | 2½ in.                    |                                  |
| 36 × 28                | 45/-                         | 21/-                        | 49/-                     | 22/6                                      | 5/-                                                     | 5/-                                           | 20/-                                                                                    | 40/-                               | 60/-       | 100/-      | 31/-                                          | 27/-       | 92A                                                            | 2½ in.                    |                                  |
| 40 × 30                | 52/6                         | 25/-                        | 57/6                     | 26/6                                      | 6/-                                                     | —                                             | 22/6                                                                                    | 45/-                               | 67/6       | 80/-       | 48/-                                          | 45/-       | 92                                                             | 3 in.                     |                                  |
| 44 × 34                | 64/6                         | 31/6                        | 69/6                     | 34/-                                      | 10/-                                                    | —                                             | 25/-                                                                                    | 50/-                               | 75/-       | 90/-       | 56/6                                          | 54/-       | 92                                                             | 3 in.                     |                                  |
| 48 × 36                | 78/-                         | 36/-                        | 83/-                     | 38/6                                      | 10/-                                                    | —                                             | 30/-                                                                                    | 60/-                               | 90/-       | 120/-      | 70/-                                          | 66/6       | 92                                                             | 3½ in.                    |                                  |

\* Best Quality Mounts, faced with Plate Paper and Plate Marked, and with India Tint mounted on.

† Sizes from 6½ × 4½ to 10 × 8 have ½-in. Gold Slip. From 12 × 7½ to 20 × 16, ¾ in. From 23 × 17 to 36 × 23, 1-in. Sizes 40 × 30 and larger are framed without mount margin, and have 2-in. gold sunk bevel matts.

PLATINOTYPE PRINTING. — For Platinotype Contact Printing refer to page 19 of Catalogue, post free on application.

ARGENTIC-GELATINO-BROMIDE WORKS,

PARIS—29 Boulevard des Italiens, 29.

Kew Foot Road, RICHMOND, S.W.

✧ MORGAN & KIDD. ✧

→✧ **COLLOTYPE.** ✧  
**MORGAN & KIDD'S 'Improved Collotype' Method of producing Permanent Machine Printed Ink Photographs.**

Suitable for Superior Illustrations to Books and Catalogues, Portraits, Views, Reproductions of Drawings and Paintings, fac-similes of M.S., Photographs of Estates for Sale, Machinery, Pottery, &c. &c., and of all Artistic and Commercial Manufactures. **PRICES: Printed in any Colour.**

| SIZE OF PAPER.                  | Size of Picture (about) | 100 COPIES. |         | 250 COPIES. |         | 500 COPIES. |         | 1000 COPIES. |         | 2000 COPIES. |         | 3000 COPIES. |         | 5000 COPIES. |         | 10,000 COPIES. |         | Proofs exclusive of Negs. |         |      |
|---------------------------------|-------------------------|-------------|---------|-------------|---------|-------------|---------|--------------|---------|--------------|---------|--------------|---------|--------------|---------|----------------|---------|---------------------------|---------|------|
|                                 |                         | £ s. d.     | £ s. d. | £ s. d.     | £ s. d. | £ s. d.     | £ s. d. | £ s. d.      | £ s. d. | £ s. d.      | £ s. d. | £ s. d.      | £ s. d. | £ s. d.      | £ s. d. | £ s. d.        | £ s. d. | £ s. d.                   | £ s. d. |      |
| An size up to Fcap 8vo. 6½ × 4½ | 4 × 3                   | 0 18 6      | 1 7 0   | 1 17 6      | 2 15 0  | 5 2 6       | 7 2 6   | 9 8 6        | 13 10 0 | 2 0 0        | 2 0 0   | 2 0 0        | 2 0 0   | 2 0 0        | 2 0 0   | 2 0 0          | 2 0 0   | 2 0 0                     | 2 0 0   | 7 6  |
| Crown 8vo. 7½ × 5               | 5 × 3½                  | 1 0 0       | 1 8 6   | 2 0 0       | 2 17 6  | 5 5 0       | 7 7 0   | 9 12 0       | 15 10 0 | 2 0 0        | 2 0 0   | 2 0 0        | 2 0 0   | 2 0 0        | 2 0 0   | 2 0 0          | 2 0 0   | 2 0 0                     | 2 0 0   | 7 6  |
| Demy 8 o. 8½ × 5½               | 6 × 4                   | 1 1 6       | 1 10 6  | 2 2 6       | 3 0 0   | 5 10 0      | 7 17 6  | 10 0 0       | 17 10 0 | 2 0 0        | 2 0 0   | 2 0 0        | 2 0 0   | 2 0 0        | 2 0 0   | 2 0 0          | 2 0 0   | 2 0 0                     | 2 0 0   | 7 6  |
| Crown 4to. 10 × 7½              | 7 × 5                   | 1 5 0       | 1 13 6  | 2 7 6       | 3 5 0   | 6 0 0       | 8 15 0  | 13 10 0      | 25 0 0  | 4 6 0        | 4 6 0   | 4 6 0        | 4 6 0   | 4 6 0        | 4 6 0   | 4 6 0          | 4 6 0   | 4 6 0                     | 4 6 0   | 8 6  |
| Demy 4to. 11½ × 8½              | 8 × 6                   | 1 10 6      | 2 2 6   | 3 0 0       | 4 0 0   | 7 10 0      | 10 10 0 | 16 0 0       | 30 0 0  | 4 6 0        | 4 6 0   | 4 6 0        | 4 6 0   | 4 6 0        | 4 6 0   | 4 6 0          | 4 6 0   | 4 6 0                     | 4 6 0   | 9 6  |
| Royal 4to. 12½ × 10             | 9 × 7                   | 1 14 0      | 2 12 6  | 3 15 0      | 4 10 0  | 8 10 0      | 12 0 0  | 18 0 0       | 32 10 0 | 5 6 0        | 5 6 0   | 5 6 0        | 5 6 0   | 5 6 0        | 5 6 0   | 5 6 0          | 5 6 0   | 5 6 0                     | 5 6 0   | 12 6 |
| Imprl. 4to. 15 × 11             | 10½ × 8½                | 2 0 0       | 3 3 0   | 4 5 0       | 6 6 0   | 12 0 0      | 16 0 0  | 24 0 0       | 40 0 0  | 6 3 0        | 6 3 0   | 6 3 0        | 6 3 0   | 6 3 0        | 6 3 0   | 6 3 0          | 6 3 0   | 6 3 0                     | 6 3 0   | 14 6 |
| Foolscap. 17 × 13½              | 11½ × 9½                | 2 10 0      | 3 17 6  | 5 0 0       | 7 10 0  | 14 0 0      | 20 0 0  | 30 0 0       | 47 10 0 | 6 3 0        | 6 3 0   | 6 3 0        | 6 3 0   | 6 3 0        | 6 3 0   | 6 3 0          | 6 3 0   | 6 3 0                     | 6 3 0   | 19 6 |
| Crown. 20 × 15                  | 14½ × 11½               | 2 17 6      | 4 10 0  | 6 0 0       | 9 0 0   | 16 0 0      | 22 0 0  | 34 0 0       | 60 0 0  | 9 3 1        | 9 3 1   | 9 3 1        | 9 3 1   | 9 3 1        | 9 3 1   | 9 3 1          | 9 3 1   | 9 3 1                     | 9 3 1   | 1 0  |
| Demy. 22½ × 17½                 | 16 × 13                 | 3 5 0       | 5 0 0   | 7 10 0      | 10 10 0 | 20 0 0      | 26 0 0  | 40 0 0       | 75 0 0  | 13 6 1       | 13 6 1  | 13 6 1       | 13 6 1  | 13 6 1       | 13 6 1  | 13 6 1         | 13 6 1  | 13 6 1                    | 13 6 1  | 2 6  |
| Royal. 25 × 20                  | 18 × 15                 | 3 10 6      | 5 7 6   | 9 0 0       | 13 10 0 | 25 0 0      | 32 10 0 | 50 0 0       | 95 0 0  | 13 6 1       | 13 6 1  | 13 6 1       | 13 6 1  | 13 6 1       | 13 6 1  | 13 6 1         | 13 6 1  | 13 6 1                    | 13 6 1  | 7 6  |
| Imperial. 30 × 22               | 23 × 17                 | 8 15 0      | 5 17 6  | 10 0 0      | 16 0 0  | 29 0 0      | 37 10 0 | 57 10 0      | 110 0 0 | 15 3 1       | 15 3 1  | 15 3 1       | 15 3 1  | 15 3 1       | 15 3 1  | 15 3 1         | 15 3 1  | 15 3 1                    | 15 3 1  | 15 0 |

\* Negatives Class A. are from Photographs, Black and White Drawings in wash or lime, &c., &c.; Class B. are Negatives, enlarged, reduced or re-produced same size, from Negatives, reversed or not reversed, and are charged 2/ more than for Class A. any size; Class C. from Paintings and other subjects of especial difficulty. See Catalogue page 16

ARGENTIC-GELATINO-BROMIDE WORKS,

PARIS—29 B ulevard des Italiens, 29.

Kew Foot Road, Richmond, S.W.



# TAYLOR & HOBSON'S LENSES.

HIGH CLASS.

MADE OF FINEST MATERIALS  
BY IMPROVED PROCESSES.

CAREFULLY DESIGNED,  
BEAUTIFULLY FINISHED.

GIVE SHARP DEFINITION,  
AND ARE USED EVERYWHERE.

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**LENSES FOR PORTRAITURE AND GROUPS**  
OF NEW AND IMPROVED DESIGN.

**PORTABLE CASKETS OF LENSES,**  
LIGHT AND COMPACT FOR TRAVELLERS.

**SPECIAL HAND CAMERA LENSES**  
FOR UNIFORM FINE DEFINITION AND RAPIDITY.

**LANTERN OBJECTIVES**  
FOR SHARP AND BRILLIANT PICTURES.

**WIDE-ANGLE RECTILINEAR LENSES**  
GIVING A FLAT FIELD AND FREE FROM DISTORTION.

**VIEW LENSES**  
FOR CLEAR IMAGES AND TRUE PERSPECTIVE EFFECTS.

**LENSES FOR ALL PURPOSES**

IN STOCK AT { SLATE STREET WORKS, LEICESTER,  
AND  
6 SOUTHAMPTON ST., HIGH HOLBORN,  
LONDON.

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**TAYLOR, TAYLOR, & HOBSON.**

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# TAYLOR, TAYLOR, & HOBSON.

The following is a condensed List of Prices of the various general Lenses with Iris Diaph. Full Catalogue mailed free on application.

| Code.<br>See foot<br>note. | 4½ × 3½ | 6½ × 4½ | 8 × 5  | 8½ × 6½ | 10 × 8 | 12 × 10 |
|----------------------------|---------|---------|--------|---------|--------|---------|
| RR                         | £2 16 0 | 3 7 0   | 3 18 0 | 5 0 0   | 6 10 0 | 8 13 0  |
| MAR                        | £3 10 0 | 3 17 0  | 4 8 0  | 5 10 0  | —      | 7 13 0  |
| WAR                        | £3 1 0  | 3 10 0  | —      | 4 0 0   | 5 0 0  | 6 3 0   |
| RV                         | £1 15 0 | 1 18 0  | 2 11 0 | 3 0 0   | 3 13 0 | 4 10 0  |
| WAV                        | £2 1 0  | 2 16 0  | —      | 3 10 0  | —      | 5 0 0   |

## LENSES FOR HAND CAMERAS.

|                                | 4-inch focus. | 5-inch focus. | 6-inch focus. |
|--------------------------------|---------------|---------------|---------------|
| Lens and Iris Diaph. .. ..     | £3 7 0        | 3 17 0        | 3 17 0        |
| Do., do., and Shew Shutter ..  | £4 5 0        | 4 17 0        | 4 17 0        |
| Lens and Wheel Diaph. f/8 ..   | —             | 2 10 0        | —             |
| Lens, Iris and Rackwork, f/8.. | —             | 3 15 0        | 4 15 0        |

## PORTABLE CASKETS OF LENSES.

| No. | Code.<br>See foot note. | 4½ × 3½ | 6½ × 4½ | 8½ × 6½ |
|-----|-------------------------|---------|---------|---------|
| 1.  | RR & RV                 | £4 0 0  | 4 12 0  | 7 4 0   |
| 2.  | RR & WAR                | £5 6 0  | 6 5 0   | 8 4 0   |
| 3.  | RR, WAR & RV            | £6 4 0  | 7 5 0   | 10 4 0  |

## LENSES FOR STEREOSCOPIC CAMERAS.

| Pair of 3 in. | Pair of 4 in. | Pair of 5 in. | Pair of 7 in. | Pair of 5 in. | Pair of 6 in. | Pair of 8 in. |
|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| WAR           | MAR           | RR            | RR            | WAV           | RV            | RV            |
| £6 2 0        | 7 0 0         | 5 12 0        | 14 0          | 4 2 0         | 3 10 0        | 3 16 0        |

PORTRAIT AND GROUP LENSES, 6 5-in., £4 14s.; 8-in., £6 16s.; 12-in., £9; 17-in., £18, &c., &c.

LANTERN LENSES, 6-in., £4 14s.; 8-in., £6 16s.; 10 in., £7 14s.; 12-in., £9.

CODE.—RR, Rapid Rectilinear; MAR, Mid-Angle Rectilinear; WAR, Wide-Angle Rectilinear; RV, Rapid View; WAV, Wide-Angle View.

**TAYLOR, TAYLOR, & HOBSON,**  
LEICESTER AND LONDON.

# TAYLOR, TAYLOR, & HOBSON.

## SPIRIT LEVELS FOR CAMERAS.

To secure Upright Views and prevent Distortion.



No. 1. 1s. 6d.  $\frac{3}{4}$ -in. diam.  
No. 2. 1-in. diam.



No. 5. 1s. 6d.



No. 11. 1s. 9d.  $\frac{3}{4}$ -in. diam.  
No. 12. 2s. 3d. 1-in. diam.



No. 1 F. 1s. 6d.  $\frac{3}{4}$ -in. diam.  
No. 2 F. 2s. 1-in. diam.



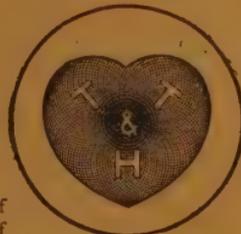
No. 4. 3s.



B Finder. 5s.

Extra Fittings  
for  
B and C Finders,  
6d. each.

TRADE MARK.



C. Finder. 5s.

CAUTION.—The success of  
has led to the introduction of  
leak and soon become useless.

Every genuine Level bears the firm's initials or the  
Registered Trade Mark.

these Circular Spirit Levels  
spurious imitations which

**TAYLOR, TAYLOR, & HOBSON,**  
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## TAYLOR, TAYLOR, & HOBSON.

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TAYLOR, TAYLOR, & HOBSON'S Lenses are all fitted with their Patent Flange Fittings, which embody the following unique

### ADVANTAGES:—

In attaching a lens to its flange, it is impossible to cross the screw threads.

The screws engage at once when turned.

Three turns brings the lens home with its diaphragm index where it is wanted for use.

Three turns release the lens, and there is no fear of dropping it.

The Screws are *accurately* formed to the Society standards.

TAYLOR, TAYLOR, & HOBSON'S System of Fittings gained the only Medal of the Photographic Society of Great Britain for apparatus, Pall Mall, 1892.

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FULLER PARTICULARS, AND COST OF ALTERING OTHER LENS FITTINGS TO EMBODY THESE VALUABLE IMPROVEMENTS, SENT ON RECEIPT OF POST CARD.

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"One of the greatest advances yet made in the construction of Camera Fittings."—*Photography*.

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**TAYLOR, TAYLOR, & HOBSON,**  
 SLATE STREET WORKS, LEICESTER, and  
 6 SOUTHAMPTON ST., HIGH HOLBORN, LONDON.

# Vevers' Specialities.

## Vevers' "DEFIANCE" Camera.



This Camera has been designed to meet the demand for a good, sound, long-focus Camera, at the lowest possible price.

It has Double Extension conical bellows, rack and pinion, swing and reversing back, sliding front and double dark slide (book form);  $\frac{1}{4}$  plate size fitted with a  $\frac{1}{4}$ -plate carrier.

MADE IN TWO SIZES ONLY:  $\frac{1}{4}$ -plate, 27 6.  $\frac{1}{2}$ -plate, 38 -

## Vevers' "CITY" Camera.



A thoroughly well-made Camera, light, strong, and rigid when erected. Fitted with best conical varnished leather bellows, rack and pinion adjustment, swing and reversing back, rising and falling front, with loose circular lens board (so that two or more lenses can be used without unscrewing the flange) and leather handle for carrying.

Price, with one double

book-form slide, with double hinge shutters, side clasp and ivory numbers:—  
 $\frac{1}{4}$ -plate, £1 10s. 0d.  $\frac{1}{2}$ -plate, £2 15s. 0d. 1-1 plate, £3 12s. 6d.

Extra Double Slides:  $\frac{1}{4}$ , 5 6;  $\frac{1}{2}$ , 10 -; 1-1, 15 - each.

## Vevers' "POPULAR" Camera.

A very strong Camera of superior workmanship; specially suitable for hot climates and rough usage.



The "Popular" has best double extension leather bellows, rack and pinion, swing and reversing back, front of Camera attachable to any part of extending frame, and back can be brought to front of base-board for wide-angle lenses. We have greatly improved this well-known and favourite pattern, and, owing to the increased demand have been enabled to considerably reduce the price as below:

|                    |               |      |       |       |       |
|--------------------|---------------|------|-------|-------|-------|
| Size $\frac{1}{4}$ | $\frac{1}{2}$ | 1-1  | 10x8  | 12x10 | 15x12 |
| Price 50/-         | 63/-          | 77/6 | 110/- | 140/- | 170/- |

The "VEVEO" Camera. An entirely new pattern of the highest quality of workmanship. Extremely light, very rigid, and beautifully finished.

|                    |               |       |       |       |       |
|--------------------|---------------|-------|-------|-------|-------|
| Size $\frac{1}{4}$ | $\frac{1}{2}$ | 1-1   | 10x8  | 12x10 | 15x12 |
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Full particulars in New Catalogue, Post Free, 2d.

**HAND CAMERAS.** A great variety from 1/6 to £20. See Catalogue.

**REPAIRS** carefully executed by skilled workmen on the shortest notice.

**FITTINGS**, bellows, &c., Wholesale & Retail. Cheapest House in the Trade.

See following pages.

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SINGLE LENSES, in Nicked Mounts,  $\frac{1}{4}$ -plate, 2/6;  $\frac{1}{2}$ -plate, 6/-.  
 " " " in Sliding Mounts,  $\frac{1}{4}$ -plate, 3/6;  $\frac{1}{2}$ -plate, 7/6.  
 " " " Superior quality in rigid mounts, rotating diaphragm, 5 x 4, 10/-  
 7 x 5, 12/6; 9 x 7, 17/6; 12 x 10, 30/-.  
 " " " New Combination, working at f-8, Waterhouse stops in case.—  
 5 x 4, 12/6; 7 x 5, 17/6; 9 x 7, 25/-; 10 x 8, 30/-; 12 x 10, 40/-.  
 PERISCOPIC RECTILINEARS with Waterhouse stops, 5 x 4, 12/6; 7 x 5, 15/-; 9 x 7, 25/-

**VEVERS' RAPID RECTILINEAR LENSES.**

Although so remarkably low in price, these lenses will be found to be equal to the most expensive. We have hundreds of letters testifying to their superiority over lenses costing three times their price. Work at f-8, with set of Waterhouse stops in case; loose hood; focal length, &c., engraved on mount



|                   |                 |                 |       |        |         |         |
|-------------------|-----------------|-----------------|-------|--------|---------|---------|
| To cover ...      | 5 x 4           | 7 x 5           | 9 x 7 | 10 x 8 | 12 x 10 | 15 x 12 |
| Approximate focus | 5 $\frac{1}{2}$ | 7 $\frac{1}{2}$ | 10    | 12     | 16      | 20 in.  |
| Price ...         | 18/6            | 25/-            | 32/6  | 60/-   | 75/-    | 105/-   |

Note—Each lens will cover a size larger than indicated.

$\frac{1}{4}$ -Plate "DETECTIVE" RECTILINEAR about  $\frac{1}{4}$  in. fixed focus; works at f-8, 8/6. Ch. 2 per quality; 5% Postage, 2d.



For prices of Wide-angle, Euryscopes, Portrait Lenses, Condensers Stereoscopic Prisms, Finders, &c., see Catalogue.

**NEW TRIPODS.**

**VEVERS' "LITTLE SANDOW" FOUR-FOLD TRIPOD**

*Warranted the strongest and most rigid four-fold stand in the market.*

The legs of this stand are made of the finest ash and walnut, and our new method of construction ensures absolute rigidity when erected. It is, indeed, a PERFECT tripod. The two lower joints slide telescopic fashion and can be instantly fixed at any height by a new clamping arrangement, that cannot wear loose and fail to "bind"—the great fault in other sliding stands. The triangle is made of panelled mahogany, extremely light and very durable. Will carry anything up to a  $\frac{1}{4}$ -plate camera.

Length when closed 18 in. Height erected, 54 in.

Weight, 34 oz. Price, 25/-.

Cheaper pattern, 4-fold Tripod, 12/6.

**VEVERS' THREE-FOLD-TRIPOD** Built on the same principle as the "Little Sandow"—a marvel of strength, rigidity and durability,  $\frac{1}{2}$  and 1-1, 20/-; 30 x 8 and 12 x 10, 25/-; 15 x 12 and 20 x 16, 35/-. Warranted to support a 14-stone man. Cheaper pattern, 3-fold stand, 12/6.

**SLIDING MAHOGANY,**  $\frac{1}{4}$ -plate, 10/-. **SLIDING ASH,** Kennett's principle (screw less)  $\frac{1}{2}$ -plate, 8/6. **ASH FOLDING, BAYONET JOINT,**  $\frac{1}{2}$ -plate, 6/6; very light.

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Fully Illustrated. Two sheets of gummed chemical labels and a photographic frontispiece. In addition to clearly written instructions for beginners, this book contains directions for working all the latest processes, thus making it far away the best manual for amateur photographers. "A splendid little work—most practical and complete. The little wrinkles and dodges in the book make it particularly valuable."—*Philadelphia Photographer*. Most favourably reviewed by the entire photographic press. Price 6d., or post free, 7d.

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**VEVERS' NEW ILLUSTRATED CATALOGUE.**

Contains a full description of *everything* (apparatus, materials and chemicals) connected with Photography, at prices fully 20 per cent. below those of any other maker. Sent post free to any address in the world for 2d., stamps.

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**VEVERS' LANTERNS AND ACCESSORIES**

ARE 20 PER CENT. BETTER VALUE THAN ANY IN THE TRADE  
**SMALL MAGIC LANTERNS**, with slides complete, from 1/-.

**VEVERS' "DEFIANCE" JAPANED LANTERN**, full size, with 4in. condensers, three wick lamp, 2in. wicks, best quality front lens, etc., doors at side and back. 27/6!

**VEVERS' RUSSIAN IRON "EXHIBITION" LANTERN**, all brass stages and fronts, 50/-!

A great variety of other patterns in Singles, Biennials and Triennials.

A first-class Biennial Lantern for £5 10s. !!



27/6

**Vevers' New Slide Carrier.**

A double registering Carrier which *automatically* raises the slide out of the frame, after exhibition, thus facilitating its removal, and avoiding the glasses being soiled by the fingers.

Best quality, in Mahogany, 2s. 9d.; Polished, 3s. Postage 3d. extra.

Ordinary double lightning Carrier 1/6 each.

**BEST PHOTOGRAPHIC LANTERN SLIDES** (any make) 11s. per doz. plain, 17s. doz. coloured

**COLOURED LITHOGRAPHIC SLIDES**, in sets of 12, 4s. 6d. per set.

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**OIL LAMPS** for Lanterns, with Russian Iron Chimney, 3 wicks, 7s. 6d.; 4 wicks, 9s.

**SETS** for Oil-Hydrogen, Blow-through patterns, 10s.; Mixed, 15s. 6d.

**VEVERS' REGULATING VALVE** for use with compressed gas, 7s. 6d.

**LANTERN SLIDE BOXES**, &c., at lowest prices.

**MATERIALS FOR MAKING LANTERN SLIDES**

**IN TWELVE COLOURS:—**

Yellow, Pink, Green, Cerise, Orange, Ruby, Ultramarine, Silver, Bronze, Olive Green, Black (one side) and Black (both sides).

6L. per Box, post free 8d. or in packets of 20 any one shape and colour 2d., post free 3d.

**CUSHION, CIRCULAR OBLONG, DOME and OVAL.**

**Vevers' Coloured Lantern Slide Binders.**

**IN SIX COLOURS:** Orange, Green, Lilac, Pink, Blue, and Black.

Packed in neat box, 6d. per 100. Post free, 8d.

**VEVERS'****Lantern Slide Binding Clamp.**

For holding and revolving the transparency mask, and glass in binding.

The Best Clamp in the Market.

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For numbering Lantern Slides, Slide Boxes, Negatives, &c.

Twelve Sets (Nos. 1 to 156) 3d., post free, 3½d.

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Contains particulars and illustrations of over 30 varieties of Magic and Optical Lanterns for Home use, Entertainments, Lectures, Scientific and Educational Purposes. Over 1500 sets of Lantern Slides, comprising upwards of 30,000 Slides; and a description of every article that can possibly be required in connection with the Lantern.

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| Cabt.          | 2/3                       | 2/6       | 3/6                | 6d.                    | 1/-                    | 1/6             | 2/-                       |
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| 1-1            | 4/6                       | 5/-       | 6/6                | 1/-                    | 2/-                    | 2/6             | 3/-                       |

*Above prices are as "per dozen."*

*Printing on every kind of Paper, up to 12 x 10, for prices see Catalogue.*

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|--------------|------------|----------------------|-----------------|----------|------------------------------|----------|
|              | BROMIDE.   |                      |                 |          | Water-colours or Monochrome. | IN OIL.  |
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| Up to 10 x 8 | 1/6        | 3d.                  | 6d.             | 3/6      | From 4/-                     | From 5/- |
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| 18 x 15      | 3/-        | 9d.                  | 1/8             | 13/-     | 7/6                          | 10/-     |
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|  |      |       |       |       |       |
|--|------|-------|-------|-------|-------|
|  | 73/- | 105/- | 138/- | 234/- | 400/- |
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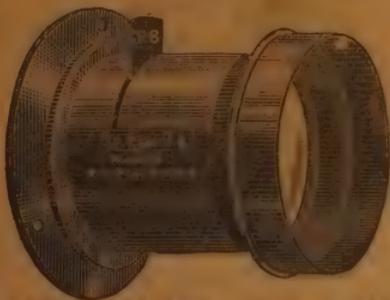
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| 46/- | 60/- | 66/- | 80/- | 102/- | 156/- | 196/- | 243/- | 295/- |
|------|------|------|------|-------|-------|-------|-------|-------|

Mounted in Aluminium with Iris Diaphragms.

|      |      |      |      |       |       |       |       |       |
|------|------|------|------|-------|-------|-------|-------|-------|
| 56/- | 70/- | 78/- | 95/- | 118/- | 170/- | 220/- | 270/- | 320/- |
|------|------|------|------|-------|-------|-------|-------|-------|

"Dear Sirs,—The Convention Group, reproduced in a reduced size in the *British Journal of Photography*, was taken by me with an 'Optimus' Rapid Rectilinear Lens, 18 by 15. I enclose rough print, from which you will see how well the lens covers to the edges of the plate. Note, also, the grouping is flat, not semicircular, as is usual when the lens is not reliable. The lens could not be a finer one. I shall be pleased to appoint you sole London Agent for the sale of the prints."—ALEXANDER AYTON, JUN.

"We may call attention to the extensive optical and metal works that Perken, Son, and Rayment have established in Hatton Garden, and their photographic cabinet factory in Saffron Hill. At the former we were much interested in the glass-grinding departments—one for photographic lenses, another for spectacles; and we were surprised to find in London such extensive workshops for the metal parts of cameras and optical lanterns."—*Photographic News*.

"We are pleased to find upon trial that the lens 'Optimus' Rapid Rectilinear sent for review is really an EXCELLENT instrument."—*Photographic News*.

"Frith's series of 'Life in London Streets' were all taken with 12 by 10 Portable 'Optimus' lens on Cobb's plates. Had an 'Optimus' Rapid Symmetrical been used, the plates would have been over-exposed with full aperture. G. LINDSAY JOHNSON, M.A., M.B., F.R.C.S., England."—*Amateur Photographer*.

"PORTRAIT LENS.—The 'Optimus' lenses are moderate in price, and yield most excellent results."—*Amateur Photographer*.

TRADE DISCOUNT LIST ON APPLICATION.

# 'OPTIMUS'

PERKEN, SON & RAYMENT, 99, HATTON GARDEN, LONDON.  
141, OXFORD STREET,



## "OPTIMUS" QUICK-ACTING PORTRAIT LENS.

**PORTRAIT LENS.**—Specially constructed as quick-acting for short exposures in Portraiture. They are second to none, the definition being maintained by their perfect optical qualities.

|        |           |              |                    |              |
|--------|-----------|--------------|--------------------|--------------|
| Diam.  | 2 inches. | 2½ inches.   | 3½ inches.         | Larger Sizes |
| Price  | 90/-      | 120/-        | 180/-              | to order.    |
| C de V | 1 B       | Cabinets 2 B | Grand Cabinets 3 B |              |

"Dear Sirs,—Herewith your 7 x 5 'Optimus' Lens, which, as per your request, I have tried in the production of large heads. Along with it I send two negatives taken by it, the head in one of them measuring 2 ins., that in the other being 3 ins. In both, the perspective seems right enough, there being no appearance of its being strained or violent.

"With us, it was rather dark and rainy all day, and I took the negatives inside a room, without a diaphragm, exposure 7 secs. respectively. The SHARPNESS of all the planes of the head is good, as you will perceive. The distance of the sitter from the lens was 9 ft. 6½ in. for the larger head, and 4 ft. 9 in. for the smaller head.—Yours truly,  
J. TRAILL TAYLOR."

" . . . . . We may call attention to the extensive optical and metal works that Perken, Son and Rayment have established in Hatton Garden, and their photographic cabinet factory in Saffron Hill. At the former we were much interested in the glass-grinding departments—one for photographic lenses, another for spectacles; and we were surprised to find in London such extensive workshops for the metal parts of cameras and optical lanterns; indeed, we thought outside Birmingham we should not find such workshops in the United Kingdom. The cabinet works in Saffron Hill also interested us much; the arrangement of the machine tools and distribution of power on the several floors being admirable."—*Photographic News*.

"We are pleased to find upon trial that the Lens ['Optimus' Rapid Rectilinear] sent for review is really an excellent instrument."—*Photographic News*.

TRADE DISCOUNT LIST ON APPLICATION.

# 'OPTIMUS'

PERKEN, SON & RAYMENT, 99, HATTON GARDEN, LONDON.  
141, OXFORD STREET,

"OPTIMUS"

## STEREOSCOPIIC LENSES,

Sold in Pairs, accurately matched,  
GIVING BRILLIANT DEFINITION,

AND

COVERING  $3\frac{1}{4} \times 3\frac{1}{4}$  PERFECTLY.

Rapid Rectilinear Aperture F. 8. PER PAIR. 80s.

Rapid Euryscope ,, F. 6. ,, 120s.

If in Aluminium Mounts with Iris Diaphragms, extra ,, 40/-

THE ABOVE ARE STRONGLY RECOMMENDED EITHER FOR

## STEREOSCOPIIC SLIDES

OR

PHOTOGRAPHIC TRANSPARENCIES

FOR

## MAGIC LANTERN PROJECTION,

*Being of short focus and fairly wide angle they include a very comprehensive amount of field; their optical perfection is such that the resulting pictures will bear almost unlimited enlargement.*

# 'OPTIMUS'

PERKEN, SON & RAYMENT, 99, HATTON GARDEN, LONDON.  
141, OXFORD STREET,

## "OPTIMUS" 1894 FILM CAMERA.

[CARRIES] 48 FILMS.

Films do not need notching or otherwise preparing.



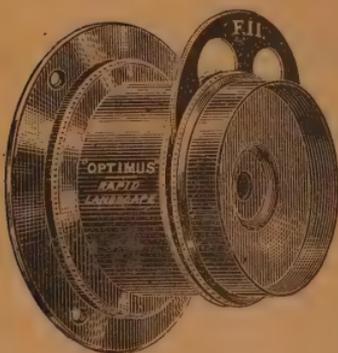
*British Journal of Photography,*  
November 10th, 1893.

Messrs. Perken Son and Rayment have perfected, and are to have on sale in January, a hand camera to carry forty-eight films on celluloid, the important feature of which is that the films will be used as supplied by all manufacturers—i.e., without any notching or interference with the films. The outside of the instrument measures  $9\frac{1}{2}$  by  $5\frac{1}{2}$  by  $5\frac{1}{2}$  inches. We have had submitted a sample for examination, and we find that by moving a lever it acts automatically without a

hit. It takes plates as well as films—a fewer number of the former, of course. The movement of the one lever releases the exposed film, and sets the next one ready for exposure. The mechanism is exceedingly simple and not likely to get out of order. We predict great popularity for the new camera.

Price, including Extra Rapid Euryscope, mounted in Aluminium,  
with Iris Diaphragm ... .. £12 12 0

## "OPTIMUS" RAPID LANDSCAPE.



MOUNTED IN BRASS WITH REVOLVING  
DIAPHRAGMS.

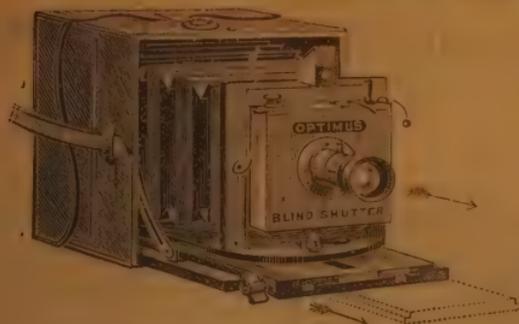
RAPID LANDSCAPE.—Works F/11, and gives brilliant negatives. Particularly suited for landscapes, also capable of being worked as a Portrait Lens.

|          |     |                |        |        |         |                  |
|----------|-----|----------------|--------|--------|---------|------------------|
| To cover | ... | 5 by 4         | 7 by 5 | 9 by 7 | 10 by 8 | 12 by 10 plates. |
| Focus    | ... | $5\frac{1}{2}$ | 9      | 12     | 14      | 18 inches.       |
|          |     | 2£/-           | 36/-   | 45/-   | 75/-    | 110/-            |

TRADE DISCOUNT LIST ON APPLICATION.

# 'OPTIMUS'

PERKEN, SON & RAYMENT, 99, HATTON GARDEN, LONDON.  
141, OXFORD STREET, LONDON.



## "OPTIMUS" CAMERA DE LUXE FOR THE HAND OR STAND.

Possesses Extra Long Focussing Adjustment.

This Camera has the advantage of being very light indeed, and very small indeed. Including the Double Dark Slides, its weight is but (2½lb.), whilst its dimensions, including Black Morocco Leather Covering, are only (6¼ by 5½ by 5½). The Telescopic Base-board sufficiently expands the bellows to allow the use of a lens of 11½ inches focus. The focussing is by Rack and Pinion arrangement. A Finder is also provided for instantaneous snap shots. A Swing Back arrangement and a Roller Blind Shutter, giving Exposures of varying speeds, are affixed. The Lens (Extra Rapid Euryscope) is attached inside the front, so that the closing up and opening out of the Camera is an operation of only one second. For either out or indoor use it is a comprehensive and self-contained little machine.

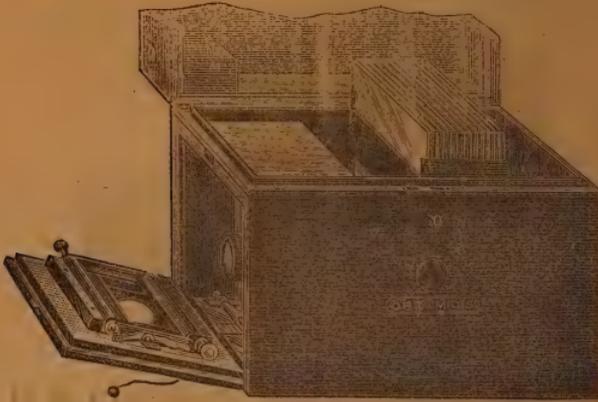
Price, including Three Dark Slides, Shutter, and "Optimus" Extra Rapid Euryscope, mounted in Aluminium, with Iris Diaphragm.

| For Plates       | Dimensions of Camera when closed | Price           | Ex. Dark Slides |
|------------------|----------------------------------|-----------------|-----------------|
| 4½ by 3½ ... ..  | 6¼ by 5½ by 5½ ... ..            | £12 12 0 ... .. | 14 0            |
| 5 " 4 " ... ..   | 7 " 5½ " 6½ ... ..               | 15 15 0 ... ..  | 14 6            |
| 6½ " 4½ " ... .. | 9 " 6½ " 8 " ... ..              | 18 18 0 ... ..  | 15 0            |

TRADE DISCOUNT LIST ON APPLICATION.

# 'OPTIMUS'

PERKEN, SON & RAYMENT, 99, HATTON GARDEN, LONDON.  
141, OXFORD STREET,



## "OPTIMUS" IMPROVED MAGAZINE CAMERA.

The original "Optimus" Magazine Camera was highly extolled on all sides as least complicated of Reservoir Cameras; but the 1893-4 Model is superlatively perfect in the simplicity of its parts, and absence of unnecessarily intricate mechanism. The grooves in which the Plates are placed are continuous from the upper or Reserve Chamber to the lower or Exposure Chamber. The Plates simply slide by their own weight from the upper to the lower chamber, without passing from box to box through a slot or performing any acrobatic feats. The Rapid Euryscope Lens can be accurately focussed from outside the box by Rack and Pinion. The Finders give proportionate images. A well-finished Roller Blind Shutter is fitted. This Instrument will be appreciated by those who desire Simplicity and Efficiency.

Price, with "Optimus" Extra Rapid Euryscope Lens,  
mounted in Aluminium, with Iris Diaphragms ... .. £10 10 0

## "OPTIMUS" UBIQUE HAND CAMERA.

Pictures  $4\frac{1}{2}$  by  $3\frac{1}{4}$

For use on Tripod or in Hand.

Carries Six Dry Plates. Three Dark Slides.

Focussing Screen, View Finder, Shutter, &c.

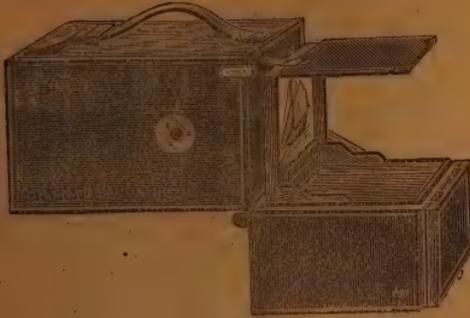
|                                    |       |
|------------------------------------|-------|
| Price, with Rapid View Lens ... .. | 55/-  |
| " " Rectilinear ... ..             | 80/-  |
| " " Euryscope ... ..               | 105/- |



TRADE DISCOUNT LIST ON APPLICATION.

# 'OPTIMUS'

PERKEN, SON & RAYMENT, 99, HATTON GARDEN, LONDON.  
141, OXFORD STREET,



## "OPTIMUS" (1893-4 IMPROVED) MINIMUS HAND CAMERA.

The 1893 Model of this Instrument has several improvements upon its predecessor of last year, the most important of which is a Focussing Screen that requires no handling, but opens and closes automatically. The Focussing is adjusted by Rack and Pinion from the outside, so that it is complete as a Field Camera. Being provided with two Finders, it is equally well-suited for instantaneous shots. The Plates, of which it accommodates twelve, are readily changed. This operation is performed by pushing the Plate into an attached bag by means of a sliding-piece which acts in a second capacity, also as a cover for the Plates. A Roller Blind Shutter, capable of giving Exposures of various rapidities is fitted within the Instrument. The outside is of the same superior finish as the interior, being covered with a durable Morocco.

Fitted with "Optimus" Extra Rapid Euryscope,  
mounted in Aluminium, with Iris Diaphragms ... .. £10 10 0

## "OPTIMUS" CYCLIST'S CAMERA.



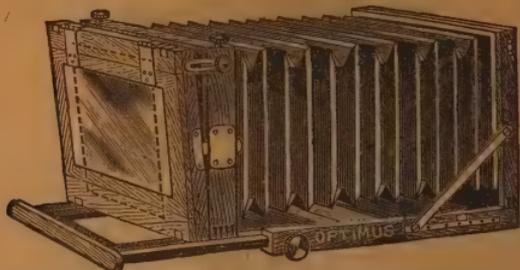
This little instrument is capable of producing results of first merit. It includes Shutter and Dark Slide as well as Rapid View Lens.

PRICE ... .. 25/-

TRADE DISCOUNT LIST ON APPLICATION.

# 'OPTIMUS'

PERKEN, SON & RAYMENT, 99, HATTON GARDEN, LONDON.  
141, OXFORD STREET,



## "OPTIMUS" CAMERA. LONG FOCUS

The Instrument can be set up almost instantaneously, has no loose parts, and includes all motions, having hinged focussing screen (adjusted by rack and pinion action), double swing back, cross fronts reversing back arrangement so that oblong dark slides give either horizontal or vertical pictures without unscrewing the Camera from the tripod.

Price of Camera, including 3 Double Dark Slides—

|          |        |          |          |         |          |          |
|----------|--------|----------|----------|---------|----------|----------|
| 4½ by 3½ | 5 by 4 | 6½ by 4½ | 8½ by 6½ | 10 by 8 | 12 by 10 | 15 by 12 |
| 130/-    | 133/-  | 137/-    | 175/-    | 227/-   | 275/-    | 333/-    |

## "OPTIMUS" PHOTOGRAPHIC OUTFIT.

Comprising Camera as above, 3 Dark Slides, "Optimus" Rapid Rectilinear Lens, Instantaneous Shutter, Tripod Stand, and Waterproof Case, complete—

|          |          |          |         |          |          |
|----------|----------|----------|---------|----------|----------|
| 4½ by 3½ | 6½ by 4½ | 8½ by 6½ | 10 by 8 | 12 by 10 | 15 by 12 |
| £10      | £12      | £15      | £20     | £23      | £30      |

This Outfit with Extra Rapid Euryscope Lens, instead of Rapid Rectilinear. extra—

|          |          |          |         |          |
|----------|----------|----------|---------|----------|
| 4½ by 3½ | 6½ by 4½ | 8½ by 6½ | 10 by 8 | 12 by 10 |
| 27/-     | 37/-     | 36/-     | 78/-    | 200/-    |

## "OPTIMUS" STUDIO CAMERA.

Specially arranged for Studio Use.

"Invited to say, if in our estimation, the Studio Cameras of Perken, Son, and Rayment could be improved in any way whatever, for the purpose for which they are intended, we must answer, No!"—*British Journal of Photography.*

This Camera is perfectly rigid, has double length of Bellows to suit small studios where large pictures are required, is fitted with Mechanical Adjustment to Focussing arrangement and to the swing back. It is in all respects a perfect instrument.

Camera with repeating frame masks, and one single dark slide—

|          |          |          |          |          |
|----------|----------|----------|----------|----------|
| 6½ by 6½ | 8½ by 8½ | 10 by 10 | 12 by 12 | 15 by 15 |
| 145/-    | 188/-    | 225/-    | 265/-    | 325/-    |

TRADE DISCOUNT LIST ON APPLICATION.

# 'OPTIMUS'

PERKEN, SON & RAYMENT, 99, HATTON GARDEN, LONDON.  
141, OXFORD STREET,



## RAYMENT'S IMPROVED PATENT WIDE ANGLE CAMERA.

EXTRA LONG FOCUS.

*British Journal of Photography* says:

"The present Model Rayment Camera is among the VERY LIGHTEST of actually RIGID Cameras offered to the public.

"The RAPIDITY of OPENING and CLOSING is greatly facilitated by the additional arrangement for throwing the pinion out of gear from the rack.

"There is NO CURTAILMENT OF VIEW when lenses of short focus and wide angular aperture are in use.

"ALL MOVEMENTS NECESSARY to the modern scientific photographer are included in this COMPACT instrument."

T. C. HEPWORTH, F.C.S., says: "The 'Rayment' Camera in particular claims attention, both for its BEAUTY OF WORKMANSHIP, and for the EASE and READINESS with which it can be put into action."

Price includes 3 Double Dark Slides—

|         |       |         |         |        |         |         |
|---------|-------|---------|---------|--------|---------|---------|
| 4½ × 3½ | 5 × 4 | 6½ × 4½ | 8½ × 6½ | 10 × 8 | 12 × 10 | 15 × 12 |
| 120/-   | 126/- | 145/-   | 168/-   | 212/-  | 258/-   | 314/-   |

## PHOTOGRAPHIC OUTFIT.

Including Three Double Dark Slides, "Optimus" Rapid Rectilinear Lens, Instantaneous Shutter, Tripod, Waterproof Case, complete—

|         |       |         |         |        |         |         |
|---------|-------|---------|---------|--------|---------|---------|
| 4½ × 3½ | 5 × 4 | 6½ × 4½ | 8½ × 6½ | 10 × 8 | 12 × 10 | 15 × 12 |
| £10     | £11   | £12     | £15     | £20    | £23     | £30     |

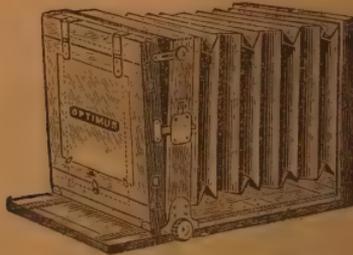
This Outfit with Extra Rapid Eury scope Lens, instead of Rapid Rectilinear, extra—

|                   |      |      |      |       |
|-------------------|------|------|------|-------|
| 27/-              | 37/- | 36/- | 78/- | 200/- |
| Turntable fitted. | 12/- | 15/- | 17/6 | 20/-  |
| Extra             |      |      |      | 25/-  |

TRADE DISCOUNT LIST ON APPLICATION.

# 'OPTIMUS'

PERKEN, SON & RAYMENT, 99, HATTON GARDEN, LONDON.  
141, OXFORD STREET,



## PORTABLE (A.R.) CAMERA.

Compact, Rigid, Inexpensive, and of Excellent Finish

These Instruments have Leather Bellows, and are fitted with hinged Focussing Screen, adjusted by Rack and Pinion, Square Reversing Back, so that horizontal or vertical pictures may be taken without removing Camera from Stand.

Price of Camera, including 3 Double Dark Slides—

|          |        |          |          |         |          |          |
|----------|--------|----------|----------|---------|----------|----------|
| 4½ by 3½ | 5 by 4 | 6½ by 4¾ | 8½ by 6½ | 10 by 8 | 12 by 10 | 15 by 12 |
| 85/-     | 87/6   | 98/-     | 125/-    | 150/-   | 200/-    | 260/-    |

Same Camera as above, without Swing Adjustment—

|      |      |      |       |
|------|------|------|-------|
| 75/- | 77/6 | 86/- | 113/- |
|------|------|------|-------|

## "OPTIMUS" PORTABLE (A.R.) PHOTOGRAPHIC OUTFIT.

Same Camera as above, which is a practical and elegant instrument, with 3 double dark slides—"Optimus" Rapid Rectilinear Lens—Instantaneous Shutter Tripod, and Waterproof Case, Complete—

|          |          |       |
|----------|----------|-------|
| 4½ by 3½ | 6½ by 4¾ | by 6½ |
| £8       | £10      | £13   |

## BRASS BINDING ANY CAMERA,

And 3 Double Dark Slides.

|          |        |          |          |         |          |          |
|----------|--------|----------|----------|---------|----------|----------|
| 4½ by 3½ | 5 by 4 | 6½ by 4¾ | 8½ by 6½ | 10 by 8 | 12 by 10 | 15 by 12 |
| 27 6     | 28 0   | 30 0     | 32 0     | 33 0    | 38 0     | 48 0     |

## EXTRA DOUBLE DARK SLIDES

For any of our Cameras.

|          |        |          |          |         |          |          |
|----------|--------|----------|----------|---------|----------|----------|
| 4½ by 3½ | 5 by 4 | 6½ by 4¾ | 8½ by 6½ | 10 by 8 | 12 by 10 | 15 by 12 |
|----------|--------|----------|----------|---------|----------|----------|

Solid, no hinges—

|      |     |     |      |     |     |     |
|------|-----|-----|------|-----|-----|-----|
| EACH | 7/3 | 8/3 | 10/9 | ... | ... | ... |
|------|-----|-----|------|-----|-----|-----|

Solid, with hinged shutters

|      |      |      |      |     |     |     |
|------|------|------|------|-----|-----|-----|
| EACH | 10/3 | 10/9 | 11/9 | ... | ... | ... |
|------|------|------|------|-----|-----|-----|

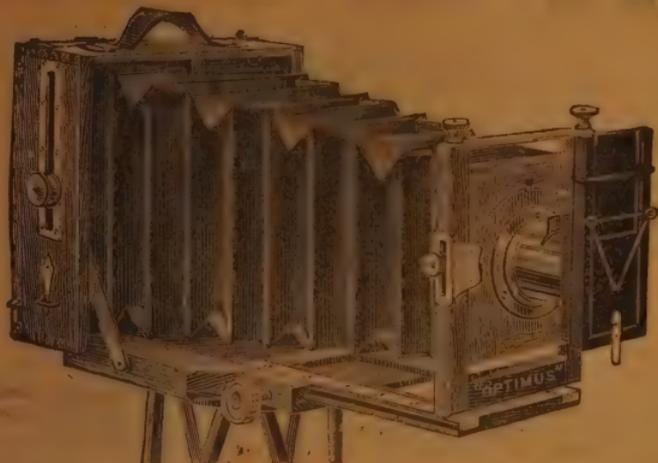
Hinged opening and Hinged shutter

|      |      |      |      |      |      |      |      |
|------|------|------|------|------|------|------|------|
| EACH | 14/- | 14/6 | 15/- | 21/6 | 25/6 | 31/6 | 47/3 |
|------|------|------|------|------|------|------|------|

TRA DISCOUNT LIST ON APPLICATION.

# 'OPTIMUS'

PERKEN, SON & RAYMENT, 99, HATTON GARDEN, 141, OXFORD STREET, LONDON.



## "OPTIMUS" (TOURIST'S PORTABLE) CAMERA (LONG FOCUS).

STRONG, SERVICEABLE, AND EFFICIENT.

It has long extension Taper Bellows, Rising Front, Rack Adjustment, Square Reversing Frame, and other modern improvements.

Price, with Three Double Dark Slides—

|          |          |          |
|----------|----------|----------|
| 4½ by 3½ | 6½ by 4½ | 8½ by 6½ |
| 98/-     | 114/-    | 136/-    |

## 'OPTIMUS' TOURIST'S PORTABLE PHOTOGRAPHIC OUTFIT.

The Tourist's Camera, as above, is supplied with 3 Dark Slides, "Optimus" Rapid Rectilinear Lens, Instantaneous Shutter and Tripod, complete with Waterproof Case.

|          |          |          |
|----------|----------|----------|
| 4½ by 3½ | 6½ by 4½ | 8½ by 6½ |
| £8       | £10      | £13      |

## "OPTIMUS" SUPERIOR OUTFITS.

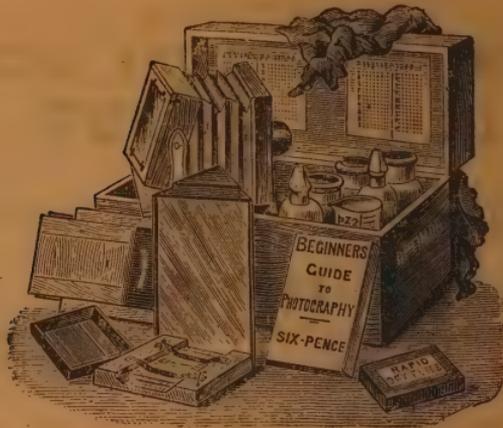
Rayment's Wide Angle, Long Focus, Rack Camera, 3 Double Dark Slides, "Optimus" Rapid Rectilinear Lens, Instantaneous Shutter, Tripod, and best Waterproof Case.

|          |          |          |         |          |          |
|----------|----------|----------|---------|----------|----------|
| 4½ by 3½ | 6½ by 4½ | 8½ by 6½ | 10 by 8 | 12 by 10 | 15 by 12 |
| £10      | £12      | £15      | £20     | £23      | £30      |

TRADE DISCOUNT LIST ON APPLICATION.

# 'OPTIMUS'

PERKEN, SON & RAYMENT, 99, HATTON GARDEN, LONDON.  
141, OXFORD STREET,



## "OPTIMUS" PORTABLE SETS OF PHOTOGRAPHIC APPARATUS.

Fitted COMPLETE in Cabinet, with Tripod Stand.

|                                                                                  | £ | s. | d. |
|----------------------------------------------------------------------------------|---|----|----|
| Quarter Pl. Size ( $4\frac{1}{4} \times 3\frac{3}{4}$ ) includes every requisite | 1 | 16 | 0  |
| Half Plate Size ( $6\frac{1}{2} \times 4\frac{3}{4}$ ) ... ..                    | 3 | 10 | 0  |

The Camera in this set has swing adjustment.

|                                                                          |   |   |   |
|--------------------------------------------------------------------------|---|---|---|
| Quarter Plate Size ( $4\frac{1}{4} \times 3\frac{3}{4}$ ) as diagram ... | 2 | 5 | 6 |
| Half Plate Size ( $6\frac{1}{2} \times 4\frac{3}{4}$ ) ... ..            | 5 | 0 | 0 |

Superior Camera, Rack and Pinion focussing adjustment. A really high-class outfit from which the most perfect results may be obtained.

|                                                                      |   |    |   |
|----------------------------------------------------------------------|---|----|---|
| Superior Quarter Plate ( $4\frac{1}{4} \times 3\frac{3}{4}$ ) ... .. | 3 | 8  | 0 |
| " Half Plate ( $6\frac{1}{2} \times 4\frac{3}{4}$ ) ... ..           | 5 | 15 | 0 |
| " Whole Plate ( $8\frac{1}{2} \times 6\frac{1}{2}$ ) ... ..          | 9 | 10 | 0 |

TRADE DISCOUNT LIST ON APPLICATION.

# 'OPTIMUS'

PERKEN, SON & RAYMENT, 99, HATTON GARDEN, LONDON.  
141, OXFORD STREET,

EXTRACT FROM

## "SHIPPING & MERCANTILE GAZETTE," LLOYD'S LIST.

### Experience in India and Chinese Central Asia OF DR. LANSDELL.

"A very practical instance of the satisfaction derived by all parties concerned when a sound and reliable apparatus is supplied has just been brought under our notice. Dr. Lansdell, whose remarkable journey through India and Chinese Central Asia was illustrated in many recent issues of the *Graphic*, obtained his photographic equipment, which included an 'Optimus' Camera and an 'Euryscope' Lens, from Messrs. Perken, Son and Rayment, of Hatton Garden, and the famous traveller's opinion of the apparatus may be given in his own words. He says: 'It accompanied me throughout my last journey of 50,000 miles to heights of 18,000 feet, through temperatures sometimes many degrees below freezing, and through equatorial heat. Nevertheless, I am pleased to say the apparatus suffered but little, and enabled me to secure some hundreds of excellently defined negatives for lantern slides for illustration of my lectures.' On one occasion the destruction of the whole plant seemed almost certain. The doctor was crossing the Muzart Pass of the ice range in the Tian Shan Mountains, a passage never before accomplished throughout by a European. The party were fording a river, when one of the baggage horses got into deep water, and for a very appreciable period his pack, which included the precious camera, &c., was entirely submerged, only the horse's head being visible. The animal, however, was subsequently washed ashore, and on the camera being opened it was ascertained that very little water indeed had got in, while out of the whole of the negatives only two had been very slightly injured. This is powerful testimony to the good cabinet-making of the camera, and, with the letter of Dr. Lansdell, certainly constitutes strong evidence of the excellence of this firm's manufactures."

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TRADE DISCOUNT LIST ON APPLICATION.

# 'OPTIMUS'

PERKEN, SON & RAYMENT, 99, HATTON GARDEN, LONDON,  
141, OXFORD STREET,



TRIPOD

AND

STUDIO.



"OPTIMUS" STANDS FOR CAMERAS.

|                                                                            | $\frac{1}{4}$ |    | $\frac{1}{2}$ |    | $\frac{1}{1}$ |    | $\frac{10}{8}$ |    |
|----------------------------------------------------------------------------|---------------|----|---------------|----|---------------|----|----------------|----|
|                                                                            | s.            | d. | s.            | d. | s.            | d. | s.             | d. |
| Telescopic adjustment, rigid ... ..                                        | 8             | 6  | 9             | 6  | 10            | 9  | 16             | 9  |
| Folding Ash, with Bayonet joint, "E.P.,"<br>very rigid ... ..              | 9             | 9  | 10            | 9  | 12            | 6  | 20             | 8  |
| Telescopic Ash, with sliding leg adjustment,<br>"Maudsley" pattern ... ..  | 18            | 6  | 19            | 9  | 20            | 9  | 24             | 9  |
| Telescope Ash, 3-fold, as sketch ... ..                                    |               |    | 16            | 0  | 18            | 0  | 20             | 0  |
| *4-FOLD, very Portable ... ..                                              |               |    | 16            | 0  | 20            | 0  | 28             | 0  |
| 'OPTIMUS' Stand, very rigid and much<br>recommended for large sizes ... .. |               |    | 15            | 0  | 16            | 0  | 20             | 6  |
| Pine Studio Stands with clamp .. ..                                        | 14            | 6  | 30            | 0  | BACK          |    | 43             | 9  |
| Mahogany ... ..                                                            |               |    |               |    | 45            | 0  | 78             | 9  |

\* Specially Portable. Strongly recommended where Small Bulk is important.

TRADE DISCOUNT LIST ON APPLICATION.

# 'OPTIMUS'

PERKEN, SON & RAYMENT, 99, HATTON GARDEN, LONDON.  
141, OXFORD STREET,



CAMERA CASES, with Shoulder Straps,  
LINED WITH GREEN CLOTH.

SQUARE—  $\frac{1}{2}$ , 20/-; 1, 29/-;  $\frac{10}{8}$ , 35/-;  $\frac{12}{10}$ , 48/- Leather.  
 $\frac{1}{2}$ , 15/9; 1, 20/-;  $\frac{10}{8}$ , 21/6;  $\frac{12}{10}$ , 28/- Canvas.  
OBLONG—  $\frac{1}{4}$ , 10/6;  $\frac{1}{2}$ , 15/-;  $\frac{1}{1}$ , 20/- Canvas only.



## PORTABLE "UMBRELLA" RUBY TENT (PATENT NON-ACTINIC.

Like an umbrella, it folds into a very small space, and can be set up for developing or changing plates as easily as its well-known prototype. Made of two thicknesses of material, one ruby, the other orange colour, no light can enter except it be filtered through these media. The head and bands are introduced so that the operator, sitting in his chair can conveniently watch the progress of his work whilst the tent rests on the table.—*Beginner's Guide to Photography.*

Made in two sizes—

|                           | Dimensions closed. | Price |
|---------------------------|--------------------|-------|
|                           | Inches.            | s. d. |
| For changing Plates .. .. | 24 by 8            | 25 0  |
| For Developing " " .. ..  | 28½ by 8           | 35 0  |

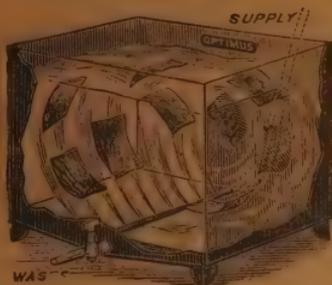
TRADE DISCOUNT LIST ON APPLICATION.



# 'OPTIMUS'

PERKEN, SON & RAYMENT, 99, HATTON GARDEN, LONDON.  
141, OXFORD STREET,

## "OPTIMUS" REVOLVING PRINT-WASHER.



Water is injected from a perforated Tube which crosses the tank at the bottom. The force of water creates a revolving current, which carries the prints over and over in its course. The bottom is slightly V-shaped, and contains an outlet for waste.

Prices, including Grooved Metal Rack, which fits into the tank and accommodates negatives which can be also washed. Making the machine efficient for both NEGATIVES and PRINTS. For all sizes up to

1. 16/-; 1/2. 21/-; 1 1/2. 30/-

## "OPTIMUS" OPAL PRINTING FRAME.



### Extract from "The British Journal of Photography."

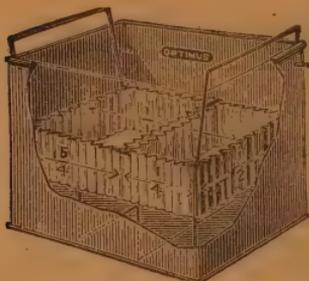
"This well-known firm are placing on the market an opal printing frame which is calculated to prove eminently useful to all who practise opal printing. The frame is hinged (book fashion) in the middle. In one half provision is made for holding the negative so rigidly that it cannot possibly get displaced, similar provision being made in the other wing for holding the sensitive opal plate, which can be brought into the most intimate contact with the surface of the negative and remain undisturbed throughout, no matter how often the frame is opened up for inspecting the progress of the printing. This perfection of registration will commend itself to the user. The frames are being made in various sizes."

1/2-plate, 12/-; 1-plate, 15/-

TRADE DISCOUNT LIST ON APPLICATION.

# 'OPTIMUS'

PERKEN, SON & RAYMENT, 99, HATTON GARDEN, LONDON.  
141, OXFORD STREET, LONDON.



## NEGATIVE WASHER AND DRAINING RACK COMBINED.

The Tank is fitted with syphon arrangement, so emptying automatically. The tap under which it is placed refills it from time to time.

For Quarter, 5 by 4, half and whole plate Negatives ... .. 7/9

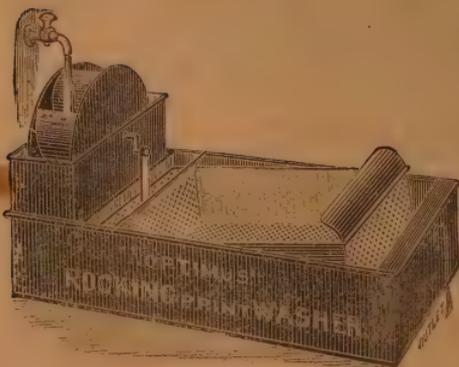
## 'OPTIMUS' PERFECTED PRINT & NEGATIVE WASHER



This tank is specially designed to automatically empty itself on the syphon principle, or to allow the water—not from the top, but from the bottom of the vessel—to overflow. The bent pipe shown outside the diagram of the tank acts as a syphon when the little tap on the top of its curvature is closed; but, when it is opened, it acts as an air valve and so destroys the syphon, thus permitting the water from the tank to flow out at the same rate that it enters. A Rack is provided which will accommodate negatives of varying sizes. This rack can be lifted out when prints are to be washed.

|                 |     | OVERFLOW. |     |     |     |     |     |      |
|-----------------|-----|-----------|-----|-----|-----|-----|-----|------|
| Rack for plates | ... | ...       | 1/2 | 1/2 | 5/4 | 1/2 | ... | 9/6  |
| " "             | ... | 10/8      | 1/2 | 1/2 | 5/4 | 1/2 | ... | 15/- |
| " "             | ... | 12/8      | 1/2 | 1/2 | 5/4 | 1/2 | ... | 20/- |

## "OPTIMUS" ROCKING PRINT-WASHER.



Water running from a tap revolves the wheel, which is connected with the cradle, causing it to work up and down at each revolution. A syphon is fitted to drain the tank. One hour's washing is ample.

|                     |      |
|---------------------|------|
| Inches 9 x 7 cradle | 18 6 |
| 11 x 9 "            | 28/- |
| 13 x 11 "           | 32/- |
| 16 x 13 "           | 39/6 |
| 20 x 16 "           | 50/- |

TRADE DISCOUNT LIST ON APPLICATION.

# 'OPTIMUS'

PERKEN, SON & RAYMENT, 99, HATTON GARDEN, LONDON.  
141, OXFORD STREET,

## REDUCED PRICES OF PHOTOGRAPHIC SUNDRIES

### PRINTING FRAMES, OAK.

Superior finish, round corners, brass springs, per doz.

|          |        |          |          |         |          |
|----------|--------|----------|----------|---------|----------|
| 4½ by 3½ | 5 by 4 | 6½ by 4½ | 8½ by 6½ | 10 by 8 | 12 by 10 |
| 4/9      | 6/2    | 8/6      | 12/6     | 18/-    | 27/-     |

Mahogany, superior, per doz.

|     |     |      |      |      |      |
|-----|-----|------|------|------|------|
| 7/6 | 9/6 | 13/- | 28/- | 39/- | 58/- |
|-----|-----|------|------|------|------|

### LIGHT-TIGHT PLATE BOXES.

Mahogany, for 12 plates, each.

|     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|
| 2/6 | 3/- | 4/3 | 5/6 | 6/6 | 7/- |
|-----|-----|-----|-----|-----|-----|

Mahogany, for 24 plates, each.

|     |     |     |     |     |      |
|-----|-----|-----|-----|-----|------|
| 3/9 | 3/9 | 4/9 | 6/- | 8/- | 10/- |
|-----|-----|-----|-----|-----|------|

### NEGATIVE BOXES.

White Wood (to hold 12) per doz.

|      |      |      |      |      |      |
|------|------|------|------|------|------|
| 10/6 | 12/- | 15/- | 22/6 | 33/- | 45/- |
|------|------|------|------|------|------|

White Wood (to hold 24) per doz.

|      |      |      |      |      |      |
|------|------|------|------|------|------|
| 12/9 | 13/6 | 18/6 | 26/- | 40/- | 57/- |
|------|------|------|------|------|------|

White Wood (to hold 50) per doz.

|      |      |      |      |      |      |
|------|------|------|------|------|------|
| 16/6 | 18/- | 24/- | 33/- | 57/- | 66/- |
|------|------|------|------|------|------|

### VIGNETTE CLASSES.

|     |     |      |      |      |      |
|-----|-----|------|------|------|------|
| 6/6 | 9/- | 14/- | 17/6 | 22/6 | 27/6 |
|-----|-----|------|------|------|------|

### CARRIERS OR INNER FRAMES.

For Double Dark Slides, to carry smaller plates, per doz.

|      |      |      |      |      |      |
|------|------|------|------|------|------|
| 12/- | 15/- | 18/- | 21/- | 24/- | 39/- |
|------|------|------|------|------|------|

TRADE DISCOUNT LIST ON APPLICATION.

# 'OPTIMUS'

PERKEN, SON & RAYMENT, 99, HATTON GARDEN, LONDON.  
141, OXFORD STREET,

## REDUCED PRICES OF PHOTOGRAPHIC SUNDRIES

### VULCANITE OR CELLULOID TRAYS.

3 by 3½ 4½ by 3½ 5½ by 4½ 7 by 5½ 8 by 6 9 by 7 11½ by 9½ by 1 13½ by 11½ by 1½

Price per doz.

4/9 4/9 5/9 8/9 14/- 15/- 24/- 32/-

### PORCELAIN TRAYS.

5 by 4 6 by 5 7 by 5 8 by 6 9 by 7 10 by 8 11 by 9 12 by 10 13 by 11 14 by 11

Price per doz.

6/6 7/6 7/6 8/9 10/- 13/- 16/- 20/- 28/- 36/-

### PAPIER MACHE.

4½ by 3 7 by 5 8½ by 6½ 10½ by 8½ 12½ by 10½ 15 by 12½

Price per doz. 6/9 11/- 14/- 21/- 28/6 45/-

### (FOLDING) PLATE DRAINING RACKS.

|                     | 12 grooves | 24 grooves | 36 grooves |
|---------------------|------------|------------|------------|
| For plates 4½ by 3½ | 9/-        | 12/-       | 20/-       |
| „ 6½ by 4½          | 12/-       | 15/-       | 24/-       |
| „ 8½ by 6½          | 15/-       | 21/-       | 30/-       |

### GRADUATED GLASS MEASURES.

1 dr. 2 dr. 1 oz. 2 oz. 4 oz. 6 oz. 8 oz. 10 oz. 16 oz. 20 oz. 32 oz. 40 oz.  
5/- 5/- 5/- 5/- 9/- 10/6 12/6 13/6 16/- 18/- 36/- 42/-

### GLASS FUNNELS, RIBBED OR PLAIN.

Diam. of Top Ins. 1½ 2 2 3 4 4½ 5 5½ 6 7 8  
Price per doz. 2/6 2/9 3/3 3/9 4/- 4/6 6/3 8/- 10/6 14/- 18/-

### CUTTING SHAPES.

C.D.V. 4 by 3 Cabinet. 6½ by 4½ 8½ by 6½ 10 by 8 12 by 10  
Price per doz. 5/6 6/- 9/6 10/- 20/- 24/- 34/-

TRADE DISCOUNT LIST ON APPLICATION.

# 'OPTIMUS'

PERKEN, SON & RAYMENT, 99, HATTON GARDEN, LONDON.  
141, OXFORD STREET,



## "OPTIMUS"

**1,000 CANDLE-POWER <sup>PHOTO</sup> EXPOSURE ILLUMINATOR.**

Magnesium Powder is uninterruptedly blown through a spirit flame, causing not flashes—but a continuity of light more perfectly actinic than any other known.

Complete with double inflation blower,

**15s.**

Several different Magnesium Lamps will be found on other Pages;

ALSO,

**DARK ROOM LAMPS.**

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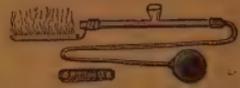
TRADE DISCOUNT LIST ON APPLICATION.

# 'OPTIMUS'

PERKEN, SON & RAYMENT, 99, HATTON GARDEN, LONDON.  
141, OXFORD STREET,

## HASTINGS' FLASH LAMP.

1/3 With Mouthpiece. | With Pneumatic Ball. 2/6



*Amateur Photographer*:—"A handy lamp. It is specially adapted for taking instantaneous photographs at night. The glass tube is charged with magnesium powder, and the brass trough filled with methylated spirit; this being lighted, the pneumatic ball is squeezed, the flash given, and the photograph taken."

## "OPTIMUS" MAGNESIUM RIBBON LAMP, 5/-

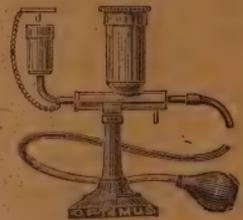


*British Journal of Photography*:—"It is a neat little thing, not greatly exceeding the dimensions of an old-fashioned watch, and projects a powerful beam of light."

## MAGNESIUM FLASH LAMP.

For Instantaneous Photography,

With this instrument either flash or continuous illuminations may be produced. It is really a strong, serviceable, and reliable apparatus. The larger vertical cylinder is the powder reservoir; by means of a spring the powder is made to pass into the horizontal discharge tube. This tube passes through the smaller vertical cylinder which contains spirit, with sponge as absorbent. By pressing the pneumatic ball the powder is now blown through the flame, so creating a brilliant flash.



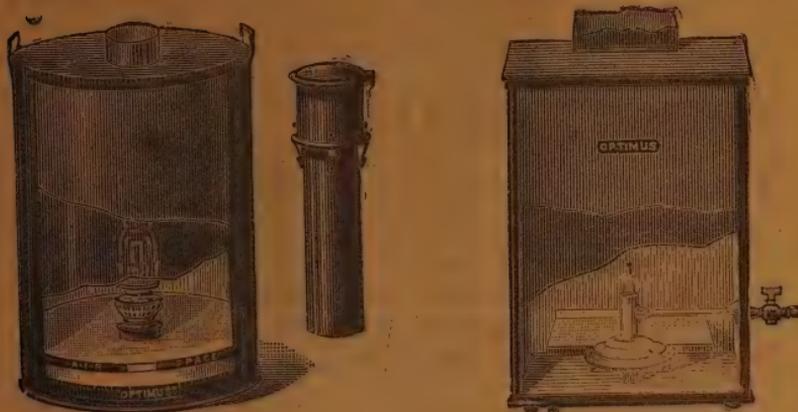
powder is now blown

PRICE (Brass Nickerled) .. .. 7/6 each.

TRADE DISCOUNT LIST ON APPLICATION.

# 'OPTIMUS'

PERKEN, SON & RAYMENT, 99, HATTON GARDEN, LONDON.  
141, OXFORD STREET, LONDON.



## "OPTIMUS" LAMPS FOR DARK ROOM.

The Lantern shown in the diagram is fitted with a gas jet adjustable from the outside: the light can thereby be readily lessened or increased at will. In front is a sheet of ruby or orange glass, easily removed, behind which is a double thickness of canary fabric set in a metal frame; it is, therefore, safe when developing the most sensitive of plates. As development progresses, one of the non-acting media can be moved, and the negative examined by the protection the second medium continues to give, enabling the amount of detail to be judged with certainty. In this lamp the joints are all perfectly light-tight, being made with a double turn over of tin; the upper parts are also held together with rivets. Ventilation is well considered, as a shaft at the back of the lamp, open at bottom and top, encourages a free circulation of air. Without doubt this lamp has no equal for the purpose for which it is intended. — *British Journal of Photography.*

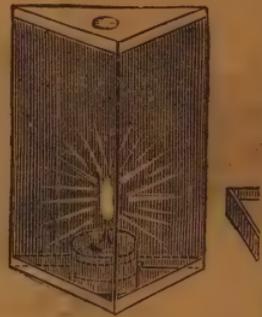
Fitted either with Gas or Argand Burner for Paraffin Oil.

Square or Round " " " each 13s.

TRADE DISCOUNT LIST ON APPLICATION.

# 'OPTIMUS'

PERKEN, SON & RAYMENT, 99, HATTON GARDEN, LONDON.  
141, OXFORD STREET,



## "OPTIMUS" LAMPS FOR DARK ROOM.

The form of Lantern shown in the accompanying diagrams presents a great many advantages. It possesses a powerful Lamp, so arranged that the oil receptacle is isolated from the flame and cannot get heated. Plenty of air circulates. In front is a sheet of ruby glass (removable), behind which is a sheet of deep orange; it is, therefore safe when developing the most sensitive of Plates. As development progresses the ruby glass can be raised and the Negative examined by the orange glass only, enabling the amount of detail to be readily judged ... each 7/4

**FOLDING LAMP.**—An inexpensive form of Lamp, having two sides of metal, and the third of red glass. The metal sides are hinged together, so that they fold up for travelling, with the ruby glass protected from fracture by lying between them. Top and bottom triangular pieces—one forming a candle-holder and the other a chimney—complete this clever little arrangement ... each 2/6

**REDDINGS' PATENT PORTABLE LAMP.**—  
Small, 2/-; and Large, 3/6 each.

CANDLES for above, Small, 1/6; Large ditto, 2/- per doz.

TRADE DISCOUNT LIST ON APPLICATION.

# 'OPTIMUS'

PERKEN, SON & RAYMENT, 99, HATTON GARDEN, LONDON.  
141, OXFORD STREET,

## "OPTIMUS" LAMPS FOR DARK ROOMS.

This drawing represents a very large Gas Lantern, fitted with Ruby and Orange Glasses or Screens of Ruby and Orange fabric—non-breakable. The two non-actinic media can be used at one time, or, where preferred, one only. As shown in the diagram the Gas is regulated on the outside of the Lantern. Ventilation is most completely considered in the construction.

Price complete ... 20/-

## NON-ACTINIC LAMP

For the Dark Room.

With Brass Oil Reservoir.

Strong and of Superior Finish. Complete, 4/-

## "OPTIMUS" HOROLOGICAL MAGNESIUM RIBBON LAMP.

The Clock Movement is of Superior Finish. It feeds out the Ribbon at the necessary speed ... 20/-  
Extra coils of Ribbon ... each 1/-

## "OPTIMUS" CHAMELEON LAMP.

Has inner and outer cylinder, the former revolves carrying

Ruby and Canary non-breakable Media.

Small Size ... 3/-  
Large Size ... 5/6

## "OPTIMUS" MAHOGANY RETOUCHING DESKS.

Who's-plate ... 16/8  
12 x 10 ... 25/-  
15 x 12 ... 35/6

Each has the smaller Carriers.

TRADE DISCOUNT LIST ON APPLICATION.



# 'OPTIMUS'

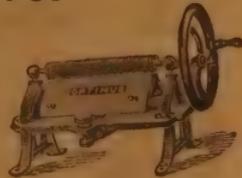
PERKEN, SON & RAYMENT, 99, HATTON GARDEN, LONDON  
141, OXFORD STREET,

## "OPTIMUS" BURNISHER FOR PHOTOGRAPHIC PRINTS.

The Burnishing Bar is specially hardened. The Frame is of superior and convenient construction. It is Nickel-plated, and of beautiful finish.

|        |      |      |       |      |       |
|--------|------|------|-------|------|-------|
| Plates | 1/2  | 1    | 1 1/2 | 2    | 2 1/2 |
| Price  | 30/- | 36/- | 45/-  | 60/- | 90/-  |

Larger to order.



PATENT

## PERFECTION PHOTOMETER.

CORRECT EXPOSURE A CERTAINTY

Each .. 6/8.



## "OPTIMUS" E. P. BURNISHER.

A highly finished machine, possessing a perfectly hardened burnishing bar.

In two sizes only, viz :—

|        |      |      |             |
|--------|------|------|-------------|
| Plates | 1/2  | 1    | Exceptional |
| Price  | 25/- | 30/- | Value.      |



## "OPTIMUS" CAMEO PRESSES.

These presses are to give a raised medallion-like effect to portraits.

|                                                                        |      |
|------------------------------------------------------------------------|------|
| Carte de Visite, including 3 shapes ...                                | 10/- |
| Cabinet, including 3 shapes for Cartes de Visite and 3 for Cabinet ... | 22/- |



TRADE DISCOUNT LIST ON APPLICATION.

# 'OPTIMUS'

PERKEN, SON & RAYMENT, 99, HATTON GARDEN, LONDON.  
141, OXFORD STREET,

## WAISTCOAT DETECTIVE CAMERA.

THIS INSTRUMENT IS ONLY MADE BY THE PATENTEE,  
C. P. STIRN.

|                                                |     |     |      |
|------------------------------------------------|-----|-----|------|
| With Plates for 36 Exposures                   | ... | ... | 23/6 |
| " " 24 " Larger<br>Size for Lantern Pictures } | ... | ... | 35/- |



## "OPTIMUS" VIEW FINDERS.

|                       |     |     |          |
|-----------------------|-----|-----|----------|
| Camera Obscura Model  | ... | ... | each 5/- |
| 1 1/2-inch bi-concave | ... | ... | " 2/6    |
| 2 1/2 " "             | ... | ... | " 3/9    |
| 3 1/2 " "             | ... | ... | " 5/-    |



## FOCUSSING GLASSES.

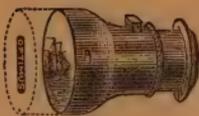
8d. 1/- 1/3 2/1 each.

With Archimedean Screw.

5/- each.



## COMBINED FOCUSSING GLASS AND FINDER.



Small Bell Shape, 2/6 ea.  
Large " " 5/- "



Screw Adjustment,  
4/- each.



Sliding Adjustment,  
5/- each.

TRADE DISCOUNT LIST ON APPLICATION.

# 'OPTIMUS'

PERKEN, SON & RAYMENT, 99, HATTON GARDEN, LONDON  
141, OXFORD STREET,

## OPTIMUS INFALLIBLE DEVELOPER.

THE Components of this Developer are perfectly pure, and the exact quantities necessary are employed, so ensuring the best possible negatives, whether Landscapes or Portraits, be the Exposures Instantaneous or Prolonged.

### TO PREPARE THE DEVELOPER.

Place the contents of one packet of each colored paper (Gold, Silver, and Blue), into a vessel and pour upon it 9 $\frac{1}{2}$  ozs. of pure water, preferably distilled, that is  $\frac{1}{10}$  less than half-a-pint. Should it be desirable to mix the whole quantity at one time add 36 $\frac{1}{2}$  ozs. of water to the 12 packets. When completely dissolved it is ready for use.

### TO ECONOMISE THE DEVELOPER.

After developing, pour the used Developer into a second bottle, for it can be advantageously employed in developing other plates.

To obtain the best possible results we recommend the following instructions to the careful attention of the operator :

#### For Plates—

|                         |        |                         |
|-------------------------|--------|-------------------------|
| Over Exposed            | ... .. | use Old Developer only. |
| Instantaneously Exposed | ... .. | ,, New Developer ,,     |
| Under Exposed           | ... .. | ,, half old & half new. |

Place the plate in the developing dish or tray and pour over it sufficient Developer to cover the upper surface thoroughly.

When the detail does not appear as quickly as expected add new Developer, or use new only, as may be found necessary.

IN PACKETS SUFFICIENT FOR 100  $\frac{1}{4}$ -PLATES.

PRICE 1s. 6d.

\* \*The temperature should not be much below 60° Fahrenheit or the action of the developer will become retarded.

PERKEN, SON & RAYMENT 99, HATTON GARDEN, LONDON.  
HOLBORN VIADUCT.

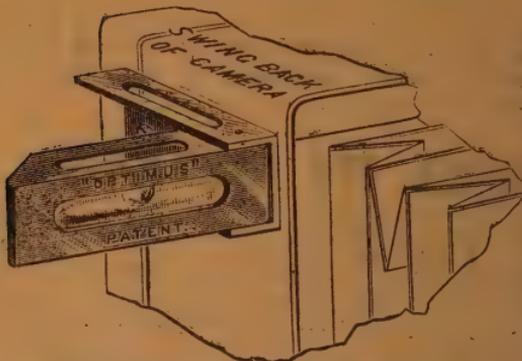
# 'OPTIMUS'

PERKEN, SON & RAYMENT, 99, HATTON GARDEN, LONDON.  
141, OXFORD STREET,

"OPTIMUS" PATENT CAMERA LEVEL.

PRICE FIVE SHILLINGS.

Extract from "Photographic Work."



"The desirability of a level on the camera is now so generally recognised that the question is rather what form of level shall be used than whether a level is to be fitted to the camera. At first sight, a small circular level seems the most desirable, but after several trials we have been obliged to discard this form, owing to the tendency of the liquid to escape. Going back, then, to the old form of level with the spirit sealed in a glass tube, we are pleased to receive from Messrs.

Perken, Son and Rayment the compact form shown in the sketch as attached to the Rayment camera. When folded in its recess it is in position for levelling the axis of the camera, and when opened out, as shown in the sketch, it is in position for levelling the transverse of the camera. When folded, the level, with its setting, measures only  $1\frac{1}{8}$  by  $\frac{1}{2}$  by  $\frac{3}{8}$  inch. It may be pointed out that to level the camera, it is not essential that the level should hinge out exactly to an angle of ninety degrees, a condition which would be difficult to ensure, owing to dust or other matter getting in the hinge, as a plane determined by any two horizontal lines will be horizontal."

Extract from "Amateur Photographer."

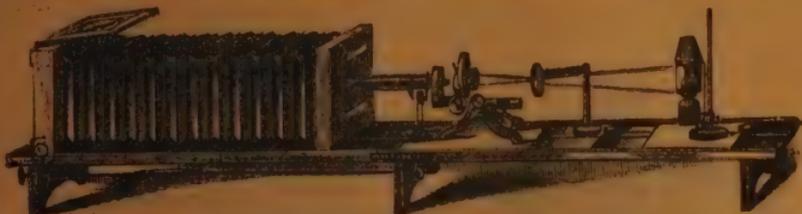
"The level is neatly set in a brass socket, which turns on a pin, so that it may be used to level the camera both ways, and a little slit at the top enables one to see easily the position of the bubble. It is turned out with the finish and nicety characteristic of this firm's work."

**INSTANTANEOUS  
SHUTTERS OF ANY KNOWN MAKE  
AT  
Lowest Market Prices.**

TRADE DISCOUNT LIST ON APPLICATION.

# 'OPTIMUS'

PERKEN, SON & RAYMENT, 99, HATTON GARDEN, LONDON.  
141, OXFORD STREET,



## "OPTIMUS" IMPROVED MICROSCOPICAL CAMERA.

"British Journal of Photography" says:

NOW that the microscope is becoming such an adjunct to the camera, we hail with pleasure every appliance that is calculated to develop this union.

Hence we have pleasure in giving a brief description of a micro-camera which appears to us to combine several advantages. We have called it an "Improved" micro-camera. So it is, in respect both of its simplicity of design and construction. The manufacturers are Messrs. Perken, Son and Rayment.

The one we examined is constructed for micro enlargements on plates  $3\frac{1}{2}$  by  $3\frac{1}{2}$ , which, it will be observed, is the English standard for lantern plates, for which adaptation it is intended, in order to exhibit the subjects by projection on a screen. This at once imparts an idea as to the dimensions of the camera proper, which is erected on a baseboard fifty inches in length. The bellows-body is twenty-four inches long, and is attached by one end to a strong wooden front erected a little over two feet from the rear end of the camera, and pierced in the centre with a hole of such dimensions as to permit of the insertion of the eyepiece end of the microscope. But the microscope itself is erected upon a moveable baseboard outside the wooden front mentioned, that is to say, it is adjustable as regards its motion to and from the camera, and, when the microscope has once been adjusted to the proper height, it is in accurate centre for ever after. On a second and similar sliding sub-baseboard, made, like the former, to slide axially, is erected any of the various microscopic sub-stage appliances common to the microscope, such as the condenser, which, after being fitted, is, like the optical system, ever afterwards in centre, requiring no further attention than the sliding backwards or forwards. A third sliding platform, similar to the two just spoken of, is intended for the lamp.

A rack extends the whole length of the principal baseboard, and each of the moveable platforms mentioned is operated by a pinion ready of access to the photographer, who thus can control the various movements necessary.

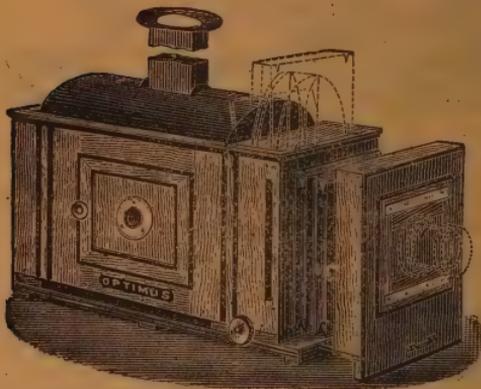
The rough adjustment for degree of enlargement is made by sliding in or out the bellows-body, which is under control of one of this firm's patent pinions, capable of being thrown out of gear with the rack for rapid adjustment, and of being geared again when it becomes necessary to focus. This we consider a very handy arrangement, as it saves the long and tedious racking out when extending the bellows to any considerable extent. The fine adjustment of the microscope is done by means of a band and pulley at the rear end.

The various sliding pieces work smoothly within brass guides at either side of the baseboard. It is made of mahogany, and is finely finished. Although the one we examined is made of dimensions suitable for lantern slides, there is no limit to the size to which it can be made. A great charm lies in the readiness with which work can be resumed at a moment's notice after the instrument has been packed away on the shelf.

|                                              |     |     |    |    |   |
|----------------------------------------------|-----|-----|----|----|---|
| Price of Camera, Stand, and Adjustable Bases | ... | ... | £7 | 10 | 0 |
| Microscope, with sin. and rin. Objective     | ... | ... | 7  | 10 | 0 |
| Condenser                                    | ... | ... | 0  | 10 | 0 |
| Lamp                                         | ... | ... | 0  | 10 | 0 |

# 'OPTIMUS'

PERKEN, SON & RAYMENT, 99, HATTON GARDEN, LONDON.  
141, OXFORD STREET.

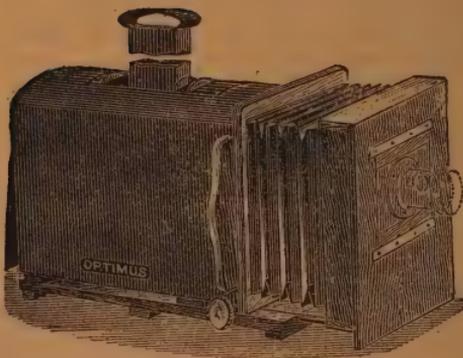


## "OPTIMUS" ENLARGING APPARATUS.

This Apparatus comprises superior Mahogany Body Lantern and long Bellows Camera adjusted by Patent Quick Action Rack and Pinion. The Lantern is fitted with powerful Refulgent Lamp, with 3 wicks, giving brilliant illumination. Compound Condensers.

### CONDENSER.

|                      |     |       |
|----------------------|-----|-------|
| 5-inch no front lens | ... | 100/- |
| 5 " with "           | ... | 127/- |
| 6 " no "             | ... | 133/- |
| 6 " with "           | ... | 161/- |
| 7 " no "             | ... | 155/- |
| 7 " with "           | ... | 173/6 |
| 8 " with "           | ... | 256/- |
| 9 " with "           | ... | 290/- |
| 10 " with "          | ... | 360/- |
| 12 " with "          | ... | 580/- |



If with Russian Iron instead of Mahogany Body.

|               |     |       |
|---------------|-----|-------|
| 5inch no lens | ... | 75/-  |
| 5 " and "     | ... | 102/6 |
| 6 " no "      | ... | 87/6  |
| 6 " and "     | ... | 115/3 |
| 7 " no "      | ... | 110/- |
| 7 " and "     | ... | 137/9 |
| 8 " no "      | ... | 160/- |
| 9 " " "       | ... | 210/- |
| 10 " " "      | ... | 285/- |
| 12 " " "      | ... | 450/- |

Adapted for use with Lime-light or Oil Lamp.

When large sized Condensers are employed, it will be found advantageous to use the Oxy-hydrogen or Oxy-calcium Lime Light Burners; but good results are obtained with the Refulgent Mineral Oil Lamps supplied with the apparatus.

## 'OPTIMUS'

### COMPOUND CONDENSERS (mounted) FOR ENLARGEMENTS.

|                 |                 |     |                 |      |      |      |      |      |       |       |
|-----------------|-----------------|-----|-----------------|------|------|------|------|------|-------|-------|
| Inches Diameter | 3 $\frac{1}{2}$ | 4   | 4 $\frac{1}{2}$ | 5    | 6    | 7    | 8    | 9    | 10    | 12    |
|                 | 8/-             | 9/6 | 16/6            | 24/- | 39/- | 50/9 | 69/6 | 93/6 | 132/- | 222/- |

TRADE DISCOUNT LIST ON APPLICATION.

# 'OPTIMUS'

PERKEN, SON & RAYMENT, 99, HATTON GARDEN, 141, OXFORD STREET, LONDON.



## "OPTIMUS" PROJECTION CAMERA FOR PHOTOGRAPHIC

### ENLARGING AND REDUCING.

TRIPLE QUICK-ACTING RACK AND PINION ADJUSTMENT.

(PATENT.)

In constructing this instrument special care has been taken to maintain the minimum of bulk, and the maximum of focal adjustment. When fully extended it is three times as long as when closed. A Compound Condenser is included, and fixed into an adapter very easily withdrawn, so that another of different size may be readily substituted. This changing of Condensers enables the operator to obtain the best possible illumination whatever may be the size of his negative. And to avoid the loss which must occur when the diameter of the Condenser greatly exceeds the diagonal of the plate to be copied. Three milled heads will be found near the baseboard attached to pinions and racks of the "Optimus" Patent Quick-Acting Arrangement. One actuates the front chamber which carries the lens, another the rear chamber which carries the illuminant, and the third the condenser and negative, allowing of a final exact adjustment immediately before exposure, when it may be required. The Body is of Superior Mahogany, ornamentally moulded and panelled. Altogether a very elaborate and complete instrument, warranted to facilitate the production of perfect results.

Complete with—

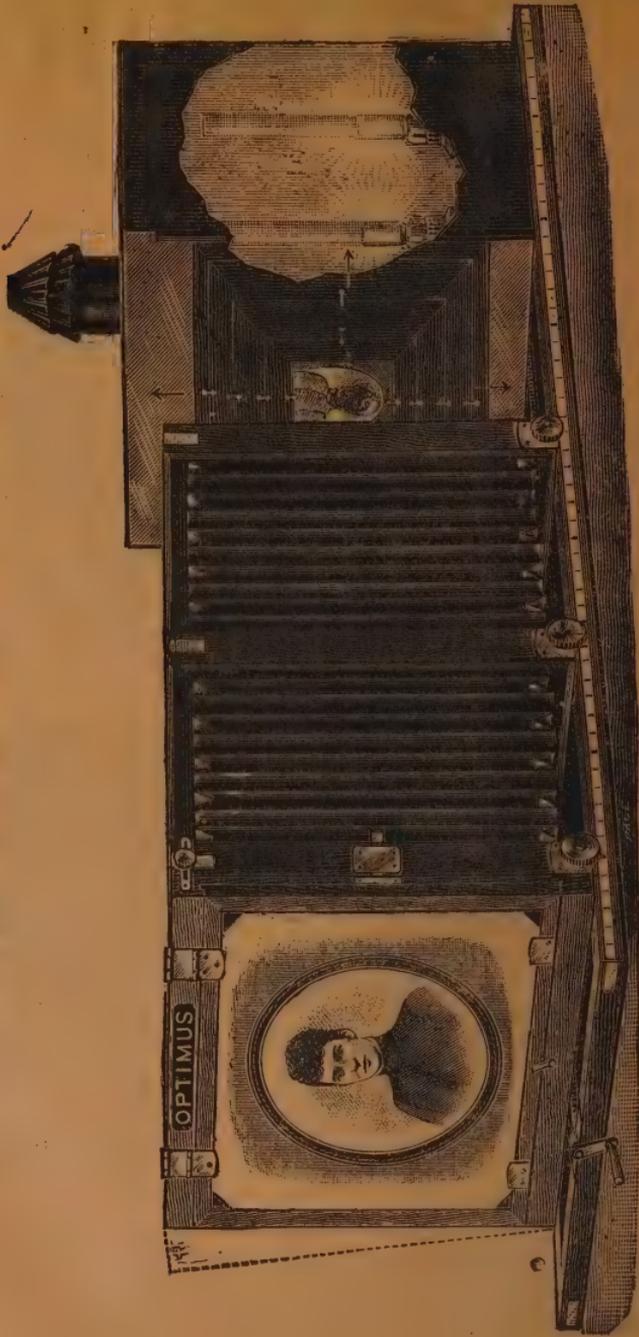
|                           |       |                                |       |
|---------------------------|-------|--------------------------------|-------|
| 5 in. Compound Condenser, | 130/- | Superior Projecting Objective, | 27/-  |
| 6                         | "     | "                              | 27/-  |
| 7                         | "     | "                              | 27/-  |
| 8                         | "     | "                              | 39/-  |
| 9                         | "     | "                              | 39/-  |
| 10                        | "     | "                              | 63/-  |
| 12                        | "     | "                              | 63/-  |
| 14                        | "     | "                              | 120/- |

Either 4-wick Oil Lamp, Safety Oxy-hydrogen Gas Jet, or Argand Gas Burner supplied with the Instrument.

TRADE DISCOUNT LIST ON APPLICATION.

# 'OPTIMUS'

PERKEN, SON & RAYMENT, 99, HATTON GARDEN, LONDON.  
141, OXFORD STREET,



DIRECT ENLARGING or REDUCING APPARATUS

*The British Journal of Photography* says:

A CONVENIENT ENLARGING APPARATUS.

"With a view to the photographer becoming his own enlarger, Messrs. Perken, Son, and Rayment have introduced an enlarging apparatus which fulfils the requirement in a singularly perfect manner. Its configuration is shown in the engraving.

"It is adapted for enlarging either by daylight or artificial light. For the latter, there is an illuminating chamber at the rear, containing two oil lamps, by which the opal, or ground glass plate behind the negative is uniformly and well lighted. For the former, this chamber is removed, and the end of the apparatus directed against the sky; hence this instrument may be used either by day or by night. The adjustments provide for any portion of the negative, from the corner to the centre, being brought opposite to the lens. A rack and pinion is provided to focussing screen and sliding adjustment to the lens front and illuminating chamber, so that they can be relatively adjusted one to the other. When all the adjustments have been made, each movable part can be securely clamped. We think very highly of this apparatus, as it so well fulfils the requirement of enabling a professional photographer to make an enlargement himself when time does not admit of his sending it to the professional enlarger. The reader will already have deduced from the above that reductions from large negatives can be as easily effected as enlargements from small ones."

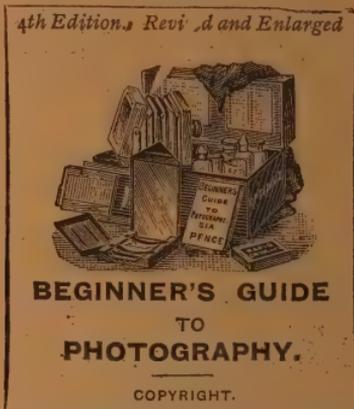
Price with dark slide—

|        |         |          |          |          |          |
|--------|---------|----------|----------|----------|----------|
| Inches | 10 by 8 | 12 by 10 | 15 by 12 | 18 by 16 | 20 by 24 |
|        | £8      | £10      | £12      | £16      | £20      |

# 'OPTIMUS'

PERKEN, SON & RAYMENT, 99, HATTON GARDEN, 141, OXFORD STREET, LONDON.

SIXPENCE.



*Fourth Edition. Beginner's Guide to Photography.*  
Cloth Covers, 6d.

## GRAPHIC.

"The 'Beginner's Guide to Photography' (Perken, Son and Rayment), by a 'Fellow of the Chemical Society,' is a useful little manual for amateur photographers. It contains brief and concise directions for taking, developing, and printing the negative, while there is a valuable article on that bugbear of all amateurs—'Exposure,' by Mr. A. S. Platts, containing some exceedingly useful exposure tables."

## DAILY NEWS.

"Under the title of the 'Beginner's Guide to Photography,' by a 'Fellow of the Chemical Society,' Perken, Son and Rayment have published a useful handbook for all interested in the art of photography. An article on 'Exposure,' and some carefully compiled exposure tables, by Mr. A. S. Platts, must be of value to all amateurs."

## St. STEPHEN'S REVIEW.

"'Beginner's Guide to Photography,' published by Perken, Son and Rayment, 99, Hatton Garden, London.—The fashionable art science, Photography, is most explicitly set forth without the confusing technicalities employed in most works on this subject. The difficult matter of 'Choice of Apparatus' has a chapter devoted to it, in which the special advantages of each kind of camera and lens is detailed. Altogether this book may be said to be of the greatest value to all who practise photography."

## ILLUSTRATED LONDON NEWS.

"The 'Beginner's Guide to Photography,' published by Messrs. Perken, Son and Rayment, of Hatton Garden, treats clearly and concisely of the apparatus and requirements necessary to engage in the delightful pastime of photography, and will be found most useful to amateurs."

## MORNING POST.

"The 'Beginner's Guide to Photography' is one of the best works on this popular and fascinating art yet published. The author thoroughly understands his subject. Messrs. Perken, Son and Rayment, Hatton Garden, are the publishers."

## LADY'S PICTORIAL.

"'Beginner's Guide to Photography,' (Perken, Son and Rayment, 'Optimus.') Revised and enlarged edition, 6d. It is clear and explicit, quite free from unnecessary and confusing technicalities. I can safely recommend this little work to any of our readers who contemplate taking up photography."

# 'OPTIMUS'

PERKEN, SON & RAYMENT, 99, HATTON GARDEN, LONDON.  
141, OXFORD STREET.

SIXPENCE.



*Second Edition. The Magic Lantern.*

*Cloth Covers, 6d.*

## ILLUSTRATED LONDON NEWS.

"For the entertainment of young folk at Christmas holiday evening parties, the magic lantern is the most powerful instrument, which has been vastly improved by modern science and skill. An instructive little sixpenny book, written by a Fellow of the Chemical Society, the author of '*The Beginner's Guide to Photography*,' is published by Messrs. Perken, Son, and Rayment, of Hatton Garden. It explains clearly and precisely, the construction and use of this ingenious optical apparatus, and the advantages of the new and improved magic lanterns, which ought not to be ignorantly or carelessly handled.

## ILLUSTRATED SPORTING AND DRAMATIC NEWS.

"*The Magic Lantern its Construction and Use.* By a Fellow of the Chemical Society.—Messrs. Perken, Son, and Rayment, of 99, Hatton Garden, publish at sixpence, a little volume, uniform with their treatises on photography and electricity, which deals very lucidly with the subject of the magic lantern. The principles which regulate the construction of magic lanterns, simple and complex, and the methods of illumination, including the preparation of the limelight, are detailed in a way to enable anyone with the most moderate aptitude for scientific matters to master the subject without difficulty."

## MORNING POST.

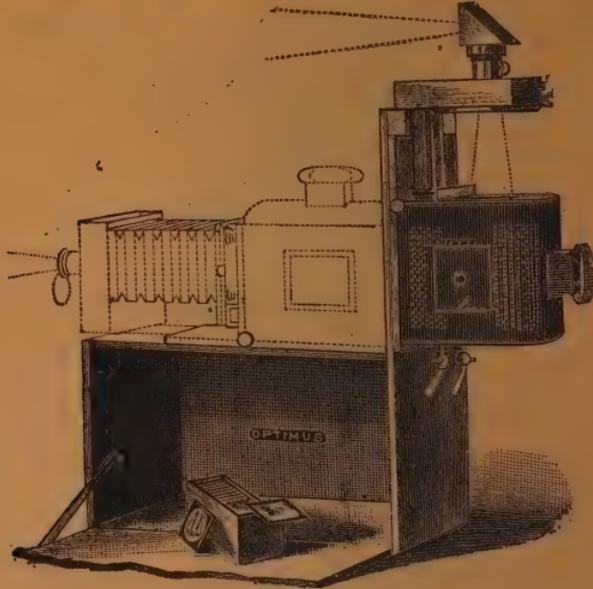
"Messrs. Perken, Son, and Rayment publish a little manual on '*The Magic Lantern, its Construction and Use.*' It explains the numerous improvements which have recently been made in this popular optical instrument, as well as the operator's duties while exhibiting the pictures. Many other matters connected with the use of the lantern, whether for pleasure or educational purposes, are included.

## ENGLISH MECHANIC.

"*The Magic Lantern.*—Messrs. Perken, Son, and Rayment have issued a cheap and useful manual of the magic lantern, explaining the principle of its construction, describing the various forms, and giving directions for its use. All who wish to have a lantern and learn how to manipulate it will find the information required in this handy book,

# 'OPTIMUS'

PERKEN, SON & RAYMENT, 99, HATTON GARDEN, 141, OXFORD STREET, LONDON.



## OPTIMUS" SCIENCE DEMONSTRATION LANTERN.

Price complete ... .. £8 6 0

Ingenious devices have been adopted to enable the manipulator of the Optical Lantern to display on the screen objects, such as liquid surfaces, when in a horizontal position. Some have involved loss of light and loss of time through re-arrangement of the optical system. In the above diagram it will be seen that the optical system is undisturbed, excepting that one mirror only, suitably mounted, is slipped on to the hood of the front lens. A tilting board, to which the lantern is attached, is turned up at a moment's notice to an angle of 90°, so making the change from horizontal to the vertical position.

## CONDENSERS IN BRASS CELLS.



| Ins. dia. | Double. | Triple. |
|-----------|---------|---------|
| 4         | 8/6     | 16/-    |
| 4½        | 16/6    | 25/-    |



Four-inch Condensers of pure White Glass, giving greatly increased light ... .. double } 60/-

# 'OPTIMUS'

PERKEN, SON & RAYMENT, 99, HATTON GARDEN, LONDON,  
141, OXFORD STREET,

## PROJECTION LANTERN OBJECTIVE

Perfect Definition. Superlatively Brilliant Illumination.  
Flat Field.

COINCIDENT FOCI, THEREFORE EQUALLY SUITABLE

FOR

## PHOTOGRAPHIC PORTRAITURE.

Extract from *The British Journal of Photography*.

"THE 'OPTIMUS' LANTERN OBJECTIVE.—This new lens, by Messrs. Perken, Son & Rayment, has a singularly flat field combined with great brilliance of the image. The corrections by which these properties have been secured have not been obtained at a cost of its utility as a *carte* portrait lens, for the coincidence of the chemical and visual foci, not always found in some lantern objectives, is here perfectly achieved. The form of the combination is essentially that of Professor Petzval's, subject to slight alterations consequent upon the improvements recently effected in optical glass. Although for lantern purposes it works with full aperture, yet it is provided with a case of stops to serve the purposes of copying or ordinary photographic portaiture. The lenses are two inches in diameter, with an equivalent focus of six inches."

T. C. HEPWORTH, of the *Photographic News*, says:

"'OPTIMUS' LANTERN OBJECTIVE.—The image given by this lens is BRILLIANT and has a WONDERFULLY FLAT FIELD. As the chemical and visual foci coincide the instrument can be used for portaiture as well as for lantern work."

### PRICES.

|                                           |     |     |     | £ | s. | d. |
|-------------------------------------------|-----|-----|-----|---|----|----|
| 6 inches Focus, 2 inches diameter of Lens | ... | ... | ... | 3 | 3  | 0  |
| 8½ " " 2½ " " "                           | ... | ... | ... | 5 | 5  | 0  |
| 12 " " 3½ " " "                           | ... | ... | ... | 7 | 7  | 0  |

TRADE DISCOUNT LIST ON APPLICATION.

# 'OPTIMUS'

PERKEN, SON & RAYMENT, 99, HATTON GARDEN, LONDON.  
141, OXFORD STREET,

## "OPTIMUS" REFULGENT LAMPS.

Stout Russian Iron. Burning Mineral Oil.



This lamp has been universally pronounced the *safest* and yet *most brilliant* lamp used with the Projecting Magic Lantern. A flame-sight-hole at the back enables the manipulator to adjust the wicks with the nicest accuracy whilst working.

|                                |     |     |      |
|--------------------------------|-----|-----|------|
| Two-wick (wicks 2-inches wide) | ... | ... | 12/6 |
| Three-wicks                    | ... | ... | 13/6 |
| Four-wicks                     | ... | ... | 15/6 |

## "OPTIMUS" LAMP WICK TRIMMER (Patent).

For 2-inch wicks ... .. 4/9



This little contrivance saves much trouble. With one cut it cleans off the charred portion of wick, and leaves a perfectly even ridge of cotton to hold the flame, which, in consequence, burns with a clearness and freedom from smoke that is very desirable. It is particularly recommended for photographic developing lamps, and for lamps used with the optical lantern. —*British Journal of Photography.*

RELIABLE REGULATORS (BEARD'S PATENT) ... 30/-

## ENAMELLED TRANSFER SLIDES.

Full Size (in sets of twelve) all  $3\frac{1}{4}$  by  $3\frac{1}{4}$  inches.

Comprising the following subjects, at the greatly reduced price of 4/- per set.

Life of Christ  
Views of Palestine  
Pilgrim's Progress  
Robinson Crusoe  
Fun's Edition of the Poets  
The Jackdaw of Rheims  
Sinbad the Sailor  
Natural History  
Cinderella  
Arctic Views  
Continental Views  
Gulliver's Travels  
Overland Route to India  
The Elephant's Revenge  
Mischievous Tommy  
Canadian Life, past and present  
Scenes in the Arctic Regions  
"Cash Three"  
"Curfew must not Ring To-night"  
Mother Hubbard

John Gilpin  
Dick Whittington  
Bluebeard  
The Tiger and the Tub  
Emigrant's Voyage  
Aladdin  
Life of Joseph  
Jack the Giant Killer  
The Life of Christ, Series II  
Palestine  
The Heroes of the Lifeboat  
Heroes of the Victoria Cross  
Old London and our Ancestors  
Robinson Crusoe, Series II  
Natural Phenomena  
Swiss Family-Robinson  
Dog and Monks of St. Bernard  
Reuben Davidger  
Bob the Fireman  
Pompey's Joys and Sorrows

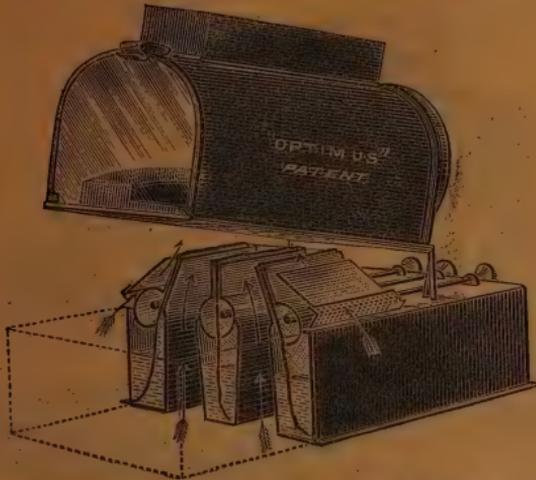
AND OTHERS.

Book of Readings, containing all the above sets, price 1/-

TRADE DISCOUNT LIST ON APPLICATION.

# 'OPTIMUS'

PERKEN, SON & RAYMENT, 99, HATTON GARDEN, 141, OXFORD STREET, LONDON.



## 'OPTIMUS' 1893-4 PATENT LAMP FOR PROJECTION LANTERN.

Price, Three-wicks, Two-inches wide, with Chimney, complete. ... 25/- each

By means of air shafts a greatly increased brilliancy is secured, which has been computed to equal three times—vide Report of British Photographic Society, February 24th, 1893—the candle power of the refulgent lamp hitherto used. These air shafts in promoting combustion create perfect ventilation, thereby overcoming the offensive odour so objectionable in mineral oil lamps. The colour of the flame is practically white, the lamp is, therefore, peculiarly suited for enlargements, and as compared with other lamps materially lessens the duration of photographic exposures.

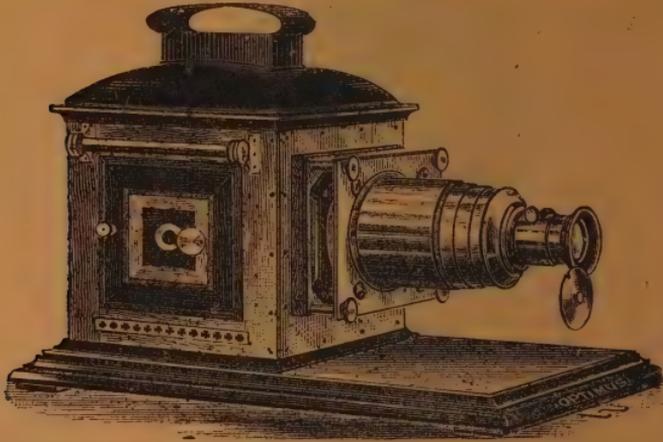
J. TRAILL TAYLOR, in the *British Journal of Photography*, says: "Messrs. Perken, Son and Rayment claim to have produced a triple-wick oil lamp, in which the luminosity is equal to ONE HUNDRED CANDLE POWER, while the light is very pure, and the heat less than usual. We have been present at trials made with it, and find their allegations as to PURITY and INTENSITY OF FLAME are maintained."

*Amateur Photographer*, November 5th, 1893.—"The 'Optimus' 1893-4 Oil Lamp for Lanterns.—Perken, Son and Rayment, of 99, Hatton Garden, have just introduced a great improvement in oil lamps, which will be warmly welcomed by all who use this form of illuminant. From the diagram it will be seen that central as well as side air shafts are provided, and with the greater supply of air is combined greater illumination and greater freedom from smell. We have had an opportunity of severely testing this lamp against some of the best ordinary forms, and the increase in illumination is at least three times. The perfect combustion and good ventilation, whilst keeping the lantern cool, also keeps the oil reservoir cool, and the whiteness of the light is so much increased that this should be useful for enlarging."

TRADE DISCOUNT LIST ON APPLICATION.

# 'OPTIMUS'

PERKEN, SON & RAYMENT, 99, HATTON GARDEN, LONDON.  
141, OXFORD STREET, LONDON.



## SUPERIOR OPTICAL LANTERN.

*For Drawing Room or Lecture Hall.*

This form of Instrument is specially suited for exhibitions. Each Lantern is fitted with Safety Blow-through Jet for Oxy-Hydrogen Light, or with 4-wick Refulgent Lamp as may be preferred. The 4in Compound Condenser is of very superior quality, and the resulting image on the screen will amply satisfy the most critical.

The projection lens is picked from a number and guaranteed to give specially sharp definition, being a high-class instrument of the Petzval form.

|                                         |        |
|-----------------------------------------|--------|
| With Single Telescopic Draw-Tube ... .. | £6 6s. |
| With Triple Telescopic Draw-Tube ... .. | £7 7s. |

TRADE DISCOUNT LIST ON APPLICATION.

# 'OPTIMUS'

PERKEN, SON & RAYMENT, 99, HATTON GARDEN, LONDON.  
141, OXFORD STREET,

Oxy-Hydrogen Gas  
may be used with  
these Lanterns.

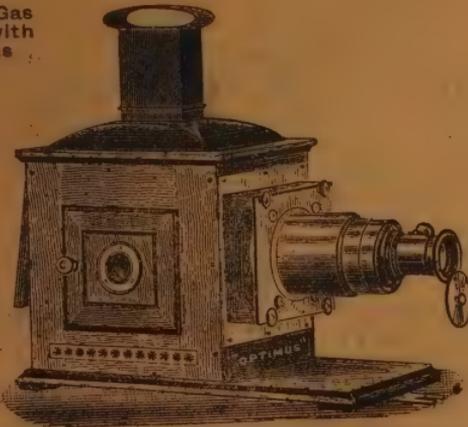


## "OPTIMUS" MAHOGANY MAGIC LANTERN.

Seasoned Mahogany Body, 2 Panelled Doors, Highly Finished Brass  
Stages and Sliding Tubes: ... .. 82s.

*Adapted for use with Limelight. For Dissolving, Two Lanterns are necessary.*

Oxy-Hydrogen Gas  
may be used with  
these Lanterns



Similar to the above, with 3-draw Telescopic Sliding Tubes and extension  
base-board.

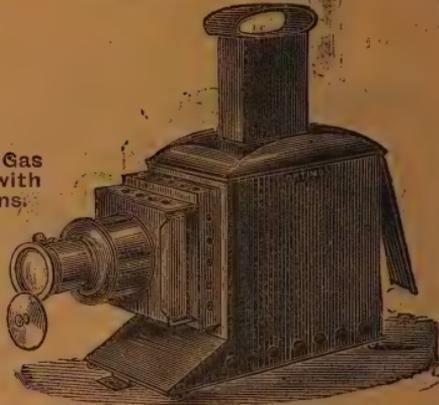
Supplied with Blow Through Jet or 3-wick Refulgent Lamp, ... .. £5 5 0  
Strongly recommended

TRADE DISCOUNT LIST ON APPLICATION.

# 'OPTIMUS'

PERKEN, SON & RAYMENT, 99, HATTON GARDEN, LONDON.  
141, OXFORD STREET,

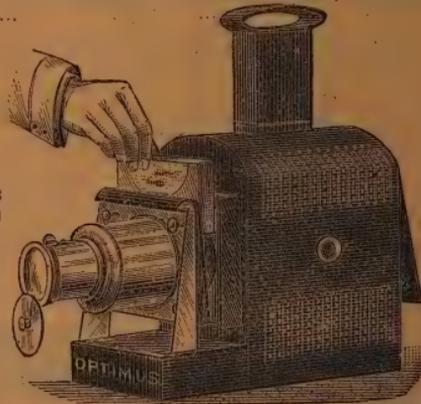
Oxy-Hydrogen Gas  
may be used with  
these Lanterns.



## 'OPTIMUS' MAGIC LANTERN.

Japanned Metal Body ... .. 30/-  
*Adapted for use with Limelight. For Dissolving 2 Lanterns are necessary.*

Oxy-Hydrogen Gas  
may be used with  
these Lanterns.



## STUDENT'S MAGIC LANTERN.

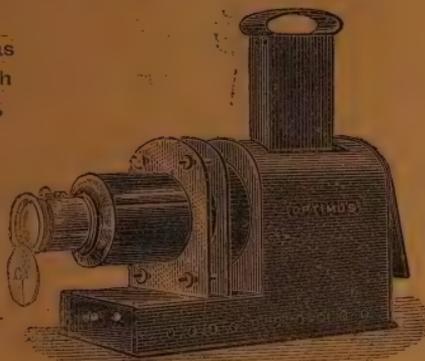
Students Lantern Japanned Metal Body (to take demonstrating tank)  
with finished Brass Sliding Tubes ... .. 40/-  
Do. Russian Iron Body, with finished brass front stage  
plate and sliding tube ... .. 55/-  
Do. Perforated Russian Iron Body, with brass fittings ... .. 60/-

Each Magic Lantern is efficient for exhibitions. The Lens gives crisp definition, being a superior Achromatic Photographic Combination (large diameter back lens), with rack and pinion. It is fitted to a telescopic lengthening tube, so gaining increased focal accommodation. The Condenser is composed of two plano-convex lenses of 4 inches diameter. The refulgent lamp has 3 wicks, or 4 wicks 2s. extra, yielding a brilliantly illuminated picture.—Each is complete in box.

# 'OPTIMUS'

PERKEN, SON & RAYMENT, 99, HATTON GARDEN, LONDON.  
141, OXFORD STREET,

Oxy-Hydrogen Gas  
may be used with  
these Lanterns.



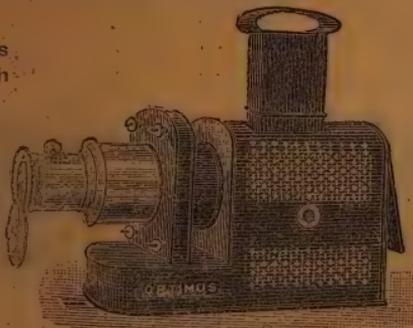
## RUSSIAN IRON MAGIC LANTERN.

Highly Finished Brass Sliding Tubes ... .. 45s.

*Adapted for use with Limelight. For Dissolving, 2 Lanterns are necessary.*

Each Magic Lantern is efficient for exhibitions. The Lens gives crisp definition, being a superior Achromatic Photographic Combination (large diameter back lens), with rack and pinion. It is fitted to a telescopic lengthening tube, so gaining increased focal accommodation. The Condenser is composed of two plano-convex lenses of 4 inches diameter. The retulgent lamp has 3 wicks, or 4 wicks 2s. extra, yielding a brilliantly illuminated picture.—Each is complete in box.

Oxy-Hydrogen Gas  
may be used with  
these Lanterns.



## "OPTIMUS" MAGIC LANTERNS.

Perforated Russian Iron Body, Brass Sliding Tubes ... 50s.

*Adapted for use with Limelight. For Dissolving 2 Lanterns are necessary.*

Each Magic Lantern is efficient for exhibitions. The Lens gives crisp definition, being a superior Achromatic Photographic Combination (large diameter back lens), with rack and pinion. It is fitted to a telescopic lengthening tube, so gaining increased focal accommodation. The Condenser is composed of two plano-convex lenses of 4 inches diameter. The retulgent lamp has 3 wicks, or 4 wicks 2s. extra, yielding a brilliantly illuminated picture.—Each is complete in box.

TRADE DISCOUNT LIST ON APPLICATION.

# 'OPTIMUS'

PERKEN, SON & RAYMENT, 99, HATTON GARDEN, LONDON.  
141, OXFORD STREET,



## 'OPTIMUS' MAGIC LANTERNS FOR YOUTHS.

To burn Paraffin or Mineral Oil.

The body of these lanterns is so constructed that the oil reservoir is not likely to become heated, since it falls through the bottom of the illuminated chamber and is in outside air.

Small Magic Lanterns, with condensers, front lens (adjustable), black japanned body, chimney, lamp and reflector—

| No.        | diam. front lens | condenser      | price | each |
|------------|------------------|----------------|-------|------|
| 1          | $1\frac{1}{8}$   | $1\frac{2}{3}$ | 2/-   |      |
| 2          | $1\frac{1}{4}$   | $1\frac{3}{4}$ | 3/-   |      |
| 3          | $1\frac{5}{8}$   | $2\frac{1}{6}$ | 5/6   |      |
| 4          | $1\frac{1}{2}$   | $2\frac{5}{8}$ | 8/-   |      |
| 5          | $1\frac{1}{2}$   | 3              | 9/6   |      |
| 6 (in box) | $1\frac{5}{8}$   | $3\frac{1}{2}$ | 17/-  |      |



Boxes of 12 Slides for Lantern, each Slide containing several figures arranged as Tales if desired.

| No. | edge       | price | each |
|-----|------------|-------|------|
| 1   | Paper edge | 3/-   |      |
| 2   | "          | 3/8   |      |
| 3   | Wood edge  | 6/8   |      |
| 4   | "          | 9/4   |      |
| 5   | "          | 12/-  |      |
| 6   | "          | 16/-  |      |
| 7   | "          | 18/8  |      |

NOTE.—We maintain the sizes, both of Lanterns and Slides, as of old: many makers call our No. 2 No. 3, and so on.

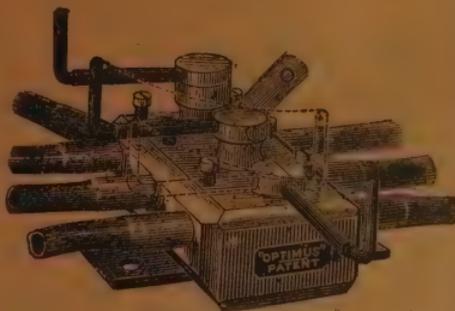
TRADE DISCOUNT LIST ON APPLICATION.

# 'OPTIMUS'

PERKEN, SON & RAYMENT, 99, HATTON GARDEN, LONDON.  
141, OXFORD STREET,

## "OPTIMUS" TRIPLE SAFETY DISSOLVER.

FOR TRI-UNIAL LANTERN ... 33/-



The two supply pipes from the bags or bottles of gas employed are marked in the illustration H and O, respectively; and as will be seen these pipes descend obliquely from the contrivance. The outlet pipes are connected by india-rubber tubing with the respective jets of the lantern, in order as they stand, that is to say, the pair at the top of this dissolver are connected with the top jet, that in the centre with the middle jet, and that at the base with the lower lantern. A lever, of simple construction and most easy of movement, governs

each pair of outlet tubes, and these levers are so arranged that they can be worked jointly by the operator's hand. Thus he can at will employ one lantern only, or he can combine the lower two, the upper two, the top and bottom ones, or all three together. More than this, if from any cause one or two of the lanterns are not required, the levers pertaining to them can be readily locked.



## "OPTIMUS" MAHOGANY MAGIC LANTERN.

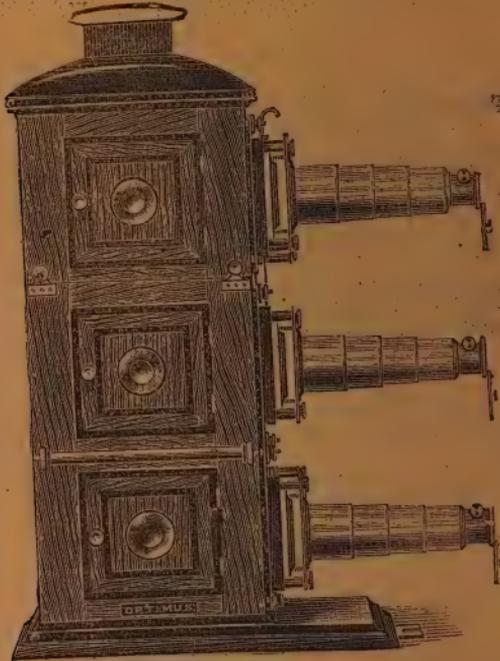
Mahogany outside Body, Japanned Metal Stages and Sliding Tubes ... 42/-

TRADE DISCOUNT LIST ON APPLICATION.

# 'OPTIMUS'

PERKEN, SON & RAYMENT, 99, HATTON GARDEN, LONDON.  
141, OXFORD STREET,

Less highly finished. With jets and dissolver, £26 4s.



## 'OPTIMUS' TRIPLE OXY-HYDROGEN LANTERN

The Top of the Lantern may be used separately with Oil Lamp.

Seasoned Mahogany and Rosewood Body, 6 Panelled Doors with Sight Holes, Moulded Foot, Highly Finished Brass Stages and Sliding Tubes, Compound Condensers 4 inches diameter. Three-draw Telescopic Front Tubes, and SIX Photographic Front Lenses of 6-in. and 4-in. focus

|                                                 |         |
|-------------------------------------------------|---------|
| Three Safety Gas Jets ... ..                    | 30 0 0  |
| 'OPTIMUS' Triple Dissolving Tap (Patent) ... .. | 1 13 0  |
| ... ..                                          | 1 13 0  |
| ... ..                                          | £33 6 0 |

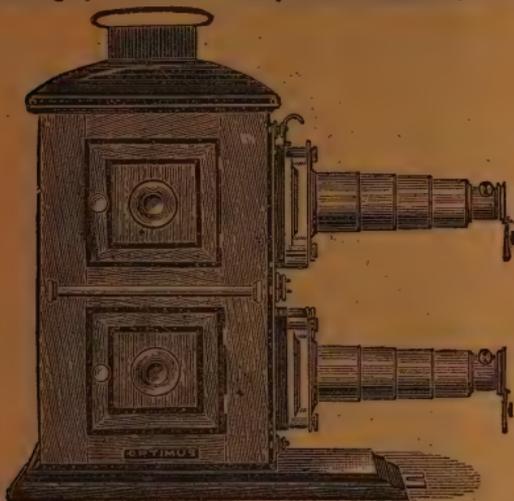
The Draw Tubes are specially rigid, so maintaining the Optical Axis accurately and ensuring the Front Lens, Condenser, and Slide occupying Parallel Planes.  
Curtain Slide, extra 7/-; Double pinion, extra 3/-;  
Lantern Photographs, ... .. Plain, 1/-; Coloured, 1/6 each.

TRADE DISCOUNT LIST ON APPLICATION.

# 'OPTIMUS'

PERKEN, SON & RAYMENT, 99, HATTON GARDEN, LONDON.  
141, OXFORD STREET,

Less highly finished. With jets and dissolver, £16 13s.



## 'OPTIMUS' BI-UNIAL OXY-HYDROGEN LANTERN,

Seasoned Mahogany and Rosewood Body, 4 Panelled Doors with Sight Holes, Moulded Foot picked out with black, Compound Bi-convex Condensers of 4 inches diameter. Highly Finished Brass Stages, and with Brass 3-draw Telescopic Front Tubes, and FOUR Photographic Front Lenses of 6 inches, 4-in. focus ... £20 6s.

2 Safety Jets ... .. £1 2s.

6 Way Dissolving Tap ... .. 17s.

£22 5s.

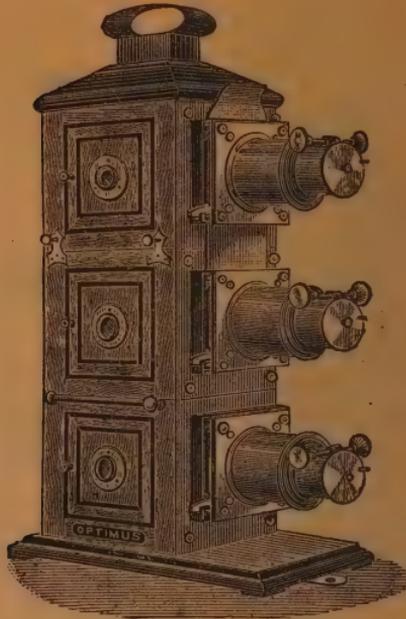
The Draw Tubes are specially rigid, so maintaining the Optical Axis accurately, and ensuring the Front Lens, Condenser, and Slide occupying Parallel Planes.

Curtain Slide, extra 7/; Double pinion, extra 3/;  
Lantern Photographs, ... Plain, 1/-; Coloured, 1/6 each.

TRADE DISCOUNT LIST ON APPLICATION.

# 'OPTIMUS'

PERKEN, SON & RAYMENT, 99, HATTON GARDEN, 141, OXFORD STREET, LONDON.



## 'OPTIMUS'

### OXY-HYDROGEN TRIPLE LANTERN.

The Top Lantern may be used separately with Oil Lamp

Seasoned Mahogany body, 6 Panelled Doors with Sight holes,  
Moulded foot, picked out with black, Finished Brass Stages  
and Sliding Tubes, Achromatic Photographic Combination  
Front Lenses, large diameter Back Lens, Compound  
Condensers of 4 inches diameter ... ..

|                                                 |          |
|-------------------------------------------------|----------|
| 8 Safety Gas Jets ... ..                        | £17 10 0 |
| 'OPTIMUS' Triple Dissolving Tap (Patent) ... .. | 1 13 0   |
|                                                 | 1 13 0   |

Complete £20 16 0

The Draw Tubes are made specially rigid, so maintaining the optical axis accurately and ensuring the front lens, condenser and slide occupying parallel planes.

Curtain Slide, extra 7/; Double pinion, extra 3/;

Lantern Photographs, ... .. Plain, 1/-; Coloured, 1/6 each.

TRADE DISCOUNT LIST ON APPLICATION.

# 'OPTIMUS'

PERKEN, SON & RAYMENT, 99, HATTON GARDEN, LONDON.  
141, OXFORD STREET,



## 'OPTIMUS' BI-UNIAL LANTERN

For Oxy-Hydrogen Lime Light.

The Top Lantern may be used with Oil Lamp.

Seasoned Mahogany Body, 4 Panelled Doors with Sight Holes, moulded foot picked out with black, Japanned stages and tubes, Achromatic Photographic Front Lenses, compound condensers of 4 inches diameter ... .. £7 7 0

Ditto ditto with highly finished BRASS stages and sliding tubes... 10 10 0

The Draw Tubes are specially rigid, so maintaining the Optical Axis accurately and ensuring the Front Lens, Condenser, and Slide occupying Parallel Planes.

Curtain Slide, extra 7/-; Double pinion, extra 3/-;  
Lantern Photographs, ... .. Plain, 1/-; Coloured, 1/6 each.

TRADE DISCOUNT LIST ON APPLICATION.

# 'OPTIMUS'

PERKEN, SON & RAYMENT, 99, HATTON GARDEN, LONDON.  
141, OXFORD STREET,



## TRANSPARENT SCREENS. Best Union Cloth

| Feet square. | 5   | 6   | 7   | 8    | 9    | 10   | 12   | 14   | 15   | 16   | 17½  | 20   | 24   |
|--------------|-----|-----|-----|------|------|------|------|------|------|------|------|------|------|
|              | 5/- | 7/- | 9/- | 12/- | 13/- | 18/- | 25/- | 31/- | 33/- | 37/- | 42/- | 50/- | 84/- |

## PORTABLE STANDS FOR SCREENS.

Packed in boxes with space for Screens.

| Feet square | 8    | 9    | 10   | 12   | 14   | 16   | 18   | 20   |
|-------------|------|------|------|------|------|------|------|------|
|             | 30/- | 33/- | 37/- | 38/- | 42/- | 48/- | 56/- | 64/- |



## 'OPTIMUS' LECTURER'S PORTABLE READING LAMP.

Price of Lamp, with Signal, Bell, and Match Box complete ... each } 8/-

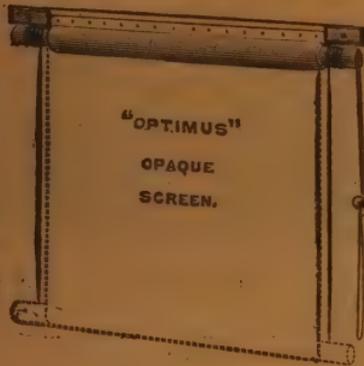


## ANIMALCULÆ OR CHEMICAL TANK

These, being made of Glass and Indiarubber are not affected by chemicals ... } 3/6

# 'OPTIMUS'

PERKEN, SON & RAYMENT, 99, HATTON GARDEN, LONDON.  
141, OXFORD STREET.



## OPAQUE <sup>PURE WHITE</sup> LANTERN SCREEN

MOUNTED ON

## A STRONG WOOD TOP FRAME

WITH WHEEL PULLEY & CORD, ALSO A BOTTOM ROLLER.

Complete—

| Feet sq. | 4    | 5    | 6    | 7    | 8    | 9    | 10   | 12   | 15   |
|----------|------|------|------|------|------|------|------|------|------|
|          | 16/- | 18/- | 20/- | 22/6 | 25/- | 28/- | 35/- | 62/- | 90/- |

The above is specially recommended as a thoroughly practical and satisfactory arrangement.

## THEATRICAL LIMELIGHT BOXES

|                                                                                                                             |       |
|-----------------------------------------------------------------------------------------------------------------------------|-------|
| Light Box, fitted with Burner, 6 in. Lens and four Coloured Squares ...                                                     | £2 0  |
| Light Box, fitted complete on Stand, with 6 in. Lens, 6 in. focus, Revolving Disc, and four Coloured Mediums and Burner ... | £2 10 |
| Light Box, fitted complete on Stand, with five Coloured Mediums, and 7 in. Lens, 7 in. focus ...                            | £3 0  |
| Light Box, fitted complete on Stand, with five Coloured Mediums, and 8 in. Lens, 8 in. focus ...                            | £4 10 |
| Light Box, fitted complete on Stand, with five Coloured Mediums, and 9 in. Lens, 18 in. focus ...                           | £4 12 |

TRADE DISCOUNT LIST ON APPLICATION.

# 'OPTIMUS'

PERKEN, SON & RAYMENT, 99, HATTON GARDEN, LONDON.  
141, OXFORD STREET,



## COMIC SLIPPING SLIDES.

600 Different Subjects ... .. each 1/-  
Well-painted, giving brilliancy and transparency of colour on the screen.



|                                                                                                     | s. d.     |
|-----------------------------------------------------------------------------------------------------|-----------|
| CHROMATROPES, 3 inch diameter, best quality (various designs)                                       | 9 0 each. |
| CHROMATROPES, 3 inch diameter, with Photographic Portraits,<br>Mottoes, Views, &c. in centre ... .. | 10 0 ,,   |
| CHROMATROPE CARRIER FRAME, with 6 Pairs of Painted<br>Discs in rack box ... ..                      | 21 0 ,,   |
| RACKWORK SOLDIERS' HEADS, changing to Donkeys' Heads                                                | 8 6 ,,    |
| SNOWSTORM EFFECT ... ..                                                                             | 7 0 ,,    |
| CURTAIN to roll up, showing Painted Curtain or Drop Scene ...                                       | 10 0 ,,   |
| DANCING SKELETON SLIDE, with lever motion taking off<br>Head ... ..                                 | 5 0 ,,    |
| LIGHTNING EFFECT ... ..                                                                             | 1 9 ,,    |
| RAINBOW EFFECT ... ..                                                                               | 1 9 ,,    |
| LEVER MOON-RISING EFFECT ... ..                                                                     | 4 8 ,,    |
| MAN SWALLOWING RATS, rack mills, &c. ... ..                                                         | 10 0 ,,   |
| RACK WORK, best painted wave slides ... ..                                                          | 15 0 ,,   |

TRADE DISCOUNT LIST ON APPLICATION.

# 'OPTIMUS'

PERKEN, SON & RAYMENT, 99, HATTON GARDEN, LONDON.  
141, OXFORD STREET, LONDON.



## 'OPTIMUS' PATENT SLIDING CARRIER BLOCK.

Price ... .. 1/6 each.

Possessed of neither levers nor springs, the "Optimus" Patent Carrier Block is capable of changing the transparency before the optical system of the lantern as speedily as any of its kind. Its individuality and efficiency are very pronounced, by the absence of the top bar of the inner frame, which form of construction permits the fingers to freely withdraw the exposed and insert the next transparency.

|                                                                                         |       |
|-----------------------------------------------------------------------------------------|-------|
| <b>SETS OF EFFECT SLIDES</b> for dissolving views, from ... per set                     | 4 6   |
| <b>LONG PANORAMA SLIDES</b> , from ... .. each                                          | 2 3   |
| Motto Slides, from ... .. "                                                             | 1 0   |
| <b>SETS OF 10 SLIDES</b> , best rack Astronomy, 2½-inch circles, in mahogany box ... .. | 100 0 |
| Ditto ditto in 3-inch... ..                                                             | 110 0 |
| <b>PHOTOGRAPHIC VIEWS</b> , taken in all countries ... .. each                          | 1 0   |
| Coloured ditto, from ... .. "                                                           | 1 6   |
| <b>SQUARE WOOD BLOCKS</b> ... .. per gross                                              | 42 0  |
| Front lens for lantern, rack motion, double achromatic photographic combination... ..   | 15 0  |
| Ditto ditto long focus ... ..                                                           | 36 0  |
| Ditto ditto long focus ... ..                                                           | 46 0  |
| <b>GAS JETS.</b>                                                                        |       |
| Blow Through ... ..                                                                     | 11 0  |
| Chamber ... ..                                                                          | 16 6  |
| Interchangeable ... ..                                                                  | 18 6  |
| <b>GAS BAGS, GAS CYLINDERS</b> , at Lowest Market Prices                                |       |
| <b>HARD LIMES</b> of great durability, in sealed tins ... .. per doz.                   | 1 6   |
| <b>SOFT LIMES</b> ... ..                                                                | 1 0   |

MAGIC LANTERN SLIDES IN GREAT VARIETY.

TRADE DISCOUNT LIST ON APPLICATION.

# 'OPTIMUS'

PERKEN, SON & RAYMENT, 99, HATTON GARDEN, LONDON.  
141, OXFORD STREET,

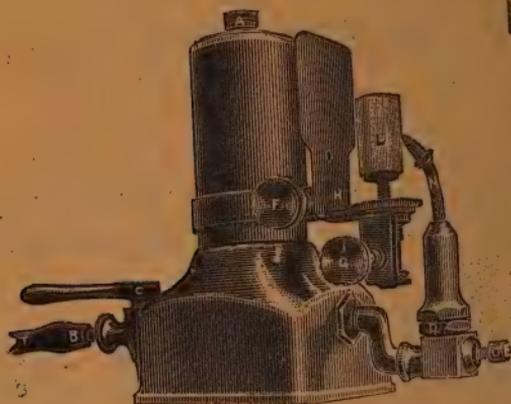


PA NT SAFETY  
POROUS

ETHER SATURATOR.

For producing the ETHO-OXYGEN LIME LIGHT,  
for Optical Lanterns.

Price ... .. 28/-



LAWSON'S <sup>NEW</sup> PATENT  
SATURATOR.

Price, fitted complete,  
45/-

Is made to fit any Single Lan-  
tern without alteration. It  
can be charged with either  
Benzoline or Ether, as the  
customer may desire.



SUITER'S SAFETY  
SATURATOR AND JET

Combined in one.

Weighs only 1 1/2 lbs, and requires  
Oxygen Gas and Benzoline. Can  
be used in ordinary 4in. Lanterns  
without alteration.

38/-

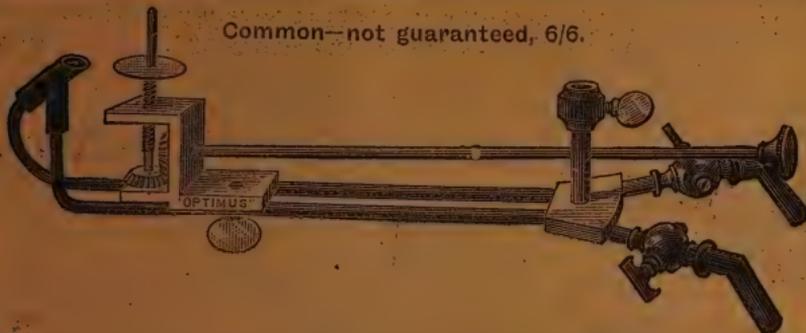
TRADE DISCOUNT LIST ON APPLICATION.

# 'OPTIMUS'

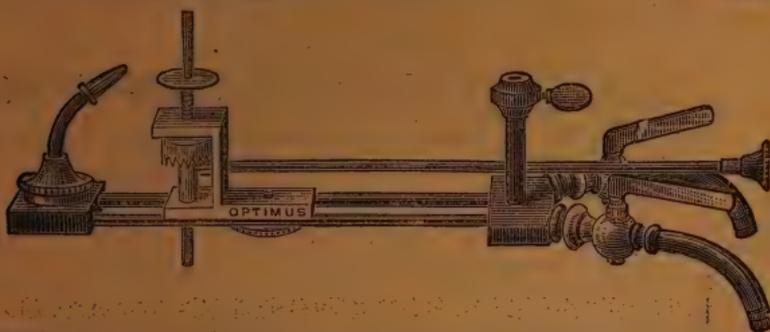
PERKEN, SON & RAYMENT, 99, HATTON GARDEN, LONDON.  
141, OXFORD STREET,

## MAGIC LANTERN GAS JETS FOR LIMELIGHT.

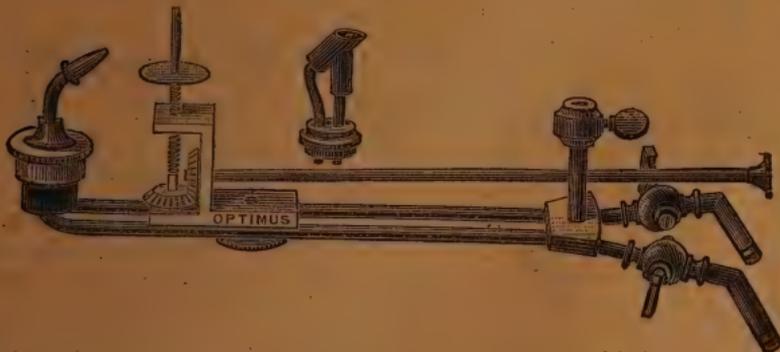
Common—not guaranteed, 6/6.



Best quality blow-through gas jet, with cog-wheel arrangement for turning, also raising and lowering the lime; platina nipple ... .. each 11/-



Best mixed chamber gas jet, with cog-wheel arrangement for turning, also raising and lowering the lime; platina nipple ... .. each 16/6



New interchangeable jet or both gases under pressure, mixed, or for blow-through form, by simply removing and using the burner as required; both have platina nipples ... .. each 18/9

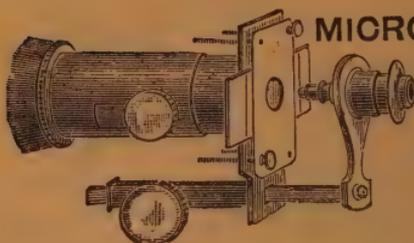
# 'OPTIMUS'

PERKEN, SON & RAYMENT, 99, HATTON GARDEN, 141, OXFORD STREET, LONDON.



## MICROSCOPE FOR LANTERN.

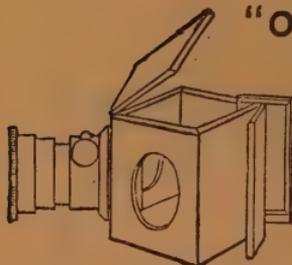
Having brass body with high and low powers, suitable for optical lantern possessing 4in. compound condensers ... .. 18/6



## MICROSCOPE FOR LANTERN.

(SUPERIOR.)

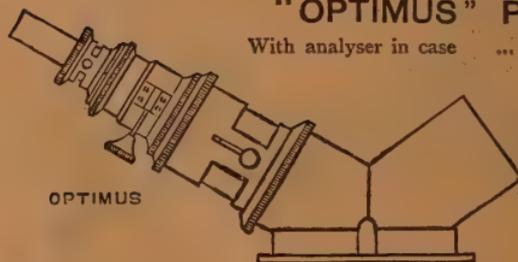
If with rack motion and revolving stage ... .. 84



## "OPTIMUS" APHENGESOOPE.

An instrument for exhibiting opaque objects, cartes-de-visite, etc.; suitable for optical lantern with 4in. compound condensers ... .. 18/-

Superior Aphengesoop, arranged for pairs of lanterns with achromatic front lenses and rack adjustments ... .. 30/-



## "OPTIMUS" POLARISCOPE.

With analyser in case ... .. 195/-

## "OPTIMUS" KALEIDOSCOPE.

In case with lock and key ... .. 40/-

# 'OPTIMUS'

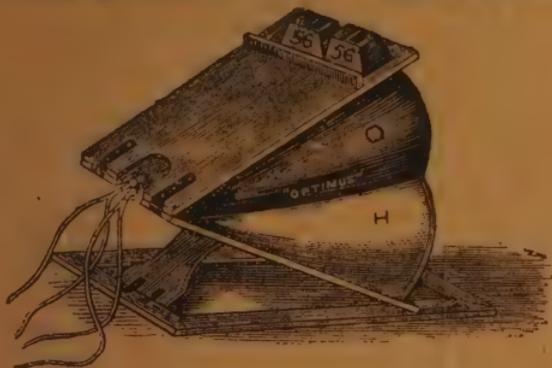
PERKEN, SON & RAYMENT, 99, HATTON GARDEN, LONDON.  
141, OXFORD STREET, LONDON.



BRAZED IRON RETORT, 10/-



ZINC PURIFIER, 4/-



## GAS BAGS—Stout Twill.

| SIZES. |       |       | Capacity<br>cubic ft. | Price | SIZES. |       |       | Capacity<br>cubic ft. | Price |
|--------|-------|-------|-----------------------|-------|--------|-------|-------|-----------------------|-------|
| in.    | in.   | in.   |                       |       | in.    | in.   | in.   |                       |       |
| 30     | by 24 | by 20 | 4                     | 32/-  | 36     | by 36 | by 24 | 9                     | 46/6  |
| 36     | 24    | 20    | 5                     | 37/6  | 40     | 32    | 24    | 9                     | 48/6  |
| 36     | 24    | 24    | 6                     | 39/6  | 40     | 36    | 24    | 10                    | 51/-  |
| 36     | 28    | 24    | 7                     | 42/-  | 40     | 36    | 26    | 11                    | 53/-  |
| 36     | 32    | 24    | 8                     | 45/-  | 40     | 36    | 28    | 12                    | 55/-  |

Subject to Fluctuations.

## LIMES FOR LIMELIGHT.

|                                  |     |     |     |                    |     |
|----------------------------------|-----|-----|-----|--------------------|-----|
| Best Quality, Soft               | ... | ... | ... | per dozen          | 1 0 |
| "    Hard                        | ... | ... | ... | "    "             | 1 6 |
| Excelsior Hard Limes             | ... | ... | ... | "    "             | 3 0 |
| Best Rubber Tubing, Red or White | ... | ... | ... | per foot           | 0 4 |
| Crystals Chlorate of Potash,     | ... | ... | ... | 8d. per lb.; 14lb. | 8 6 |
| Block Oxide Manganese            | ... | ... | ... | per lb.            | 0 2 |

TRADE DISCOUNT LIST ON APPLICATION.

# 'OPTIMUS'

PERKEN, SON & RAYMENT, 99, HATTON GARDEN, LONDON.  
141, OXFORD STREET,

## OXYGEN OR HYDROGEN GAS CYLINDERS.

Thoroughly Tested to 4,000 lb. on the Square Inch—considerably more than double the Gas pressures when the Cylinders are full of Gas.

FITTED WITH PATENT VALVE.

| Cubic contents in feet. | Approximate Diameter in inches. | Approximate Length over all in inches. | Approximate Weight in lb. | Prices of Cylinders complete with valve | Rent per week after first 7 days. | Prices of Oxygen or Coal Gas per cubic foot in our cylinders. | Prices of same in customers own Cylinders. |
|-------------------------|---------------------------------|----------------------------------------|---------------------------|-----------------------------------------|-----------------------------------|---------------------------------------------------------------|--------------------------------------------|
| 6                       | 4                               | 12                                     | 8                         | 27/-                                    | } 1/-                             | Quantities of 20 feet or less 4d.                             | Quantities of 20 feet or less 3d.          |
| 8                       | 4                               | 16                                     | 12                        | 29/-                                    |                                   |                                                               |                                            |
| 10                      | 4                               | 19½                                    | 11                        | 30/-                                    | } 1/6                             | Over 20 ft. and up to 60 feet, 3d.                            | Over 20 ft. and up to 60 ft. 2½d.          |
| 12                      | 4                               | 23                                     | 12½                       | 32/-                                    |                                   |                                                               |                                            |
| 15                      | 4                               | 25½                                    | 14                        | 35/-                                    |                                   |                                                               |                                            |
| 20                      | 4                               | 32½                                    | 18½                       | 37/-                                    | } 2/-                             | Over 60 ft. and upwards 2½d                                   | Over 60 ft. and upwards 2d.                |
| 40                      | 5½                              | 33                                     | 31                        | 45/-                                    |                                   |                                                               |                                            |
| 60                      | 5½                              | 47½                                    | 43½                       | 65/-                                    | } 2/6                             |                                                               |                                            |
| 8a.                     | 5½                              | 61½                                    | 56                        | 70/-                                    |                                   |                                                               |                                            |
| 100.                    | 5½                              | 76½                                    | 69                        | 100/-                                   |                                   |                                                               |                                            |

N.B.—All Cylinders are *solid drawn*.

FITTINGS.—Nipple and Union, 2/-; Key, 2/6. GAUGES, 35/-

DEPOSITS.—Customers not wishing to purchase Cylinders must send with their Order an amount equal to the price of Cylinder and Fittings, as deposit. On all Cylinders not returned within 7 days, rent will be charged, as per particulars above.

GAS GAUGES of all makes at a discount.

REGULATORS of all makes at a discount.

TERMS—NET CASH ON DELIVERY.

TRADE DISCOUNT LIST ON APPLICATION.

# 'OPTIMUS'

PERKEN, SON & RAYMENT, 99, HATTON GARDEN, LONDON.  
141, OXFORD STREET,

## MAGIC LANTERNS & SLIDES

LENT

## ON HIRE.

|                                                                                                                                                                         | £ | s. | d. |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|----|----|
| Russian Iron Body Lantern, with 3-wick Oil Lamp, &c.,<br>Suitable for Drawing Room or School Entertainment                                                              | 0 | 4  | 0  |
| Pair do. do. for dissolving                                                                                                                                             | 0 | 6  | 0  |
| Lime-light Bi-unial Apparatus for Dissolving Views                                                                                                                      | 0 | 12 | 6  |
| If including Oxygen Gas in Cylinder, Blow-through<br>(safety) Jets, 4 Lime Cylinders, 7 yards Rubber Tubes<br><i>Book of Instruction, Every detail of Manipulation.</i> | 1 | 0  | 0  |
| Display Screen, according to size, from                                                                                                                                 | 0 | 1  | 0  |
| Lecturer's Reading Lamp                                                                                                                                                 | 0 | 0  | 6  |
| Rubber Tubing (20 yards)                                                                                                                                                | 0 | 1  | 0  |
| Twelve Slides                                                                                                                                                           | 0 | 1  | 0  |
| 144                                                                                                                                                                     | 0 | 10 | 0  |
| 300*                                                                                                                                                                    | 1 | 0  | 0  |
| 700*                                                                                                                                                                    | 2 | 0  | 0  |

*All Prices mentioned above are for One Day—(i.e.), from Noon  
one day till Noon the next.*

Two Days charged as one and a half.

\*The Series of 300 and 700 may be had in lots of 100 at various times, to suit the convenience of hirers.

*All Slides lent on hire on the following understanding, viz.—*

- 1.—That the hirer be responsible for their safety from the time of despatch from our warehouse until their return to it.
- 2.—Any damage sustained from time of despatch from our warehouse until re-delivered to us to be made good by the hirer.
- 3.—Delay in Transit to be at the expense of the hirer.
- 4.—Carriage: Town Customers must fetch and return at their own expense. Carriage: Country Customers (those residing beyond a radius of 25 miles from London).—Goods will be packed free of charge and despatched the day previous to that specified for the exhibition. ONE DAY will be charged if the Goods reach us by first train the day following that specified as the day of exhibition.

**TO AVOID DISAPPOINTMENT.**—All Prices in this Catalogue being for PROMPT CASH, Customers are respectfully requested to make POSTAL or TELEGRAPHIC REMITTANCE covering the value of Goods required, as a deposit. This will be refunded, less amount of hire, upon our receiving back the Goods.

**PROMPT DESPATCH.**—Customers are earnestly requested to place their Orders as early as possible.

TRADE DISCOUNT LIST ON APPLICATION.

# 'OPTIMUS'

PERKEN, SON & RAYMENT, 99, HATTON GARDEN, LONDON.  
141, OXFORD STREET, LONDON.

## SETS OF LANTERN PHOTOGRAPHS.

Price Uncoloured .. .. . 1/- each.  
" Coloured .. .. . 1/6 "

Number of Slides comprised in each Set is stated in figures attached to each Title.

| A                                                                                             |     |
|-----------------------------------------------------------------------------------------------|-----|
| A Day in London .. .. . set of                                                                | 60  |
| A Day's Holiday at Windsor .. .. .                                                            | 30  |
| A Photographer's Perplexities .. .. .                                                         | 12  |
| A Precious Couple on the road to<br>Gretna Green .. .. .                                      | 12  |
| A Trap to Catch a Sunbeam .. .. .                                                             | 15  |
| A Trip to Brighton .. .. .                                                                    | 40  |
| A true Story of the old Coaching<br>Days .. .. .                                              | 10  |
| A Visit to the British Museum .. .. .                                                         | 50  |
| A Walk in the "Zoo" .. .. .                                                                   | 48  |
| A Year within the Arctic Circle .. .. .                                                       | 50  |
| Abbeys and Castles of England .. .. .                                                         | 50  |
| Adventures of Briggs with a Bull<br>Adventures of Brown, Smith,<br>Jones and Robinson .. .. . | 4   |
| Æsop's Fables .. .. .                                                                         | 50  |
| Afghan War .. .. .                                                                            | 36  |
| Aladdin, or the Wonderful Lamp .. .. .                                                        | 107 |
| Algiers .. .. .                                                                               | 20  |
| Alice in Wonderland .. .. .                                                                   | 42  |
| " " Songs .. .. .                                                                             | 7   |
| America, North, and Niagara .. .. .                                                           | 59  |
| American Franklin Search Expe-<br>dition .. .. .                                              | 20  |
| Androcles and the Lion .. .. .                                                                | 6   |
| Animal Sagacity .. .. .                                                                       | 24  |
| Animals at the Zoological Gardens .. .. .                                                     | 215 |
| An Old Story .. .. .                                                                          | 26  |
| Art Collections, South Kensing-<br>ton Museum .. .. .                                         | 59  |
| Astronomy .. .. .                                                                             | 300 |
| Astronomical Instruments .. .. .                                                              |     |

| B                                 |    |
|-----------------------------------|----|
| Baby's Sugar Bag .. .. .          | 12 |
| Barber and his Clever Dog .. .. . | 12 |
| Baron Munchausen .. .. .          | 8  |
| " " " " .. .. .                   | 17 |
| Barred Window .. .. .             | 8  |
| Bashful Man .. .. .               | 6  |
| Beautiful Snow .. .. .            | 5  |
| Belgium .. .. .                   | 50 |
| Berlin .. .. .                    | 46 |
| Bible Manners and Custom .. .. .  | 30 |
| Blunderbore .. .. .               | 12 |
| Book of Martyrs .. .. .           | 52 |
| Bookworm .. .. .                  | 12 |

| B (continued).                                                         |        |
|------------------------------------------------------------------------|--------|
| Boons and Blessings .. .. .                                            | 16     |
| Bottle, The .. .. .                                                    | 8      |
| Boys and Ravens .. .. .                                                | 8      |
| Boys of Corinth .. .. .                                                | 12     |
| Brazilian Ape .. .. .                                                  | 14     |
| Brighton Aquarium .. .. .                                              | 14     |
| Briggs and the Bull .. .. .                                            | 78     |
| British Museum, Antiquities of &c. .. .. .                             | 23     |
| Brown and the Bear .. .. .                                             | 12     |
| Brown and Mouse .. .. .                                                | 12     |
| Brussels .. .. .                                                       | 50     |
| Bunyan, Life of .. .. .                                                | 111    |
| Bunyan's Pilgrim's Progress<br>" Art Journal" .. .. .                  | 22     |
| Do. Cassell .. .. .                                                    | 36     |
| Bunyan's Pilgrim's Progress<br>Religious Tract Society, set of .. .. . | 17     |
| Do. Routledge .. .. .                                                  | 111    |
| Do. Service of Song .. .. .                                            | 23     |
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| Jericho ... ..                  | 4  | EXPOSITIONS                        |     |
| Jerusalem et ses environs       | 49 | Exposition de 1855 ... ..          | 8   |
| Lydda ... ..                    | 2  | Exposition universelle de 1867 ... | 223 |
| Le Jourdain ... ..              | 1  | Exposition universelle de 1878 ... | 315 |
| Mer Morte ... ..                | 1  | VOYAGE FROM DAMARA TO              |     |
| Mont Carmel ... ..              | 1  | Canada ... ..                      | 100 |
| Naplouze ... ..                 | 3  | Quebec ... ..                      | 12  |
| Nazareth ... ..                 | 4  | Montmorency ... ..                 | 4   |
| Ramleh ... ..                   | 4  | La Chine ... ..                    | 4   |
| Route d'Hebron ... ..           | 4  | Ottawa ... ..                      | 10  |
| Samarie ... ..                  | 2  | St. Hyacinthe ... ..               | 2   |
| St. Jean dans le Desert ...     | 3  | St. Jerome ... ..                  | 3   |
| Taberiade... ..                 | 3  | Niagara Falls ... ..               | 10  |
| SYRIE                           |    | Descent of St. Laurence ...        | 5   |
| Bal'beck ... ..                 | 33 | Cape Breton ... ..                 | 19  |
| Beyrouth ... ..                 | 5  | FRANCE                             |     |
| Damas ... ..                    | 9  | Benzeval ... ..                    | 13  |
| Hama ... ..                     | 7  | Dives ... ..                       | 2   |
| Japhet ... ..                   | 1  | Chartres ... ..                    | 12  |
| Kala't-el-Hens'n ... ..         | 4  | Maintenon Park ... ..              | 1   |
| Saïda ... ..                    | 1  | Villebon, near Chartres ...        | 2   |
| St. Jean d'Acre ... ..          | 2  | Le Mans ... ..                     | 2   |
| Tripoli ... ..                  | 1  | St. Malo ... ..                    | 18  |
| Tyr ... ..                      | 3  | St. Servan ... ..                  | 3   |
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| Musee d'Antiquites au Caire ... | 11 | Dinan ... ..                       | 12  |
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|                                 |    | Hendaye ... ..                     | 2   |

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# 'OPTIMUS'

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## SETS OF LANTERN PHOTOGRAPHS.

Plain 1s.; Coloured 1s. 6d. each.

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| Ax (Ariege) ... ..      | 3  | General 26 )           |     |
| Tarascon (Ariege) ...   | 1  | St. Sebebastien ... .. | 11  |
| Roquebrune ... ..       | 1  | Fontarabie ... ..      | 4   |
| Beaulieu ... ..         | 1  | Pasages ... ..         | 3   |
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|                         |    | Irun ... ..            | 1   |
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| Dinnant ... ..          | 3  | Lahnock ... ..         | 3   |
| Heyst ... ..            | 8  | Bornhoten ... ..       | 1   |
|                         |    | Caub ... ..            | 5   |
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| Marken ... ..           | 8  |                        |     |

## PRICE OF THE FOREGOING LANTERN PHOTOGRAPHS.

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Very superior colouring, 2/6 each  
His Royal Highness the Duke of Connaught. (Standing.)  
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Trooper and Trumpeter, Royal Horse Guards.  
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Trooper, Queen's Bays.  
Sergeant-Major, Royal Scots Greys. (Mounted.)  
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Trooper, 5th Royal Irish Lancers. (Drill orders.)  
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Sergeant-Major, Coldstream Guards. (Drill order.)  
Sergt.-Instructor, Coldstream Guards. (Signalling field-day order.)  
Piper, 1st Battalion Scots Guards.  
Colour-Sergeant, 1st Battalion Scots Guards.  
Officers, 1st Battalion Scots Guards.  
Private, 1st Battalion Scots Guards. (Marching order.)  
Officer, 2nd Battalion Scots Guards.  
Sergeant and Drummer, 2nd Battalion Scots Guards. (The long and short of it.)  
Bayonet Exercise, 2nd Battalion Scots Guards. (Engage.)  
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The Colours, 1st Battalion The Royal Scots.  
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Drum-Major, Sergeant-Major and Sergeant, Royal Inniskilling Fusiliers.  
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Officers, 2nd Battalion Sutherland Highlanders.  
Squad, Independent Firing, Sutherland Highlanders.  
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Officers, Royal Marine Artillery. (Group.)  
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Non-Commissioned Officers, 1st and 2nd Life Guards and Royal Horse Guards.
- THE ROYAL NAVY.  
Very Superior Colouring, 2/6 each.  
H.M.S. Rodney.  
" Northumberland.  
" Victory. (Poop-deck where Nelson fell.)  
" Pallas.  
" Camperdown.  
" Victory, on 86th Anniversary of Trafalgar.  
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Ammunition Room. (Whale Island.)  
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# 'OPTIMUS'

PERKEN, SON & RAYMENT, 99, HATTON GARDEN, LONDON.  
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## "OPTIMUS" BINOCULAR TELESCOPES.

**MOST PORTABLE.**

**SIXTEEN LENSES.**

Adjustment to suit any sight  
and width of eyes.

**EXTREME POWER.**

**20 MILES RANGE.**

**LARGE FIELD OF VIEW.**



"Optimus" Binocular or Twin Telescopes are specially recommended for use at long distances on sea and land. They are from two to five times as powerful as ordinary field glasses and, on that account, will take the place of a long single telescope. In addition they are much easier to use, and are sufficiently portable to be carried in the pocket. Those with Aluminium Mountings are about one-third the weight of ordinary metal.

|                                                                  | Length<br>Shut.     | Length<br>Open.     | Dia. of<br>O. G.  | Mag.<br>Power. | Price.           |
|------------------------------------------------------------------|---------------------|---------------------|-------------------|----------------|------------------|
| 0. 1.—Morocco covered, no shades ...                             | 5 $\frac{1}{2}$ in. | 8 $\frac{3}{4}$ in. | $\frac{3}{8}$ in. | 11             | £ s. d.<br>4 0 0 |
| " 2.—" with sunshades ...                                        | 6 $\frac{1}{2}$     | 8 $\frac{3}{4}$     | 1 $\frac{1}{8}$   | 12             | 5 0 0            |
| " 3.—" " " ...                                                   | 7                   | 9 $\frac{1}{2}$     | 1 $\frac{3}{8}$   | 13             | 6 5 0            |
| " 4.—" " " ...                                                   | 8                   | 10 $\frac{3}{4}$    | 1 $\frac{1}{2}$   | 18             | 6 15 0           |
| " 5.—" " " ...                                                   | 8 $\frac{1}{2}$     | 11 $\frac{1}{2}$    | 1 $\frac{3}{8}$   | 19             | 7 5 0            |
| " 6.—" " " ...                                                   | 10                  | 13 $\frac{1}{2}$    | 1 $\frac{3}{8}$   | 25             | 10 0 0           |
| 0. 1.—Bright Aluminium Mountings<br>covered Russia Leather... .. | 5 $\frac{3}{4}$     | 8 $\frac{3}{4}$     | $\frac{7}{8}$     | 11             | 8 0 0            |
| " 2.—Ditto ditto ... ..                                          | 6 $\frac{1}{2}$     | 8 $\frac{3}{4}$     | 1 $\frac{1}{8}$   | 12             | 10 0 0           |
| " 3.—Ditto ditto ... ..                                          | 7                   | 9 $\frac{1}{2}$     | 1 $\frac{3}{8}$   | 13             | 12 0 0           |
| " 4.—Ditto ditto ... ..                                          | 8                   | 10 $\frac{3}{4}$    | 1 $\frac{1}{2}$   | 18             | 13 5 0           |
| " 5.—Ditto ditto ... ..                                          | 8 $\frac{1}{2}$     | 11 $\frac{1}{2}$    | 1 $\frac{3}{8}$   | 19             | 14 18 0          |
| " 6.—Ditto ditto ... ..                                          | 10                  | 13 $\frac{1}{2}$    | 1 $\frac{3}{8}$   | 25             | 20 15 0          |

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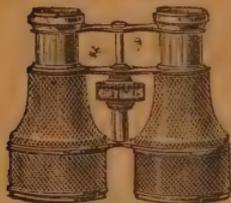
All Prices include Best Solid Leather Cases, with  
Shoulder-straps, either fawn or black.



## "OPTIMUS" MILITARY BINOCULAR.

Combines great power with a minimum loss of light, consequently is specially suited for reconnoitring purposes.

Japanned Metal Body, covered with Russian Leather ... £3 10  
Aluminium Body, either Bright or Japanned covered  
with Russian Leather ... .. £6 6



## "OPTIMUS" REGULATION FIELD GLASS.

In size exactly suitable for the Sealed Pattern Case at the War Office, and approved by H.R.H. the Commander-in-chief. The portability of this instrument, coupled with its power, crisp definition, and wide-angular aperture, have won it a reputation equal to many more bulky glasses.

In Solid Leather Sling Case, fawn or black ... .. £2 5  
Aluminium Body, Polished or Japanned, in Case ... .. £4 10



## "OPTIMUS" QUICK ADJUSTING BINOCULAR.

The Screw Focussing Adjustment having been once set to the sight of the user, a slight push with the finger will close the tubes into the body, and a pull reopen the instrument at the focal position previously fixed. Height when closed, 4 inches

Price, in Crush or Sling Case ... .. £2 10  
Body of Aluminium, Bright or Japanned ... .. £5 10



## "OPTIMUS" WIDE ANGLE BINOCULAR.

Suited for Field Glass or for Theatrical use, as it has an exceptionally wide field of view, and gives clear definition.

In Sling Case ... .. £3 3  
Body of Aluminium, either Bright or Japanned ... .. £6 6



## TRIPLE-POWER BINOCULAR.

As its name indicates, this instrument has three distinct sets of Eye Lenses which can be instantaneously changed by turning the spindle on which they are supported. The great advantage of this system is that for the theatre and near objects out of doors a low power can be employed, whilst for more distant objects the higher focal powers will give a very great advantage. Made in four sizes. In best Sling Case, Fawn or Black.

| Height when Closed. | Diameter of Object Glasses. | Price in Best Leather Sling Case. | Body of Aluminium Bright or Japanned |
|---------------------|-----------------------------|-----------------------------------|--------------------------------------|
| 4½ inches.          | 1½                          | 70/-                              | 140/-                                |
| 5 "                 | 1¾                          | 75/-                              | 150/-                                |
| 5½ "                | 2                           | 80/-                              | 160/-                                |
| 6¼ "                | 2¾                          | 90/-                              | 180/-                                |

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# 'OPTIMUS'

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"Optimus" Field, Marine, and Opera Glasses have Achromatic Lenses. Inferior Instruments are not offered in this Catalogue.

## "OPTIMUS" SCORER

Unrivalled for excellence and cheapness. It shows  
 the number of people in Boats four miles distant, Sea  
 birds one mile distant, and Bullet Marks on Target at  
 100 yards. Height when closed, 3 $\frac{3}{4}$  inches ... ..

With Aluminium Body ... ..

30/-

60/-



## "OPTIMUS" MARKSMAN.

*Unsurpassed for brilliancy of definition.*

Comprehending a very wide angle of view, and giving  
 high magnifying power ... ..

With Aluminium Body ... ..

60/-

105/-



## "OPTIMUS" SCOUT.

Medium size. Clear definition. Good field of view.  
 Target Marks 1,200 yards. Magnifying 64 times ... ..

With Aluminium Body ... ..

70/-

140/-



## "OPTIMUS" DOUBLE TELESCOPE.

This Instrument has Bending Bar for Exact Visual  
 Adjustment. The size is moderate. The definition  
 crisp. Very high (Magnifying 144 times) ... ..

With Aluminium Body ... ..

Expanded, with Morocco Body, Shades as Diagram ...

.. with Aluminium Body ... ..

80/-

160/-

100/-

200/-



For General Excellence, Definition, and Magnifying Power, we invite intending purchasers to test our Field and Opera Glasses against in the world.

**OPERA GLASSES IN GREAT VARIETY.**

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# 'OPTIMUS'

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All "Optimus" Opera, Field, and Marine Glasses have Achromatic Lenses. No Instruments of inferior quality are offered in this Catalogue.

## "OPTIMUS" NAVY BINOCULAR.

So constructed as to be useful as a night-glass as well as for general marine use; 2 in. object glass and large eye lenses ... ..

84/-



## "OPTIMUS" CAPTAIN BINOCULAR.

The object glasses are of extra diameter (2½ in.) so admitting the maximum of light and yielding a very brilliant image. Very strong and durable. Specially efficient at night... ..

84/-



## "OPTIMUS" YACHTSMAN BINOCULAR

Possesses the greatest power consistent with bright and sharp definition. Beautifully finished and in every respect A1 in quality ... ..

84/-



## "OPTIMUS" NAUTICAL BINOCULAR.

Includes a comprehensive field of view, coupled with distinctness of definition. The eye pieces have cups attached to exclude all light from the eye except that which passes through the glass ... ..

84/-



For General Excellence, Definition, and Magnifying Power, we invite intending purchasers to test our Field and Opera Glasses against any in the world.

**OPERA GLASSES IN GREAT VARIETY.**

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PERKEN, SON & RAYMENT, 99, HATTON GARDEN, LONDON.  
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## OPTIMUS" ROYAL OPERA GLASS WITH LONG TELESCOPIC HANDLE.

"Optimus" Opera, Field, and Marine Glasses are all fitted with Achromatic Lenses. No inferior instruments stocked. All are supplied in cases.

These instruments are most elegant in appearance, and, at the same time, light, portable, and of the highest optical perfection. The handle slides telescopically into half its maximum length and can be carried in the silk plush satchel supplied with it.

|                                                                    |     |     |     |     |      |
|--------------------------------------------------------------------|-----|-----|-----|-----|------|
| Body covered with Morocco, with Bronzed, Nickelled, or Gilt Mounts | ... | ... | ... | ... | 42/- |
| Body of Embossed Aluminium                                         | ... | ... | ... | ... | 84/- |
| " Tortoise Shell and Aluminium                                     | ... | ... | ... | ... | 90/- |
| " Ornamental Pearl and Aluminium                                   | ... | ... | ... | ... | 90/- |



## "OPTIMUS" DWARF OPERA

A small but efficient instrument. Can be conveniently suspended by a thin cord around the neck. Always ready for use.

|                                       |     |     |     |      |
|---------------------------------------|-----|-----|-----|------|
| Black Morocco and Japanned Metal Body | ... | ... | ... | 15/- |
| Polished Aluminium Body               | ... | ... | ... | 30/- |
| Tortoise Shell or Fancy Pearl Body    | ... | ... | ... | 35/- |



## "OPTIMUS" GUINEA OPERA GLASS.

Covered with Morocco, fitted with Powerful and very Clear Glasses ... .. 21/-

## "OPTIMUS" FAVORITE OPERA

With Russia Leather or Morocco Covered Body as preferred. Combining the maximum of power and definition with the greatest possible visual angle required for theatre use.

|                            |           |     |     |      |
|----------------------------|-----------|-----|-----|------|
| Diameter of Object Glasses | 1 1/2 in. | ... | ... | 30/- |
|                            | 1 1/4 "   | ... | ... | 40/- |
|                            | 1 1/8 "   | ... | ... | 50/- |

Aluminium and Morocco Body Opera Glasses of the very finest finish and optical excellence.

|                            |         |     |     |       |
|----------------------------|---------|-----|-----|-------|
| Diameter of Object Glasses | 1 inch  | ... | ... | 30/-  |
|                            | 1 1/4 " | ... | ... | 45/-  |
|                            | 1 1/2 " | ... | ... | 60/-  |
|                            | 1 3/4 " | ... | ... | 75/-  |
|                            | 1 7/8 " | ... | ... | 100/- |

Ornamental Inlaid or White Pearl Opera Glasses, mounted in Aluminium or best Gilt Metal from 25/- to 200/-. In fancy velvet cases.



TRADE DISCOUNT LIST ON APPLICATION.



## "OPTIMUS" ACHROMATIC TELESKOPE

|                                                          | Diameter of object glass | lin.  | 1 $\frac{3}{16}$ | 1 $\frac{7}{16}$ | 1 $\frac{11}{16}$ |
|----------------------------------------------------------|--------------------------|-------|------------------|------------------|-------------------|
| <b>Morocco covered bodies—</b>                           |                          | s. d. | s. d.            | s. d.            | s. d.             |
| Brass mounts, 3 draws                                    | ...                      | 5 9   | 8 0              | 15 0             | 21 0              |
| "Tourist" Morocco-covered bodies—                        |                          | 7 0   | 10 6             | 17 6             | 23 0              |
| Oxidised mounts, 3 draws, cap and sun shades             | ...                      | 15 6  | 23 0             | 30 0             | 30 0              |
| <b>"Army" Morocco-covered bodies—</b>                    |                          | s. d. | s. d.            | s. d.            | s. d.             |
| Oxidised mounts, 4 draws                                 | ...                      | 31 0  | 41 0             | 58 0             | 72 0              |
| <b>"Navy" or "Day and Night" Morocco-covered bodies—</b> |                          | ...   | ...              | ...              | ...               |
| 1 draw, with shades                                      | ...                      | 30 0  | 41 0             | 60 0             | 80 0              |
| <b>"Government," Morocco-covered bodies—</b>             |                          | ...   | ...              | ...              | ...               |
| Panratic, 3 draws, with shades                           | ...                      | 42 0  | 54 0             | 72 0             | 90 0              |



This diagram displays the Panratic Eye-piece. The figures represent magnifying power in diameters, which may be squared to ascertain number of times the object observed is amplified, thus  $46 \times 46 = 2116$  so that one superficial inch would appear enlarged that number of times.

|                                                                   |     |      |         |      |       |
|-------------------------------------------------------------------|-----|------|---------|------|-------|
| <b>"Yachtsman," Morocco-covered bodies—</b>                       |     | ...  | ...     | ...  | ...   |
| Tapered, 1 draw, with shades                                      | ... | 34 0 | 42 0    | 57 0 | ...   |
| <b>"Rifleman's," Morocco-covered bodies—</b>                      |     | ...  | ...     | ...  | ...   |
| 2 draws, exceptionally portable, but having high power            | ... | 29 0 | 34 0    | ...  | ...   |
| With still higher power                                           | ... | ...  | 40 0    | ...  | ...   |
| <b>"Deerstalker," Morocco-covered bodies—</b>                     |     | ...  | ...     | ...  | ...   |
| 3 draws, cap and sling                                            | ... | 26 6 | ...     | 44 0 | ...   |
| <b>"Viceroy," Morocco-covered bodies, 3 draws</b>                 | ... | 25 0 | ...     | 40 0 | ...   |
| <b>"Empress," for ladies' use, being very light—</b>              |     | ...  | ...     | ...  | ...   |
| Polished Aluminium bodies, covered with superior leather, 3 draws | ... | 80 0 | 95 0    | ...  | 130 0 |
| Wo 1 Tripod Stands for Telescopes, with gutter tops, adjustable,  | ... | 13s. | to 30s. | ...  | ...   |

### ASTRONOMICAL TELESCOPES

With Mechanical Motions

MOUNTED ON BRASS OR WOOD STANDS.

TRADE DISCOUNT LIST ON APPLICATION.

# 'OPTIMUS'

PERKEN, SON & RAYMENT, 99, HATTON GARDEN, LONDON.  
141, OXFORD STREET,

## SURVEYING INSTRUMENTS.

ELS.

|                                                                                                                                                                                                                                  | £  | s. | d. |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|
| Drainage Level, with Telescope, 8in. in length, 1in. diameter cross wire sights, spirit level on Telescope—with hinge and set-screw motion—axis socket attached to ash stand (folding), Level packed in pine case                | 4  | 0  | 0  |
| Drainage Level, with Telescope, 8in. in length, 1in. diameter object glass, spirit level on Telescope, parallel plates to unscrew from the limb, packed in mahogany case with capstan pin, with round tripod stand complete      | 8  | 13 | 0  |
| Gravatt's pattern Level, with 10in. Telescope, 1½in. diameter object glass, parallel plates to unscrew from limb, packed in a mahogany case, with extra eye-piece, capstan pin and screwdriver complete, with round tripod stand | 11 | 0  | 0  |
| If fitted with compass, with aluminium ring 3in. diameter                                                                                                                                                                        | 11 | 10 | 0  |
| Gravatt's pattern Level (as above), with Telescope 12in. long, 1½in. object glass                                                                                                                                                | 12 | 10 | 0  |
| If fitted with compass, 3½in. diameter                                                                                                                                                                                           | 14 | 10 | 0  |
| Gravatt's pattern Level (as above), with Telescope 14in. long, 1½ object glass                                                                                                                                                   | 14 | 0  | 0  |
| If fitted with compass, with ring 3½in. diameter                                                                                                                                                                                 | 16 | 0  | 0  |
| Gravatt's pattern Level (as above), with Telescope 16in. long, and object glass 2in. diameter                                                                                                                                    | 17 | 10 | 0  |
| If fitted with compass with 3½ ring                                                                                                                                                                                              | 19 | 0  | 0  |

## ASTRONOMICAL TELESCOPES.

|                                                                                                                                                                                                                 | £  | s. | d. |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|
| 2ft. Telescope, with 1½in. object glass, bright brass body mounted on a brass pillar, with black iron claw foot, sliding adjustment to focus, packed in pine case, with 1 celestial and 1 terrestrial eye-piece | 3  | 14 | 0  |
| If with rack focussing adjustment                                                                                                                                                                               | 4  | 15 | 0  |
| 2ft. Telescope, as above, with 2 in. O.G., fitted with rack and pinion focussing arrangement                                                                                                                    | 5  | 5  | 0  |
| 30in. Telescope, as above, with 2½in. O.G., fitted with rack and pinion focussing adjustment                                                                                                                    | 6  | 10 | 0  |
| 3ft. Telescope, as above, with 2½in. O.G., with rack and pinion, and sliding focussing adjustment                                                                                                               | 7  | 10 | 0  |
| 42in. Telescope, as above, 3in. O.G.                                                                                                                                                                            | 8  | 15 | 0  |
| 4ft. " " 3½in. " but fitted with 2 celestial eye-pieces                                                                                                                                                         | 15 | 10 | 0  |
| Garden Stands, made of very durable white wood                                                                                                                                                                  | 2  | 10 | 0  |
| " " very superior, made of mahogany                                                                                                                                                                             | 3  | 15 | 0  |

TRADE DISCOUNT LIST ON APPLICATION.



# 'OPTIMUS'

PERKEN, SON & RAYMENT, 99, HATTON GARDEN, LONDON.  
141, OXFORD STREET,

## OPTIMUS' ANEROID BAROMETERS.

s. d.



Watch size (1½ or 2 inch dial), Hard Enamel, 26s. 6d.; Engraved Silvered ... 30 0  
 " with mountain scale, 8,000 feet, 33s.; 10,000 feet, 36s.; 12,000 feet... 42 0  
 " first quality mountain scale silvered dial, 10,000ft. 50s.; 12,000ft. 54s.; 15,000ft. ... 65 0

Pocket size, (2¼ or 3 inch dial), compensated 48 0

with mountain scale, compensated, 10,000ft, 66s.; 15,000 feet, 75s.; 20,000 feet ... 88 0  
 less motion for revolving altitude scale ... (extra) 8 0  
 Thermometers on dials ... 8 0

Gold or Silver cases, hall-marked, extra according to weight.

Mining and Surveying Aneroid supplied to order.

### ANEROIDS IN BRASS CIRCULAR MOUNTS and outside Boxes.

|                    | Superior |       | Extra quality, with Thermometer |       |       |       |
|--------------------|----------|-------|---------------------------------|-------|-------|-------|
|                    | 5-inch.  | 6     | 8                               | 5     | 6     | 8     |
|                    | s. d.    | s. d. | s. d.                           | s. d. | s. d. | s. d. |
| Plain Dials ...    | 12 6     | 22 6  | 36 0                            | 22 0  | 30 0  | 38 0  |
| Engraved Dials ... | 22 0     | 29 0  | 41 0                            | 32 0  | 42 0  | 54 0  |
| Hard engraved ...  | 22 0     | 33 0  | 49 0                            | 32 0  | 42 0  | 58 0  |

£ s. d.

Aneroids as above, fitted into carved oak and other wood cases, extra according to workmanship ... from 8s. 6d. to 5 0 0

Verifications supplied with above instruments for a small extra charge.

## MERCURIAL BAROMETERS.

£ s. d.

|                                                                     |                               |         |
|---------------------------------------------------------------------|-------------------------------|---------|
| Fitzroy, in wood frames ...                                         | 9s. 6d., 12s. 6d., 20s.       | 1 5 0   |
| Ditto Carved ...                                                    | £1 10s.; £1 15s.; £2 8s.      | 3 2 0   |
| Wheel pattern frames 6in. dial                                      | 18s., 8in. 26s.; 10in. 1 18 0 |         |
| Ditto, Superior ...                                                 | 30s.; 8in. 48s.; 10in. 3 8 0  |         |
| Pediment, in Oak, Rosewood, Walnut or Mahogany, Fig. 1,             | £1 4s., £1 16s., £2 18s., £4. | 7 10 0  |
| Marine Barometer with Sympiesometer vernier and gumbals, Fig. 2 ... | ... £3 15s.                   | 4 10 0  |
| Standard Barometer ...                                              | £7 10s., £12 12s.             | 22 10 0 |
| Board of Trade ...                                                  | ... ..                        | 3 10 0  |



FIG. 2

G. 1

# 'OPTIMUS'

PERKEN, SON & RAYMENT, 99, HATTON GARDEN, LONDON.  
141, OXFORD STREET.

## THERMOMETERS.

### CLINICAL THERMOMETERS—

|                                                              |                           |
|--------------------------------------------------------------|---------------------------|
| Indestructible index, in boxwood or German silver case,      | s.                        |
| 4in. or 5in., 2s. ... ..                                     | 6in. 2                    |
| Indestructible index, with magnifying lens front, in boxwood |                           |
| or German silver cases ... ..                                | 4in. and 5in. 3s.; 6in. 4 |
| Kew Certificate to any of the above ... ..                   | extra 1                   |

### CHEMICAL THERMOMETERS—

|                                                                |        |
|----------------------------------------------------------------|--------|
| For immersion, with scale graduated on the glass tube, to read |        |
| to 220°, 2s.; 400°, 4s. ... ..                                 | 600° 6 |



|                                                                  |    |
|------------------------------------------------------------------|----|
| 8in. Boxwood Thermometer, enam'd tube on boxwood scale,          |    |
| mercury or spirit, Fahrenheit and Centigrade scales, 6d &        | 1  |
| 8in. Thermometer, as above, but of superior finish; for use      |    |
| in hospitals and public buildings ... ..                         | 1  |
| 10in. do. do. do. ... ..                                         | 2  |
| 8in. Thermometer, with enamel tube, double scales—               |    |
| viz., Fahrenheit and Centigrade, bevelled-edged mounts,          |    |
| and superior finish ... ..                                       | 5  |
| 10in. do. do. do. ... ..                                         | 7  |
| Hot-house Registering Minimum Thermometer; spirit                |    |
| tube enamelled, on boxwood ... ..                                | 1  |
| Do. do. do. superior quality and finish ... ..                   | 2  |
| Do. Minimum Thermometer, enamelled tube, on zinc                 |    |
| scale, suitable for taking observations in the open air ... ..   | 2  |
| A cheaper model of this instrument can be obtained, price ... .. | 1  |
| Sixes' Registering Thermometer, enamelled tubes, mounted         |    |
| on boxwood, in japanned metal case, 8in. ... ..                  | 4  |
| Ditto ditto 10in. ... ..                                         | 6  |
| Ditto ditto 12in. ... ..                                         | 8  |
| Ditto, if mounted on porcelain or opal glass scale in white      |    |
| japanned metal case 8in. ... ..                                  | 9  |
| Ditto ditto 10in. ... ..                                         | 10 |
| Ditto ditto 12in. ... ..                                         | 12 |

*The prices of Sixes' Thermometers include grooved magnets for setting the indices.*

|                                                               |                              |
|---------------------------------------------------------------|------------------------------|
| Bath Thermometers, enamelled tube, mounted on porcelain,      |                              |
| black japanned metal case ... ..                              | 8in. 3s., 10in. 4            |
| Ditto, with metal scale and plain tube ... ..                 | 8in. 1s. 4d., 10in. 3        |
| Brewer's Thermometer, plain tube on silvered metal scale, in  |                              |
| black japanned metal case ... ..                              | 8in. 1s. 4d., 10in. 3        |
| Ditto, with enamelled tube on silvered metal scale, in copper |                              |
| case ... ..                                                   | 8in. 5s., 10in. 6s., 12in. 9 |

TRADE DISCOUNT LIST ON APPLICATION.

# 'OPTIMUS'

PERKEN, SON & RAYMENT, 99, HATTON GARDEN, LONDON.  
141, OXFORD STREET,

*Christiania.*

Messrs. Perken, Son and Rayment,  
99, Hatton Garden, London.

Gentlemen,

Having lately returned from Greenland after my Expedition last year across the Inland Ice, I have great pleasure in now informing you, that the Instruments supplied by you for the Expedition, namely the three Aneroids, and the pocket Sextant, have been proved to my entire satisfaction.—Time not allowing the Aneroids to be verified at the Kew Observatory as intended, I had this done at the Meteorological Institute here, with the most satisfactory results as to their correctness, and although the necessarily severe usage and tests to which, from the rather unexpected high altitude of upwards 9,000 feet reached, and the great change of temperature, varying from + 55 to — 55 Fh. in the day and night, they were exposed, yet they worked admirably together, and on again reaching the sea level, they differed but very slightly.—The pocket Sextant also, the only instrument we had for fixing our latitudinal position, proved invaluable to us, and justified fully the excellent workmanship and finish.

I am, Gentlemen,

Your obedient servant,

(Signed.) FRIDTJOF NANSEN.

# 'OPTIMUS'

PERKEN, SON & RAYMENT, 99, HATTON GARDEN, 141, OXFORD STREET, LONDON.

## "OPTIMUS" MICROSCOPES.



### THE "OPTIMUS" SCHOOL MICROSCOPE.

£ s.

Highly finished, bronzed foot, sliding coarse adjustment, fine adjustment by milled head,  $\frac{1}{2}$  in.,  $\frac{1}{4}$  in., and lin. dividing objective, one eye-piece and condenser, in upright mahogany case, with drawer for objects ... 2 15

### THE "OPTIMUS" STUDENT MICROSCOPE.

Rack coarse adjustment with double milled heads, fine adjustment, revolving stage, concave mirror,  $\frac{1}{2}$  in.,  $\frac{1}{4}$  in., and lin. dividing objective, one eye-piece, live cage, hand and stage forceps, in mahogany box (as above) with lock and key, and handle ... 3 6

### THE "OPTIMUS" UNIVERSITY MICROSCOPE.

As above, but having stage plate with Universal motion, stand condenser, and revolving diaphragm ... 4 4

### THE "OPTIMUS" COLLEGE MICROSCOPE.

Flat brass foot and movable stage plate, rack and fine adjustment, 2 in. and  $\frac{1}{2}$  in. objectives, two eye-pieces, stand condenser, and accessories, in mahogany upright case with lock and key ... 5 10

### THE "OPTIMUS" UNIVERSAL MICROSCOPE.

Full-size Monocular Microscope, best quality, rack and pinion, coarse adjustment, lever screw, fine adjustment giving most delicate motion, lin. and  $\frac{1}{4}$  in. objectives, two eye-pieces, Universal hand motion to stage, revolving diaphragm, stand condenser, live cage, forceps, in upright mahogany cabinet, with drawer for objects, lock and key ... 7 7

### THE "OPTIMUS" POPULAR MICROSCOPE.

Full-size Monocular Microscope and apparatus (as above), with vertical and horizontal movement, rack and pinion to stage ... 8 8

### THE "OPTIMUS" PORTABLE MICROSCOPE.

Best quality, coarse and fine adjustments, two eye-pieces, 2 in., lin., and  $\frac{1}{2}$  in. objectives, stand condenser, live cage, forceps, in polished mahogany case (as above) ... 10 10

# 'OPTIMUS'

ERKEN, SON & RAYMENT, 99, HATTON GARDEN, LONDON.  
141, OXFORD STREET,

## "OPTIMUS" MICROSCOPES.



- Monocular, rack and pinion adjustment—glass £ s. d.  
stage, reflector, condenser, 2 eye-pieces—2in.,  
1in., and  $\frac{1}{2}$ in. objectives ... 15 0 0
- Monocular, as above, with Polarizing apparatus,  
3 eye-pieces—2in., 1in.,  $\frac{1}{2}$ in. and  $\frac{1}{4}$ in. ob-  
jectives, double nose-piece ... 22 10 0
- Monocular, large size, circular revolving stage,  
graduated, milled heads to slow motion,  
suited for examining sections of crystals—3  
eye-pieces, 2in.,  $\frac{1}{2}$ in.,  $\frac{1}{4}$ in. and  $\frac{1}{8}$ in. ob-  
jectives ... 38 10 0
- ocular bodies, having the necessary additional eye-pieces  
suitable for the instrument ... extra from £4 to 9 0 0
- ecting microscope, complete ... 2 10 0

| Inches                     | 4    | 3   | 2   | 1   | 1   | $\frac{2}{3}$ | $\frac{1}{2}$ | $\frac{1}{4}$ | $\frac{1}{5}$ | $\frac{1}{6}$ | $\frac{1}{8}$ | $\frac{1}{12}$ | $\frac{1}{15}$ |
|----------------------------|------|-----|-----|-----|-----|---------------|---------------|---------------|---------------|---------------|---------------|----------------|----------------|
| Microscopic Objectives ... | 25   | 25  | 25  | 25  | 25  |               | 40            | 35            | 40            | 48            | 65            |                |                |
| 1st quality—               |      |     |     |     |     |               |               |               |               |               |               |                |                |
| Angular aperture ...       | 9°   | 12° | 16° | 20° | 27° | 30°           | 80°           | 100°          | 100°          | 150°          | 140°          | 145°           | 150°           |
| Greatest magnifying        |      |     |     |     |     |               |               |               |               |               |               |                |                |
| power ... diameters        | 72   | 112 | 140 | 196 | 280 | 420           | 620           | 1400          | 1480          | 1820          | 2380          | 5200           | 6400           |
|                            | 26/6 | 40  | 40  | 46  | 46  | 50            | 77            | 88            | 105           | 125/          | 135/          | 198/           | 210/           |

The first quality, half-inch and higher powers, are fitted with screw collar  
adjustment for adjusting distance according to thickness of covering glass.

|                     | £ | s. | d. |                            | £ | s. | d. |
|---------------------|---|----|----|----------------------------|---|----|----|
| ising Apparatus ... | 1 | 2  | 0  | Section Cutting Machines   |   |    |    |
| oola ...            | 0 | 16 | 0  | from                       | 0 | 9  | 0  |
| Lens ...            | 0 | 8  | 0  | Air Pump, with tray, &c. " | 0 | 15 | 0  |
| le Nose-piece ...   | 0 | 12 | 6  | Microscopic Object Boxes   |   |    |    |
| Cage ...            | 0 | 3  | 0  | 1s. 4d., 2s., 2s. 6d.,     |   |    |    |
| Forceps ...         | 0 | 3  | 0  | 3s. 6d., 4s.,              | 0 | 9  | 0  |
| ra Lucida ...       | 0 | 12 | 6  | " Object Cabinets,         |   |    |    |
| " Wollaston's       | 1 | 4  | 0  | mahogany, 40s.             | 3 | 0  | 0  |
| rkuhn ...           |   |    |    | " Lamps, with Shades       |   |    |    |
| Condensers 5s. 9d., |   |    |    | 6s., 10s. 6d., 14s.        | 1 | 0  | 0  |
| 7s. 6d., 15s.,      | 1 | 0  | 0  | " Dissecting Knives,       |   |    |    |
| table ... from      | 0 | 4  | 0  | Scissors, Forceps, &c.     |   |    |    |

Microscopic Accessories, including objects (mounted and un-  
ted), supplied to order on the most reasonable terms.

TRADE DISCOUNT LIST ON APPLICATION.

# 'OPTIMUS'

PERKEN, SON & RAYMENT, 99, HATTON GARDEN, LONDON.  
141, OXFORD STREET, LONDON.



JAPANESE.



CANADIAN.



PERFECTION.

## "OPTIMUS" FOLDERS (FOLDING EYE GLASSES).

The same price is charged for either of these styles or fashions of folders, and where it is possible to see the wearer we can suggest the one best adapted to fit the shape of the face and nose.

|                        |     |     |     |     |     |     |     |   |   |
|------------------------|-----|-----|-----|-----|-----|-----|-----|---|---|
| For Hospital Patients  | ... | ... | ... | ... | ... | ... | ... | 1 | 0 |
| Superior Quality       | ... | ... | ... | ... | ... | ... | ... | 3 | 0 |
| Extra Superior Quality | ... | ... | ... | ... | ... | ... | ... | 5 | 0 |
| Very Best possible     | ... | ... | ... | ... | ... | ... | ... | 7 | 6 |

## GOLD FOLDERS OF EITHER SHAPE SHOWN ABOVE.

|                                      |     |     |     |     |     |     |     |    |   |
|--------------------------------------|-----|-----|-----|-----|-----|-----|-----|----|---|
| 10c. Light Weight, including Glasses | ... | ... | ... | ... | ... | ... | ... | 21 | 0 |
| 10c. Medium                          | ..  | ..  | ..  | ..  | ..  | ..  | ..  | 25 | 0 |
| 10c. Heavy                           | ..  | ..  | ..  | ..  | ..  | ..  | ..  | 30 | 0 |
| 15c. Light                           | ..  | ..  | ..  | ..  | ..  | ..  | ..  | 25 | 0 |
| 15c. Medium                          | ..  | ..  | ..  | ..  | ..  | ..  | ..  | 35 | 0 |
| 15c. Heavy                           | ..  | ..  | ..  | ..  | ..  | ..  | ..  | 45 | 0 |
| 18c. Light                           | ..  | ..  | ..  | ..  | ..  | ..  | ..  | 35 | 0 |
| 18c. Medium                          | ..  | ..  | ..  | ..  | ..  | ..  | ..  | 45 | 0 |
| 18c. Heavy                           | ..  | ..  | ..  | ..  | ..  | ..  | ..  | 55 | 0 |

*Glasses tinted either Blue, Smoke, or Green, at same prices as the White.*

|                                        |     |     |     |     |     |     |     |   |   |
|----------------------------------------|-----|-----|-----|-----|-----|-----|-----|---|---|
| Brazilian Pebbles, Best Quality, extra | ... | ... | ... | ... | ... | ... | ... | 3 | 0 |
|----------------------------------------|-----|-----|-----|-----|-----|-----|-----|---|---|

## D-EYE, OR HORSESHOE SPECTACLES

Have coloured glasses in front and at the sides of the eyes, so giving extra protection from strong glare of light ...

|                       |     |     |     |     |     |     |     |   |   |
|-----------------------|-----|-----|-----|-----|-----|-----|-----|---|---|
| Do. do. best possible | ... | ... | ... | ... | ... | ... | ... | 5 | 0 |
|                       | ... | ... | ... | ... | ... | ... | ... | 7 | 6 |



## EYE PRESERVERS

With wire shades and coloured glasses, the sides of which are worked flat or parallel for weak eyes of normal vision ...

5 0



## DOCTOR BOWMAN'S GOGGLES

With coloured glasses. The sides are worked flat or parallel and shaped like a shallow cup, intended for eyes of normal vision exposed to strong glare of light. Suitable for foreign travel, sea voyages, or sandy countries ...

10 6



# 'OPTIMUS'

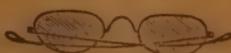
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## "OPTIMUS" SPECTACLES.

OCULISTS' FORMULÆ ACCURATELY AND PROMPTLY EXECUTED.



ORDINARY FRAME.



PANTOSCOPIC  
FRAME

for those who need spectacles for reading only, the wearer can look over the top at distant objects.



HOOK SIDE FRAME  
for  
Walking or Riding.

The same price is charged for either shape. Where possible we prefer to see the wearer and to measure the face, so that the frame may be of correct width between the eyes, properly adjusted to the shape of the nose, &c.

The frames are of pliable steel, either blue or straw-colour. If desired metal frames are supplied at an extra cost of one shilling. These are non-rosive.

Prismatic lenses for Strabismus, cylindrical and sphero-cylindrical lenses for astigmatism, or combined, extra, according to focal working from 12 to 4s.

|                                                              |        |   |   |
|--------------------------------------------------------------|--------|---|---|
| Prices for Hospital Patients, with Concave or Convex Glasses | ...    | 1 | 0 |
| Superior Quality                                             | ... .. | 3 | 0 |
| Extra Superior Quality                                       | ... .. | 5 | 0 |
| Best possible                                                | ... .. | 7 | 6 |

## GOLD SPECTACLES OF EITHER SHAPE SHOWN ABOVE.

|                                                   |        |    |   |
|---------------------------------------------------|--------|----|---|
| Light Weight, including Concave or Convex Glasses | ...    | 21 | 0 |
| Medium                                            | ... .. | 25 | 5 |
| Heavy                                             | ... .. | 30 | 0 |
| Light                                             | ... .. | 25 | 0 |
| Medium                                            | ... .. | 35 | 0 |
| Heavy                                             | ... .. | 45 | 0 |
| Light                                             | ... .. | 35 | 0 |
| Medium                                            | ... .. | 45 | 0 |
| Heavy                                             | ... .. | 55 | 0 |

Glasses tinted either Blue, Smoke, or Green at same prices as White.

|                              |        |   |   |
|------------------------------|--------|---|---|
| Glasses, Best Quality, extra | ... .. | 3 | 0 |
|------------------------------|--------|---|---|

TRADE DISCOUNT LIST ON APPLICATION.

1893

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AND

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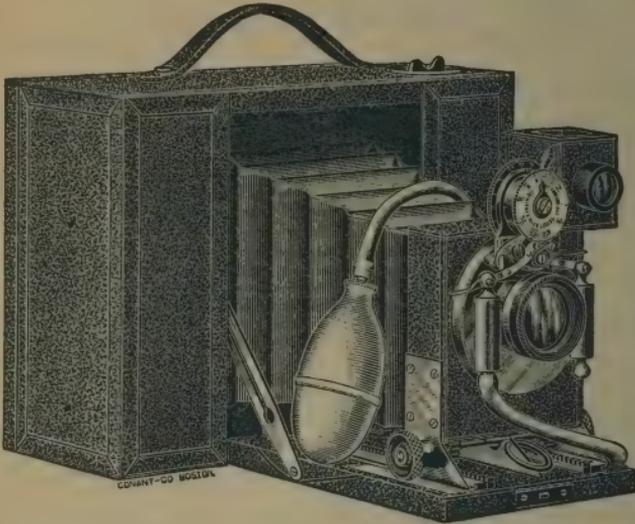
BLAIRCAM, BOSTON.

451 BROADWAY, NEW YORK.

245 STATE ST., CHICAGO.

# One of Blair's Hand Cameras

## THE FOLDING KAMARET.



Folds like a book  $3\frac{1}{2}$  inches thick; Capacity 50  $4\times 5$  pictures without reloading.

This is the most compact  $4\times 5$  camera for roll film in existence, and the highest grade folding hand camera in the world.

Every exposed part when folded or unfolded, except the brass work, is covered

with the finest selected morocco.

The second illustration shows the extreme convenience of the shape, but the bellows capacity is nevertheless such that a lens of longer focus than usually employed with  $4\times 5$  cameras is fitted. It is an 8 inch Rapid Rectilinear and with large opening gives beautiful definition to the extreme edges of the field.

The shutter may be set for automatically timed exposures of from 1-100 of a second to 3 seconds with great accuracy, as well as for longer exposures in the usual manner. Price, £12 12s.

Attachments for glass-plates, 2 2

IMPORTERS FOR EUROPE:

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LIBERAL TERMS TO DEALERS.



# Another One.

## THE "COLUMBUS."



The model of this camera affords great compactness and quicker adjustment for use than the folding cameras. To focus, the inside case is projected by turning the sunken key, and the finders are located close to the scales.

The dimensions, closed, are  $5\frac{1}{2} \times 6\frac{1}{2} \times 8$  inches, and capacity 25 to 100  $4 \times 5$  pictures without reloading.

The "Columbus" is fitted with a R. R. Lens, oscillating diaphragm and adjustable speed safety shutter with time exposure stop.

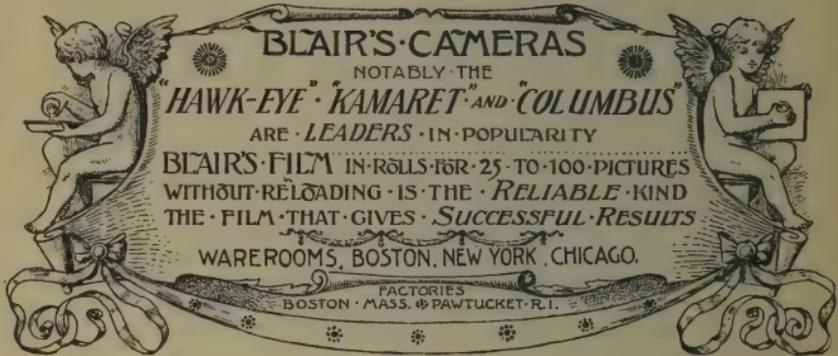
The great convenience of this camera together with the very moderate price make it a universal favourite. Price, covered with grain leather, £ 5 5s.

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LIBERAL TERMS TO DEALERS.

BLAIR'S PIONEERS IN 1880.  
CAMERAS LEADERS IN 1893.



\* Blair's Films have no joints or seams,  
never frill, are clean, quick and uniform.

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FACTORIES:

Boston, Mass., and Pawtucket, R. I.

IN EUROPE:

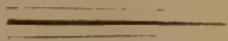
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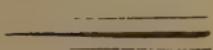
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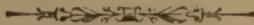
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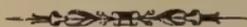
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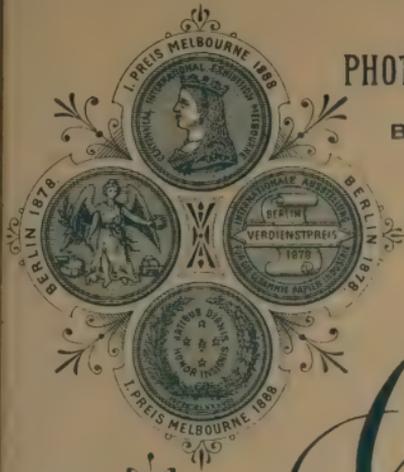
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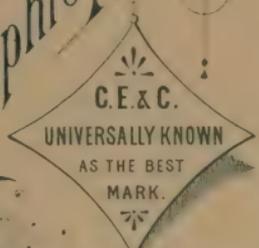
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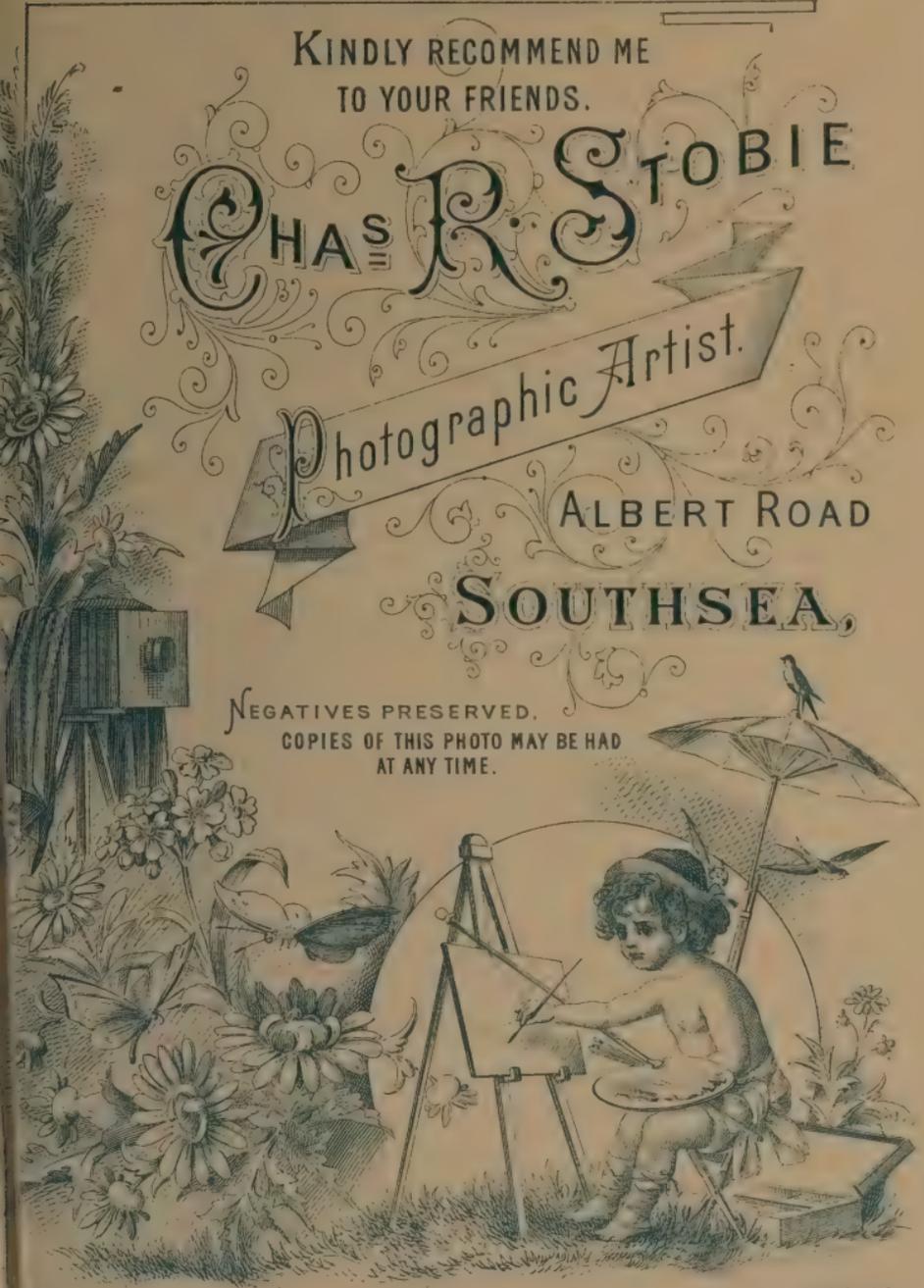
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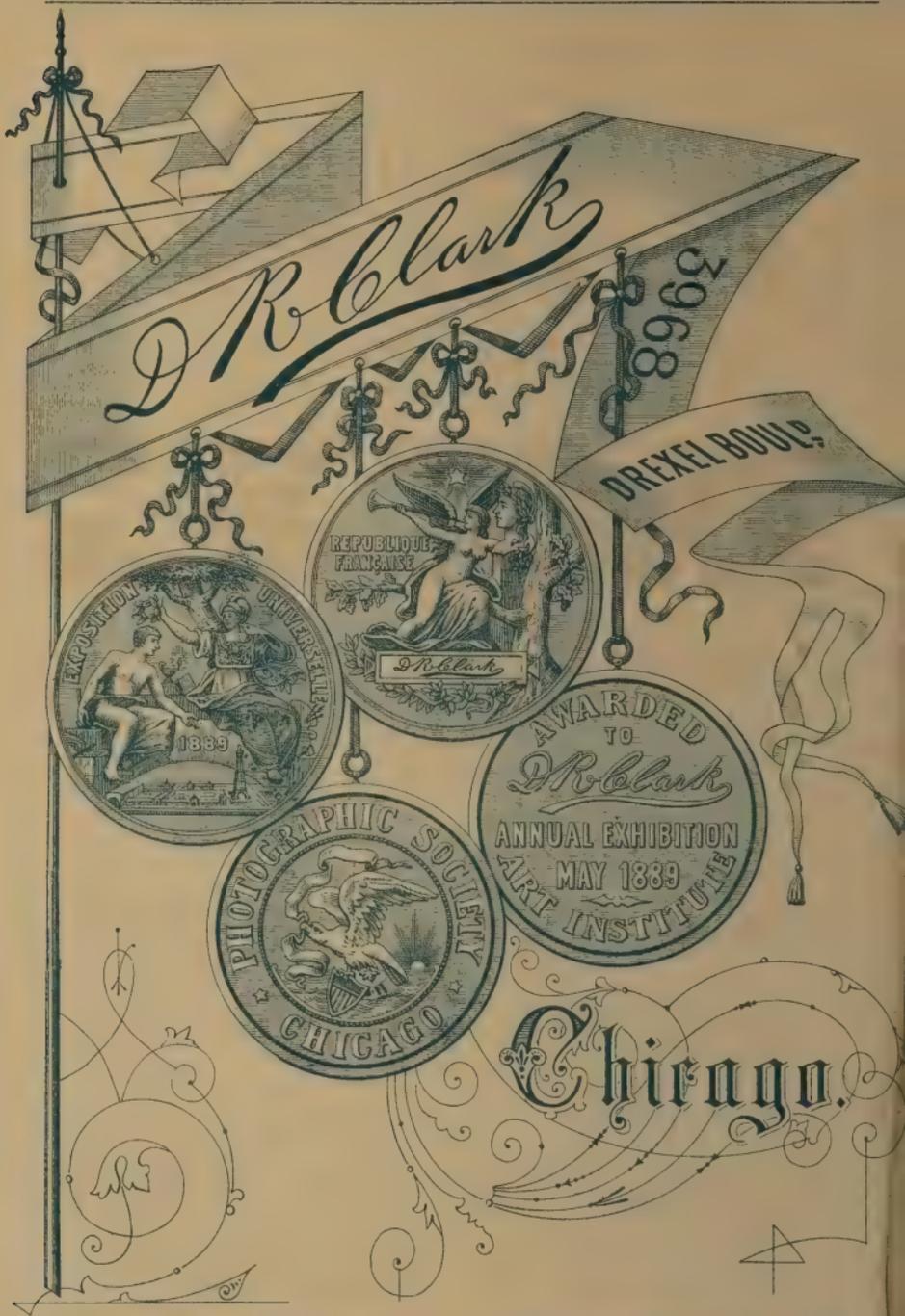
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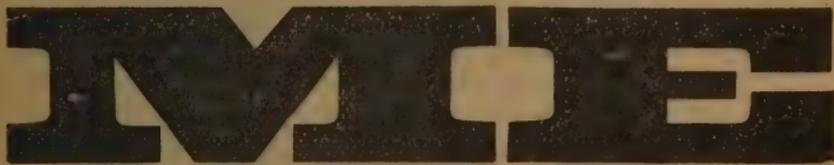
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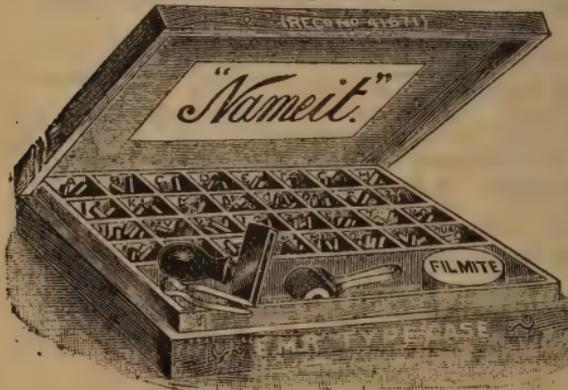
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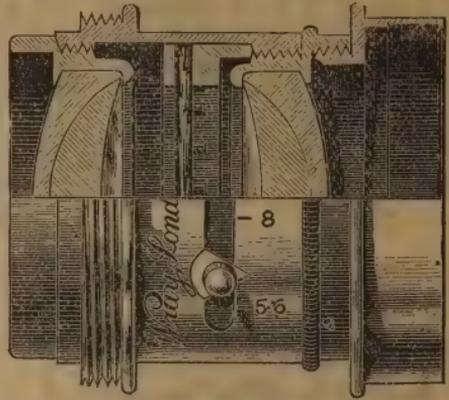
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Size... ..	4½×3¼	5×4	6½×5	8×5	8½×6½	10×8	12×10	15×12	18×16	22×18
Waterhouse										
Diaphragms ...	£2 5	£2 10	£3 10	£4 0	£4 10	£6 0	£8 0	£10 10	£14 0	£30 0
Iris Diaphragms...	3 0	3 5	4 5	4 15	5 5	6 15	9 0	11 15	15 10	32 0
Aluminium										
Settings extra	0 15	0 15	1 0	1 5	1 10	1 15	2 5	3 10	5 0	10 0

The full aperture of these Lenses is  $f/8$ , excepting the two first, which have double this aperture,  $f/5.65$ .

## Prices—WIDE-ANGLE RECTILINEAR LENSES.

Approximate Angle included, 90 degrees. Largest aperture  $f/16$ .

Focus	3-in.	4-in.	5-in.	6-in.	7-in.	8-in.	9-in.	10-in.	12-in.	15-in.	18-in.	21-in.
Price	£2 10	£2 15	£2 17 6	£3	£3 15	£4 10	£5 5	£6	£7	£8	£10	£12

Aluminium Settings up to and including 10 inch focus, 15/- extra; 12 inch to 18 inch focus, £1 extra; and 21 inch focus, £1 5s. extra.

The sizes from 3 to 10 inches fit one flange, and the tubes being the same size the Lenses are interchangeable. Up to and including 9 inches focus they are fitted with Revolving Stops. Beyond these sizes Waterhouse Stops are used; but the Iris Diaphragm, 15s. extra, is strongly recommended for all sizes above 7 inches.

## WIDE-ANGLE LANDSCAPE LENSES.

Size ... ..	5×4	6½×5	7½×5	8½×6½	10×8	12×10
Focus ... ..	5-in.	6½-in.	7½-in.	9-in.	10-in.	12-in.
Price ... ..	£1 15	£2 5	£2 10 0	£3 0	£3 15	£4 10
Aluminium Settings extra	0 15	1 0	1 2 6	1 5	1 15	2 5

## NARROW-ANGLE LANDSCAPE LENSES.

FOR DISTANT VIEWS.

Size ... ..	5×4	6½×5	7½×5	8½×6½	10×8	12×10	15×12
Focus... ..	7½-in.	9-in.	10-in.	12-in.	15-in.	18-in.	21-in.
Price ... ..	£1 10	£1 15	£2 0 0	£2 10	£3 5	£4 0	£4 15
Aluminium Settings extra	0 15	1 0	1 2 6	1 5	1 15	2 5	3 0

The Landscape Lenses are fitted with Rotating or Waterhouse Stops.  
Iris Diaphragms, 15/- extra.

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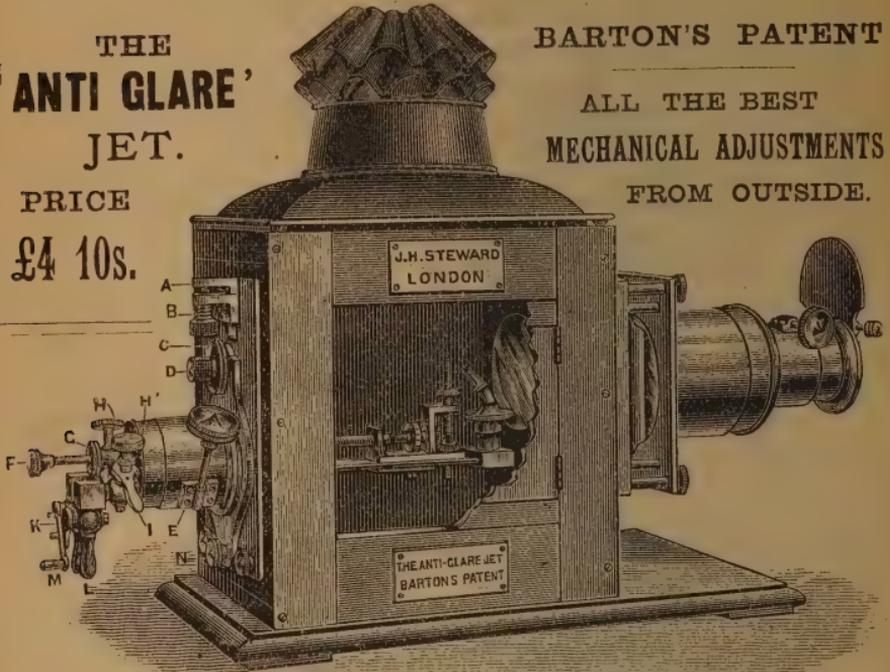
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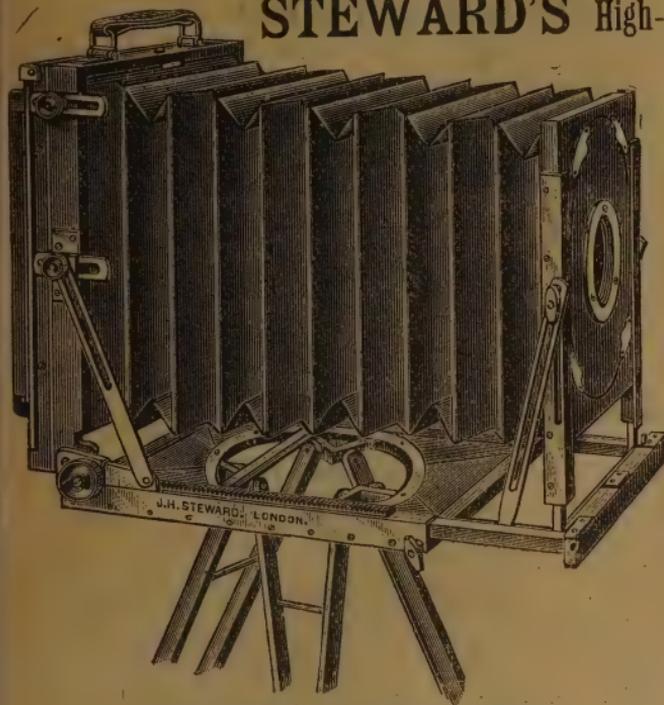
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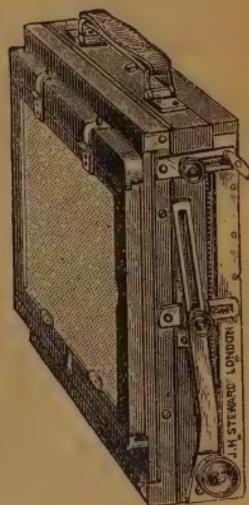
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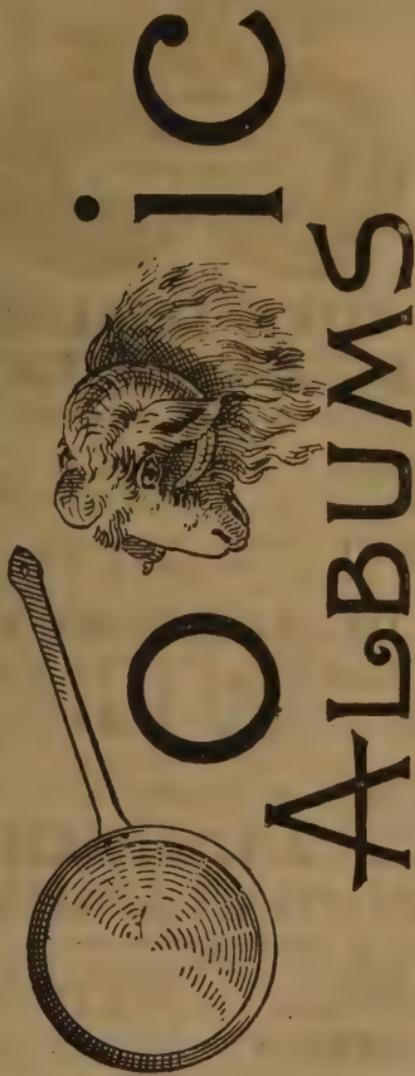
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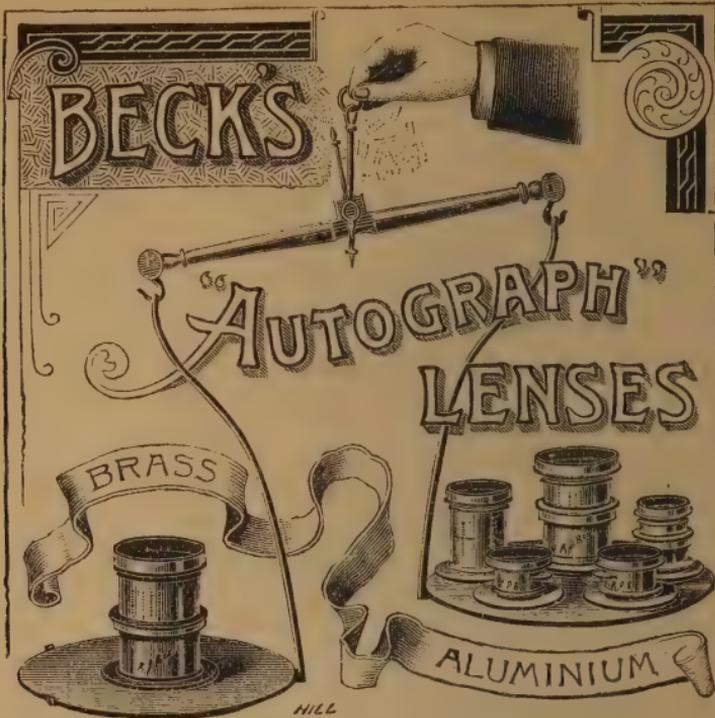
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4081 ...	3 ...	9 $\frac{1}{4}$ ...	7 $\frac{3}{4}$ ...	C.-D.-V. and Cabinets...	6 $\frac{1}{2}$ × 4 $\frac{3}{4}$ ...	11 0 0
4082 ...	4 ...	11 $\frac{3}{4}$ ...	9 $\frac{1}{2}$ ...	Cabinets .....	8 $\frac{1}{2}$ × 6 $\frac{1}{2}$ ...	16 10 0
4083 ...	5 ...	14 ...	11 $\frac{1}{2}$ ...	Panel .....	10 × 8 ...	22 0 0

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Catalogue No.	No.	Size of Plate. inches.	Equiva- lent Focus. in.	Price with Set of Waterhouse Stops.		Price with Iris Diaphragm. £ s. d.
				£	s. d.	
4999 .....	0 .....	3 $\frac{1}{4}$ × 3 $\frac{1}{4}$ .....	4 $\frac{1}{4}$ .....	3	0 0 .....	3 7 6
5000 .....	1 .....	4 $\frac{1}{4}$ × 3 $\frac{1}{4}$ .....	5 .....	3	3 0 .....	3 10 6
5001A .....	2A .....	5 × 4 .....	6 .....	3	3 0 .....	3 10 6
5001 .....	2 .....	5 × 4 .....	7 .....	3	6 0 .....	3 13 6
5002 .....	3 .....	8 × 5 .....	8 $\frac{3}{4}$ .....	3	19 0 .....	4 6 6
5003 .....	4 .....	8 $\frac{1}{2}$ × 6 $\frac{1}{2}$ .....	11 .....	5	10 6 .....	6 1 0
5004 .....	5 .....	10 × 8 .....	13 .....	7	2 0 .....	7 12 6
5005 .....	6 .....	12 × 10 .....	16 .....	8	8 0 .....	9 3 0
5006 .....	7 .....	14 × 11 .....	18 .....	10	0 0 .....	10 17 6
5007 .....	8 .....	17 × 14 .....	24 .....	16	16 0 .....	17 17 0
5008 .....	9 .....	22 × 20 .....	30 .....	23	2 0 .....	24 3 0
5008A .....	10 .....	25 × 21 .....	33 .....	31	0 0 .....	32 10 0
5009 .....	11 .....	30 × 25 .....	36 .....	38	10 0 .....	40 0 0

## PRICES of the 'AUTOGRAPH' COMBINATION LENSES.

Catalogue No.	No.	Full Aperture. inches.	Size of Plate.		Small Stop. inches.	Equiv- alent Focus. in.	Price with Iris Diaphragm.	
			Moderate Stop. inches.	inches.			£	s. d.
5030 ...	1 ...	3 $\frac{1}{4}$ × 3 $\frac{1}{4}$ ...	4 $\frac{1}{4}$ × 3 $\frac{1}{4}$ ...	5 × 4 ...	3 ...	3	0 0	
5031 ...	2 ...	4 $\frac{1}{4}$ × 3 $\frac{1}{4}$ ...	5 × 4 ...	6 $\frac{1}{2}$ × 4 $\frac{3}{4}$ ...	4 ...	3	5 0	
5032 ...	3 ...	5 × 4 ...	6 $\frac{1}{2}$ × 4 $\frac{3}{4}$ ...	7 $\frac{1}{2}$ × 5 ...	5 ...	3	7 6	
5033 ...	4 ...	6 $\frac{1}{2}$ × 3 $\frac{3}{4}$ ...	7 × 5 ...	8 $\frac{1}{2}$ × 6 $\frac{1}{2}$ ...	6 ...	3	10 0	
5034 ...	5 ...	7 $\frac{1}{4}$ × 4 $\frac{1}{2}$ ...	8 $\frac{1}{2}$ × 6 $\frac{1}{2}$ ...	9 × 7 ...	7 ...	3	13 6	
5035 ...	6 ...	7 $\frac{1}{2}$ × 5 ...	9 × 7 ...	10 × 8 ...	8 ...	3	17 6	
5036 ...	7 ...	8 × 5 ...	10 × 8 ...	11 × 9 ...	9 ...	4	5 0	
5037 ...	8 ...	8 $\frac{1}{2}$ × 6 $\frac{1}{2}$ ...	11 × 9 ...	12 × 10 ...	11 ...	5	15 0	
5038 ...	9 ...	10 × 8 ...	12 × 10 ...	15 × 12 ...	13 ...	7	0 0	

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[See preceding and following page

## PRICES OF SETS OF THE 'AUTOGRAPH' COMBINATION LENSES.

5045.	No. 1.	For $\frac{1}{4}$ -plate Camera, set of Lenses, Nos. 1, 3, 5, all fitting the same mount, giving foci of 3 in., 5 in., 7 in., 6 in., 10 in., 14 in.; the mount provided with Iris diaphragm graduated with three scales of apertures. The whole packed in morocco case	£	s.	d.
				8	10 0
5046.	No. 2.	For $5 \times 4$ Camera, set as above, consisting of Lenses Nos. 2, 4, 6		9	5 0
5047.	No. 3.	For $\frac{1}{2}$ -plate Camera, set as above, consisting of Lenses Nos. 3, 5, 7		10	0 0
5048.	No. 4.	For whole-plate Camera, set as above, consisting of Lenses 4, 6, 8		11	15 0
5049.	No. 5.	For $10 \times 8$ Camera, set as above, consisting of Nos. 5, 7, 9		13	10 0

## PRICES OF THE 'AUTOGRAPH' WIDE-ANGLE RECTILINEAR LENSES.

Catalogue No.	No.	Size of Plate. inches.	Equivalent Focus. inches.	Price £ s. d.
5020	1	5 × 4	3	3 3 0
5021	2	6 $\frac{1}{2}$ × 4 $\frac{3}{4}$	4	3 6 0
5022	3	8 $\frac{1}{2}$ × 6 $\frac{1}{2}$	5	3 19 0
5022*	3*	10 × 8	6	4 15 0
5023	4	12 × 10	7	5 10 6
5024	5	15 × 12	9	7 15 0
5025	6	17 × 14	11	10 10 0

## PRICES of the 'AUTOGRAPH' NARROW-ANGLE SINGLE VIEW LENSES.

Catalogue No.	No.	Size of Plate. inches.	Diameter of Lens. inches.	Equivalent Focus. inches.	Price with Iris Dia. £ s. d.
4070	1	4 $\frac{1}{4}$ × 3 $\frac{1}{2}$	1 $\frac{1}{2}$	8 $\frac{1}{2}$	2 15 0
4071	2	5 × 2	1 $\frac{1}{2}$	10 $\frac{1}{2}$	3 5 0
4072	3	6 $\frac{1}{2}$ × 4 $\frac{3}{4}$	1 $\frac{1}{2}$	12 $\frac{1}{2}$	3 10 0
4073	4	8 $\frac{1}{2}$ × 6 $\frac{1}{2}$	2	15	4 5 0
4074	5	10 × 8	2 $\frac{1}{2}$	18	5 5 0
4075	6	12 × 10	3 $\frac{1}{8}$	23	7 0 0

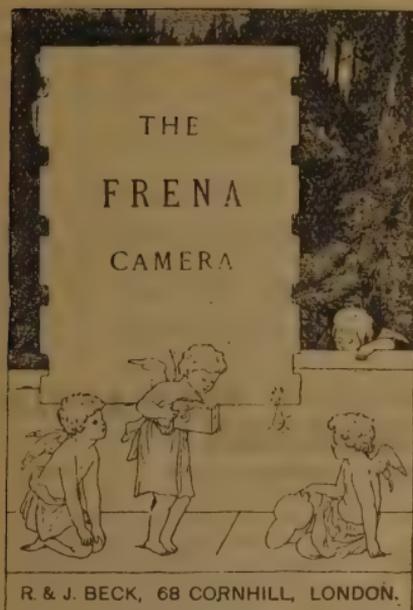
## PRICES OF THE 'AUTOGRAPH' WIDE-ANGLE SINGLE VIEW LENSES.

Catalogue No.	No.	Size of Plate. inches.	Equivalent focus. inches.	Price with Iris Dia. £ s. d.
4060	1	5 × 4	5	3 0 0
4061	2	6 $\frac{1}{2}$ × 4 $\frac{3}{4}$	6 $\frac{1}{2}$	3 10 0
4062	3	8 $\frac{1}{2}$ × 6 $\frac{1}{2}$	8 $\frac{1}{2}$	4 0 0
4063	4	10 × 8	10	5 0 0
4064	5	12 × 10	12	6 10 0

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*[See preceding and following pages.]*

# FRENA, No. 1.

.....

**LANTERN PLATE SIZE.**—Camera is held in normal position, while handle is turned to change the film the receiving chamber is at the bottom of the Camera. The square shape of the picture renders this less suitable for artistic work than the FRENA NO. 2, but in cases where Lantern Slides are the ultimate object, or where price and size are important factors, it is recommended.

## TECHNICAL DATA.

Lens	...	...	4½ 'Autograph' Rapid Rectilinear.
Aperture	...	...	$f/11$ , no diaphragms.
Focus	...	...	Fixed-range distance to 15 feet. FRENA Magnifiers are added for near objects.
Size of Film	...	...	3¼ in. × 3¼ in.
Size of Picture	...	...	3 in. × 3¼ in.
Maximum Charge	...	...	2 packs of 20, <i>i.e.</i> , 40 Films.
Speed of Shutter	...	...	$\frac{1}{6}$ $\frac{1}{10}$ $\frac{1}{20}$ $\frac{1}{40}$ and $\frac{1}{80}$ th of a second, also time exposures.
Indicator, showing number of Films used.			
Finders	...	...	One.
Swing back	...	...	Can be used to a moderate extent.
Weight	...	...	3 lbs.
Dimensions	...	...	8¼ in. × 6 in. × 4½ in.

Price, with 40 Films and Handbook, £5 5s.  
Frena Magnifiers, 10s. 6d.

Full Descriptive Pamphlet Free on Application to

→\* R. & J. BECK, \*←  
68 CORNHILL, LONDON.

Cash Discount on Lenses, Five Per Cent. All other Prices  
STRICTLY NET.

[See preceding and following pages.]

SEE NEXT PAGE.



SEE NEXT PAGE.

AT  
LAST.



THE  
Quarter-plate  
**FRENA**  
is Ready.

[See preceding and following pages.]

# FRENA, No. 2.

Quarter-plate Size. For Pictures  $4\frac{1}{4}$  in.  $\times$  3 in.

**T**HE Camera is held with Lens end pointing upwards, while handle is turned to change the film, the receiving chamber being at the back. The No. 2 FRENA is thus much smaller in proportion than No. 1, the weight is about  $\frac{3}{4}$ -lb. more, while the more artistic shape of the picture, and the possession of stops, renders it a much more popular size.

## TECHNICAL DATA.

Lens ... ..	$5\frac{1}{2}$ in. 'Autograph' Rapid Rectilinear.
Aperture ... ..	$f/8$ . Diaphragms, $f/11$ , $f/16$ , $f/22$ , $f/64$ .
Focus ... ..	Fixed - range distance to 20 ft. FRENA Magnifiers used for objects up to 3 ft.
Size of Film ... ..	$4\frac{1}{4}$ in. $\times$ $3\frac{1}{2}$ in.
Size of Picture ... ..	$4\frac{1}{4}$ in. $\times$ 3 in.
Maximum Charge ... ..	2 packs of 20, <i>i.e.</i> , 40 films.
Indicator, showing number of films exposed.	
Swing Back ... ..	Can be used about $20^\circ$ with sharpness all over with smallest stop.
Finders ... ..	Two.
Tripod Sockets ... ..	Two, and Screw.
Weight, charged ... ..	4 lbs.
Dimensions ... ..	$11\frac{1}{2}$ in. $\times$ $5\frac{1}{2}$ in. $\times$ $4\frac{1}{2}$ in.

Price, with Forty Films and Handbook, £8 17s. 6d.

Frena Magnifiers, set of Four, 10s. 6d.

FULL DESCRIPTIVE PAMPHLET FREE ON APPLICATION TO

**R. & J. BECK, 68 CORNHILL, LONDON, E.C.**

CASH DISCOUNT ON LENSES FIVE PER CENT. ALL OTHER ARTICLES STRICTLY NET.

[See preceding pages.]

*ABRIDGED LIST. For Full Catalogue see below.*

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EVERYTHING PHOTOGRAPHIC.

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WHOLESALE AND RETAIL DEALERS IN EVERY KIND  
OF PHOTOGRAPHIC AND LANTERN MATERIALS.

Inventors, Patentees, and Hand Camera Specialists.

81 ALDERSGATE STREET, E.C.

(FACING THE STATION), and at

26 CHARING CROSS ROAD, W.C.

(ADJOINING THE CAMERA CLUB, CLOSE TO TRAFALGAR SQUARE),

Camera Factories and Mount Printing Works:

2, 3, & 4 ALDERSGATE BUILDINGS, LONDON, E.C.

*Please address all correspondence to 81 Aldersgate Street, E.C.*

Makers of all Descriptions of  
PHOTOGRAPHIC INSTRUMENTS,  
AND THE LARGEST MANUFACTURERS OF  
FIRST-CLASS HAND CAMERAS IN THE WORLD.

For full particulars of articles in this list, together with prices and descriptions of every photographic requisite and specialty, send for Adams & Co.'s PHOTOGRAPHIC ANNUAL AND PRICE LIST (400 pages and 550 illustrations), 6d., post free, 1s.

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81 ALDERSGATE S.E.C.  
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ADJOINING THE CAMERA CLUB  
CHARING CROSS END

**LONDON**

## IMPORTANT NOTICE.

**W**E sell in ALL cases for CASH at very lowest possible prices, and in NO single instance are we higher than any other Dealers, Manufacturers, or Co-operative Stores and Societies. Everything appertaining to Lantern or Photographic Materials may be obtained direct from us at the BOTTOM PRICE, at which it is elsewhere obtainable, and in the majority of cases, very much lower. Where goods are made in two or more qualities, we stock only the BEST, and we can honestly assure clients it pays far better to purchase such quality.

Every possible photographic requirement is kept in stock by us, we having the most varied and highest class assortment in the world. Our fully Illustrated and Descriptive Catalogue (over 400 pages, and 550 illustrations, post free, 1/-), contains everything of note in the photographic world and is the recognised guide of the trade.

All our prices are naturally subject to fluctuation, according to the state of the market. In some instances manufacturers attempt to form 'trade rings,' in order to bolster up prices, and in supplying goods of their manufacture, we have to abide by their rules and instructions. But our prices in EVERY POSSIBLE INSTANCE are the very lowest obtainable, and we respectfully ask buyers to obtain estimates, or compare our advertised prices before purchasing.

**ADAMS & Co**

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1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100

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## ORDERS BY POST.

We have exceptional facilities for the immediate execution and despatch of orders received by post. ALL orders for usual or every-day requirements are sent off SAME DAY as received, and WE NEVER DISAPPOINT where the full remittance accompanies the order, or we hold deposit accounts. Our terms are in all cases strictly cash, and if goods are entered in our books, the full amount at which the makers advertise their goods will be charged.

All our prices are NET CASH, unless stated to the contrary.

## GOODS OF OUR OWN MAKE.

We strongly advise the purchase of our own Specialties, being made directly through ourselves. Buyers thus ensure the latest patterns, as well as promptness of despatch, and the guaranteed perfectness of the goods they purchase. If ordering through a local dealer, INSIST on our goods being supplied, as only too frequently we hear of the tradesman advising some other make, MERELY because out of an inferior article he can obtain a much larger profit. We sell our Specialties at such a small amount of profit, that we cannot offer dealers a large discount that will favourably compete with goods of inferior manufacture. Our successful and immense business has been built entirely upon lowness of price and excellence of workmanship, and we intend adhering to it.

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Fig. 6A.



Fig. 7A.

Double Back Smoking Chair, plain or figured velvet, a most useful Posing Chair (Figs. 6A and 7A) ... .. £3 15 0

## ADAMS & CO.'S POSING CHAIR.



Fig. 10A.



Fig. 11A.

This is the latest and most useful chair for the operating room, as it comprises in one piece the chair for posing for bust pictures, together with an ornamental Arm Rest, or back, for figure posing. The Back Rest can be moved instantly up or down, forward or backward, at will. The seat revolves on an elevating screw, enabling the operator to get any desired height of seat as well as to turn his subjects at will. The semi-circular back is new and rich in design, adjustable, and unsurpassed in usefulness, and the whole constitutes just what is essential in every well-regulated studio.

Price, in Velveteen, £4 10s.

If wanted for bust posing only, we will deduct, for the large semi-circular arm, 17/6.

ALL GOODS AT LOWEST STORE PRICES.

## ADAMS & CO.'S STUDIO CHAIRS.

**T**HESSE are the very finest upholstered chairs obtainable. We are Determined to supply the very BEST goods only at the LOWEST prices. In plain crimson or figured velvet of any colour. These prices being so extremely low we have to make them nett cash.



No. 4a.—4 Backs, £7 5s.



No. 3a. £6.



No. 5a.—£6 10s.

ALL GOODS AT LOWEST STORE PRICES.

# ALBUMS FOR MOUNTING PHOTOGRAPHS.



Fig. 23A.



Fig. 24A.

Full-bound Russia, best quality, with padded covers, superior white or toned card leaves, linen joints, gilt edges, extra gilt finish, oblong or upright.

No.	No. of Leaves.	Size of Leaf.	Each.
6071a Demy 4to.	30	9½ × 7	17/6
6072a Medium 4to.	30	10½ × 8¼	21/-
6073a Royal 4to.	30	11½ × 9	25/-
6074a Imperial 4to.	30	14¼ × 10	32/6

NOTE.—All books are sent UPRIGHT if the shape is not mentioned on the order. The sizes given above are those of upright books only; oblong ones vary a little from these.

## SERIES No. 1a.

30 Toned Card Leaves, linen-jointed, half bound French morocco, gilt back, and lettered 'Scrap Book.'

No.	Size of Cover.	Each.
869a ...	9½ × 7	£0 3 0
870a ...	11½ × 9¼	0 3 6
871a ...	12½ × 10¼	0 4 0
872a ...	15 × 12	0 4 6
946a ...	19 × 14¼	0 9 0

## SERIES No. 2a.

30 Card Leaves in half real morocco, double linen-jointed, gilt edges and gilt fillets back and side.

No.	Size of Cover.	Each.
1008a ...	11½ × 9¼	£0 5 3
1009a ...	12½ × 10¼	0 7 0
1010a ...	15 × 12	0 8 3
1011a ...	19 × 14¼	0 12 6

## SERIES No. 51a.

Half-bound chequered Persian, cloth sides, superior white or toned card leaves, linen joints, gilt edges, extra gilt finish, oblong or upright.

No.	No. of Leaves.	Size of Leaf.	Each.
51a Demy 4to.	36	9½ × 7	7/-
52a Medium 4to.	36	10½ × 8¼	9/-
53a Royal 4to.	36	11½ × 9	10/-
54a Imperial 4to.	36	14¼ × 10	12/-
55a Atlas 4to.	36	16 × 11¼	18/-
56a Imperial folio	36	21 × 13¼	25/-



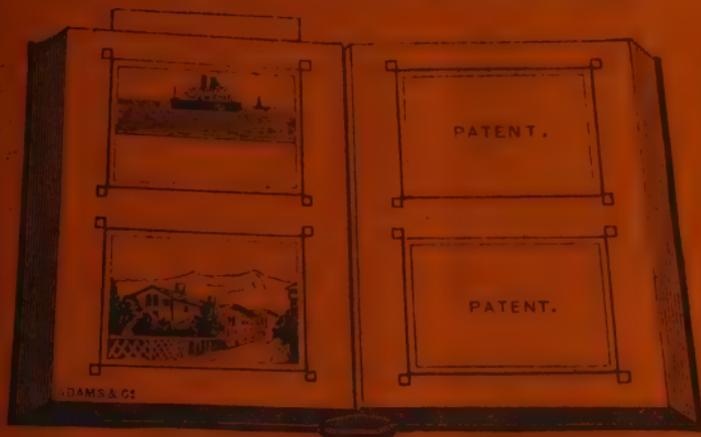
Fig. 25A.

ALL GOODS AT LOWEST STORE PRICES.

# ADAMS & CO.'S 'CLUB' ALBUMS AND MOUNTS.

*No more Trimming and Mounting.*

(For prices of Mounts see under 'Mounts.')



THESE ALB-  
ums entirely  
remove the  
unpleasant-  
ness connected  
with trim-  
ming and  
mounting  
photos in an  
ordinary al-  
bum. Tissues  
of chloride of  
silver papers  
they are es-  
pecially valu-  
able, as they  
obviate the  
only difficulty  
found with  
these beauti-  
ful printing  
processes.

Fig. 17A.

**Prints can be removed and re-arranged at will.**

No. 1, cloth series, blocked in real gold.

No. 7.	...	12	1/4-plate prints, one on a page	...	...	10d.	; postage, 3d.
" 10.	...	24	" " two "	...	...	1/2	" 3d.
" 11.	...	48	" " four "	...	...	2/-	" 4 1/2d.
" 8.	...	12	1/4 " one "	...	...	1/-	" 3d.
" 12.	...	12	Cabinet plate prints, one on a page	...	...	1/2	" 3d.
" 9.	...	12	1/4-plate prints, one on a page	...	...	1 6	" 3d.
" 21.	...	12	7x5 " "	...	...	1 10	" 4 1/2d.
" 13.	...	12	1/4-plate " "	...	...	2/-	" 4 1/2d.

No. 2 series. Handsomely bound with leather backs and corners and gold edges.

No. 1.	...	48	1/4-plate prints, one on a page	...	...	3/0	; postage, 4 1/2d.
" 2.	...	96	" " two "	...	...	5/-	" 6d.
" 3.	...	192	" " four "	...	...	7/6	" 6d.
" 4.	...	48	5x4 " one "	...	...	4/-	" 6d.
" 5.	...	48	1/4-plate " "	...	...	5/-	" 6d.
" 6.	...	48	" " " "	...	...	7/6	" 9d.
" 14.	...	48	Cabinet plate prints, one on a page	...	...	5/-	" 3d.
" 15.	...	48	1/4-plate prints, one on a page	...	...	7/-	" 4 1/2d.

**CONTINENTAL SIZES.**

No. 16.	...	48	1/2 prints, one on a page	...	...	5/-	; English postage, 3d.
" 17.	...	96	1/2 " two "	...	...	7/-	" 4 1/2d.
" 18.	...	48	1/3 " one "	...	...	7/-	" 4 1/2d.

**PLATE SUNK AND INDIA TINT.**

No. 19.	...	96	1/4-plate, two on a page	...	...	6/6	; postage, 4 1/2d.
" "	...	48	1/2 " one "	...	...	6/6	" 4 1/2d.

**ADAMS & Co** 21 ALDERSGATE S. CO. THE PATENT...  
 THE PATENT...  
 THE PATENT...  
**LONDON**

ALL GOODS AT LOWEST STORE PRICES.

**ADAMS & CO.'S "SPECIAL" BACKGROUNDS.**

These are a very special cheap line, and are as suitable for the amateur as the professional. They are well painted on canvas in distemper, and mounted upon rollers, and are only half the usual price. Size, 7 ft. 6 in. high, and 5 ft. wide, being suitable for busts or  $\frac{3}{4}$  lengths. Price 12/6 each net, or set of 9 for 10/6 each net.

No. 53B is a cloud vignette background, and should always be used when vignettes are required.



Fig. 51A.



Fig. 52A.



Fig. 53A.



Fig. 54A.

ALL GOODS AT LOWEST STORE PRICES.

These Backgrounds are really remarkable value.  
 12/6 only; ORIGINAL PRICE 27/6.



Fig. 55A.



Fig. 56A.



Fig. 57A.



Fig. 58A.

The reason the majority of amateurs fail at Portrait Photography is simply because they do not use a background.

Purchase one of the above and you will doubtless meet with immediate success.  
 Price 12/6 each net, or set of 9 for 10/6 each net.

ALL GOODS AT LOWEST STORE PRICES.



Figs. 39A to 44A, see page 257 for prices, &c.

ALL GOODS AT LOWEST STORE PRICES.



Figs. 45A to 50A, see page 257 for prices, &c.

ALL GOODS AT LOWEST STORE PRICES.

## ADAMS & CO.'S COMIC OR CARICATURE BACKGROUNDS.

**T**HESE are extremely popular in America and upon the Continent, and during holiday times and fairs are the means of bringing a great influx of trade. As will be seen below, we have introduced a series of copyright designs, which, whilst being humorous, are entirely free from even a semblance of vulgarity. We strongly recommend them for use by professional photographers, as they are a most decided novelty from a commercial point of view, and have never before been placed upon the market in this convenient form, as they enable comic effects to be obtained without any additional apparatus. A few assorted specimens in windows or show cases makes a most effective and remunerative advertisement. Fig. 59A shows the manner in which the backgrounds are used. It is merely necessary to hang a white sheet behind the sitter.



Fig. 59A.

Fig. 60A.

Fig. 61A.

Size 26 by 19, on stout white cardboard. Price **3/-** each;  
**2/6** each for 6.

Packed flat and sent post free for **1/-** each extra.

But if more than one is ordered, the extra postage will be but 3d.  
each beyond the 1s.

ALL GOODS AT LOWEST STORE PRICES.



Fig. 63A.



Fig. 64A.



Fig. 65A.



Fig. 66A.



Fig. 67A.



Fig. 68A.



Fig. 69A.



Fig. 70A.



Fig. 71A.

ALL GOODS AT LOWEST STORE PRICES.



BEST QUALITY PA PER BACKGROUNDS 8x5, 7/- each, or to order 8x6, 10/- ROLLERS, 6d.  
 These are bound top and bottom with strong calico to prevent tearing.

ALL GOODS AT LOWEST STORE PRICES.

# BACKGROUNDS.

HIGH-CLASS ARTISTIC BACKGROUNDS ON CANVAS, complete with Roller (Designs as pages 252 and 253, or to order).

	Plain Distemper.	Landscapes or Interiors, Distemper.	Flatted Oil.
8 ft. x 6 ft. ... ..	£0 15 0	£1 15 0	£2 0 0
8 ft. x 7 ft. ... ..	1 2 0	2 2 0	2 7 6
8 ft. x 8 ft. ... ..	1 8 0	2 6 6	2 15 6
9 ft. x 8½ ft. ... ..	1 14 0	2 10 6	3 0 0
10 ft. x 8½ ft. ... ..	1 18 6	2 18 6	3 10 0
12 ft. x 8½ ft. ... ..	2 10 0	3 12 6	4 10 9

Any design painted at same prices.

If fitted complete with roller, lath, and pulley, as Lantern Screen, 10 per cent. extra.

We strongly recommend them this way, as they require no special hanging, and are ready for immediate use.

A Book of Photographs will be sent upon a deposit of 10/- being paid us, which amount will be refunded (Less cost of postage, when an order is not placed).

## PAPER BACKGROUNDS.

Well-painted Popular Designs (see previous page).

These we can strongly recommend, as the paper is exceedingly strong, and stands up on rolled end, similar to linoleum. They are bound top and bottom with a wide band of strong tape, to prevent tearing. All designs on page 256 are kept in stock and can be despatched at once.

Interior or Exterior, 8 ft. x 6 ft., to order only ... ..	s. d.
Interior or Exterior, 8 ft. x 5 ft. ... ..	10 0
Side Slips, ditto 8 ft. x 2 ft. 6 in. ... ..	7 0
Rollers 6d. each extra.	4 0

## ADAMS & CO.'S

### CELEBRATED 'CHALLENGE' CLOTH BACKGROUNDS.

Can now be obtained up to 8 ft. wide. The cheapest and best Backgrounds in the world. See that each one is marked with our name, as many spurious imitations are offered which will not wash.

6 x 4 ft., on light deal roller ... ..	s. d.
6 x 5 ft., " " ... ..	3 6
8 x 6 ft., " " ... ..	4 6
8 x 7 ft., " " ... ..	7 0
8 x 8 ft., " " ... ..	9 0
8 x 8 ft., " " ... ..	11 0

In two tints, suitable for vignette and plain portrait work.

### ADAMS & CO.'S WOOLLEN CLOTH BACKGROUNDS.

Without crease, in two tints, 2/9 per foot run, 8 ft. wide. Any length cut. This is one of the most largely used plain Backgrounds in the market, and is the most serviceable of any. Does not become damaged, and is practically everlasting.

ALL GOODS AT LOWEST STORE PRICES.



**BORDER NEGATIVES.**

THE WHOLE OF THESE DESIGNS ARE OUR OWN COPYRIGHT.



Fig. 73A.



Fig. 74A.

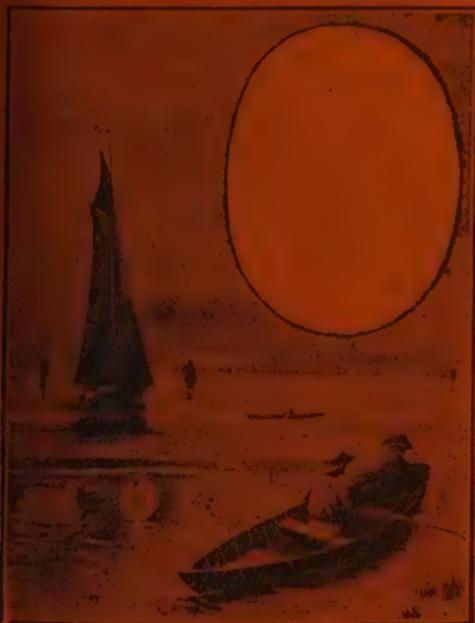


Fig. 75A.



Fig. 76A.

We have much pleasure in introducing a new series of really first-class Border Negatives. Each is sent out with the necessary spaces blocked out to print white. They enable a C.-D.-V. portrait to be used for a cabinet, and a cabinet for whole-plate. They are as artistic as they are useful, and as suitable for the amateur as the professional. Every photographer should make a display of them in his window and show-cases. It must be borne in mind that they are *negatives*, and that only *one* of each size is required. For prices, see next page.

ALL GOODS AT LOWEST STORE PRICES.

ALL DESIGNS ARE OUR OWN COPYRIGHT.



Fig. 77A.



Fig. 78A.



Fig. 79A.



Fig. 80A.

**PRICES.**

	C.-D.-V.	1/3-plate.	Cabt.	1/3-plate.	1/3-plate.
On Glass ... ..	1/3	1/3	2/-	2/-	3/- each.
On Celluloid ... ..	1/6	1/6	2/6	2/6	3/6 "

Postage 3d. extra. Fig. 77a is specially suitable for 'In Memoriam' purposes.

ALL GOODS AT LOWEST STORE PRICES.



**DEAL  
PLATE BOXES**  
For **STORING NEGATIVES,**  
with numbered grooves.

For Plates.	12 Grooves.	24 Grooves.	50 Grooves.	100 Grooves.
	s. d.	s. d.	s. d.	s. d.
3½ × 3½	1 0	1 4	1 8	3 4
4½ × 3½	0 8	1 0	1 1	3 0
5 × 4	0 9	1 4	1 2	2 4
6½ × 4½	1 1	1 8	2 0	4 0
8½ × 6½	1 6	2 8	2 10	6 0
10 × 8	2 4	3 3	3 6	7 0
12 × 10	3 0	3 10	4 1	8 2

The 3½ square are wide grooves for Lantern Slides.

**BOXES, LIGHT-TIGHT, FOR DRY PLATES.**

Of mahogany, slide lid, well made (Fig. 91A).



These are very best quality, and *really* light-tight.

Size.	12 Gr.	24 Gr.
4½ × 3½	s. d.	s. d.
5 × 4	4 6	5 0
6½ × 4½	5 0	6 3
7½ × 4½	6 6	7 3
7½ × 5	7 0	8 6
8½ × 6½		

Fig. 91A.



**JAPANNED TIN  
DRY-PLATE BOXES.**

Thirteen Grooves for Twelve Plates, with side clasps to secure the lid (Fig. 92A).

For Plates	s. d.
½-plates ... ..	1 1
5 × 4 ... ..	1 4
6½ × 4½ ... ..	1 6
7½ × 5 ... ..	3 0
8½ × 6½ ... ..	2 2
10 × 8 ... ..	3 7
12 × 10 ... ..	4 9
15 × 12 ... ..	6 9

Fig. 92A.

ALL GOODS AT LOWEST STORE PRICES.

# CHEAP PATENT PLATE BOXES.



Fig. 95A.

**PATENT PLATE BOXES, with patent metal grooves, cloth covered.**

For Plates	...	...	each	s.	d.	For Plates	...	...	...	s.	d.
$4\frac{1}{2} \times 3\frac{1}{2}$	...	...	each	0	5	$7\frac{1}{2} \times 5$	...	...	...	0	7
$4 \times 4$	...	...	„	0	6	$8\frac{1}{2} \times 6\frac{1}{2}$	...	...	...	0	8
$6\frac{1}{2} \times 4\frac{3}{4}$	...	...	„	0	6	$10 \times 8$	...	...	...	0	10
			12 x 10	...	...	each			11d.		

A special cloth-covered box with wide grooves, for holding 12 Lantern Slides,  $3\frac{1}{2} \times 3\frac{1}{4}$ , 6d. each.



Fig. 99A.

**STRONG MOUNTANT BRUSH, for Mounting Photographs, 6d. and 1s. each.**



Fig. 100A.

**DUSTING BRUSHES.** Best quality, Nickel-plated, and Polished Handle, Camel-hair, 2-inch, 9d.; 3-inch, 1s.; 4-inch, 1s. 4d.

## 25% SAVED.

Our Prices are Astonishingly Low!  
Just Compare them!!

ALL GOODS AT LOWEST STORE PRICES.

# BURNISHERS.

## ADAMS & CO.'S 'STAR' BURNISHER.



Fig. 101A.



Fig. 102A.

Fig. 101a, 5 in. ... ..	£0 7 6	Fig. 102a, 9 in. ... ..	£0 14 6
„ 102a, 6½ in. ....	0 11 0	„ 102a, 11 in. ....	1 0 0

Complete with lamp. Less 5 per cent. discount.

These are specially manufactured for us; and in cases where the very best quality are found to be too expensive we can strongly recommend these, as being the best value it is possible to obtain at the price.

## ADAMS & CO.'S 'CLUB' BURNISHER.



Fig. 104a.

The 'Club' is the most perfect and highest class burnisher manufactured. The bar is easily cleaned, and by raising the roller when it is being heated, prevents it getting hot and causing the cards to 'skid' through. Absolutely the best made.

For C.-D.-Vs. and Cabinets, gas or spirit lamp ...	£1 9 6
„ 9-inch Roller ... ..	1 11 6
„ 12-inch „ ... ..	2 2 0

Other sizes to order.

ALL GOODS AT LOWEST STORE PRICES.

## ADAMS & CO.'S BLOTTING BOOKS FOR DRYING PRINTS.

THE use of impure blotting paper is a prolific source of faded and yellow prints. The material used in these books is quite free from acids and other injurious chemicals, and may be used with safety.

There is an absence of loose fibre on the surface, which is smooth, and acts uniformly. The substance is extra thick and very absorbent.

No. 1.—	7×5	...	...	...	...	...	-/6; by post, -/7.
„ 2.—	9×7	...	...	...	...	...	-/9; „ -/10.
„ 3.—	12×10	...	...	...	...	...	1/6; „ 1/8.

## BOOKS FOR RECEIPTS.

Prices according to quantity, quality, and size. Estimates given.

RECEIPT and Order Book combined. Special Lithographed Receipt opposite each entry, which is perforated, and is easily detached, leaving the Day Book concise and complete. The simplest and best way of keeping books. Half bound, with 1200 forms, 30/-

## ADAMS & CO.'S PHOTOGRAPHER'S DAY-BOOK.

The most concise system possible. 250 pages, containing space for 2000 entries.  
Strongly bound in half red bazil. Price 16/-

No.	Name and Address	Style, Position, Vignette or Group, &c.	Quantity Cartes.	Quantity Cabinets.	Quantity Imperial, Panel, Enlargements, &c.	Quantity delivered, and when.	Amount paid.	Amount to pay.

## BOOK-POST WRAPPERS.

C.-D.-V., well made, cleanly finished, with name and address	... 16/- per 1000.
Cabinet	... 25/- „
C.-D.-V., best quality	... 18/- „
Cabinet	... 31/- „

With tape affixed, 2/6 per 1000 extra for C.-D.-V's.

„ „ 3/6 „ „ Cabinets.

Also kept in stock, printed, but without name and address, C.-D.-V's, 100, 1/9.  
Cabinets, 2/9.

*We pay particular attention to see that these are extra strongly gummed.*

# ALL PRICES WONDERFULLY LOW! EVERYTHING KEPT IN STOCK!!

# ADAMS & Co

71 ALDERSGATE S.E.C.  
FACING THE STATION  
20 CHARING CROSS R.W.C.  
(OPPOSITE THE CAMERA CLUB)  
CHURCHING CROSS E.N.E.

# LONDON

ALL GOODS AT LOWEST STORE PRICES.

## ADAMS & CO.'S 'CLUB' DEVELOPING AND PRINTING SET

A complete Outfit of best quality goods, packed in strong chest for travelling. All Chemicals are in stoppered bottles. Any article may be withdrawn and others substituted, if preferred.



Fitted with the undermentioned Accessories and Chemicals:—Tin Light-tight Box for 12 Plates, 2 Mahogany Printing Frames, 2 Celluloid Dishes, 1 Deep Porcelain Dish, 1 ditto for Hypo, Lamp, Scales and Weights, Focussing Cloth, Draining Rack, 2-drachm Measure, 6-oz. measure, 10 ozs. Negative Varnish, Pyro. Bottle and Pyro.,  $\frac{1}{2}$  lb. Ammonia,  $\frac{1}{2}$  lb. Sulphite Soda and Bottle,  $\frac{1}{2}$  lb. Acetate of Soda,  $\frac{1}{4}$  lb. Potassium Bromide, 2 16-oz. Stoppered Bottles, 1 lb. Hypo, 1 lb. Alum,  $\frac{1}{2}$  lb. Citric Acid, 4 ozs. Gold Solution, Sensitised Paper Box, 2 Packets Sensitised Paper, 2 doz. Plates, Mountant, 2 Brushes, 2 Vignette Glasses, Masks and Discs, 2 Cutting Shapes, Trimming Knife, Book of Instruction, Strong Chest (iron bound and polished) suitable for travelling.

The above in $\frac{1}{4}$ -plate size	...	...	...	...	£4 10 0
Ditto $5 \times 4$ ditto	...	...	...	...	5 0 0
Ditto $6\frac{1}{2} \times 4\frac{3}{4}$ or $7\frac{1}{2} \times 5$ ditto	...	...	...	...	5 10 0
Ditto $8\frac{1}{2} \times 6\frac{1}{2}$ ditto	...	...	...	...	6 6 0

LARGER SIZES MADE TO ORDER.

**NOTE.**—The above Prices are subject to 5% Discount for Cash with Order.

**FREE LESSONS AT EITHER OF OUR ESTABLISHMENTS.**

Use of Dark Room Free.

ALL GOODS AT LOWEST STORE PRICES,

# ADAMS & CO.'S 'CLUB' CAMERA.

Absolutely the lightest made. The perfection of Cameras.

*For Aluminium Prices see next page but one.*

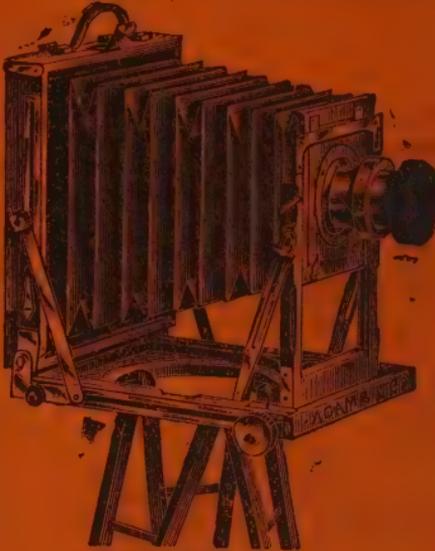


Fig. 105A.



Fig. 106A.

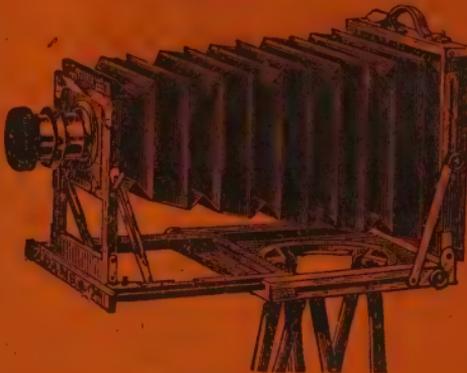


Fig. 107A.



Fig. 108A.

**A NEW, EXCEEDINGLY LIGHT AND PORTABLE TOURIST'S CAMERA,**  
 Made of very best quality and thoroughly well seasoned Spanish mahogany,  
 and is an exquisite piece of apparatus in every particular.

Fig 105A shows it erected on tripod in usual manner.

In Fig. 106A the back is brought up towards the front, for using short focus and wide-angle lenses.

Fig. 107A shows the baseboard extended, thus making the Camera of long focus.

Whilst Fig. 108A shows the Camera and Lens folded, for the purpose of being carried.

*For Complete 'Club' Outfits see next page but one.*

**ALL GOODS AT LOWEST STORE PRICES.**

## ADAMS & CO.'S 'CLUB' CAMERA (continued)

This is the lightest, most portable and compact Camera that is made. It is square, has reversing back, rising and falling front, and swinging motion to both back and front. The back part of Camera also slides up to the front, so as to be able to use wide-angle lenses, thus avoiding a projecting baseboard, which usually cuts off the angle of view. The Camera is of long focus, the back sliding in grooves, and the front being moved by rackwork adjustment. It is thoroughly strong and rigid, and suitable for all work. The dark slides are fitted with stop springs to the shutters. It has a revolving turntable which can be clamped at any point, and to which the threefold stand supplied can be affixed in a thoroughly simple manner.

**It is of far Superior Workmanship and Construction to apparently similar Cameras largely advertised.**

The *Amateur Photographer* of April 3rd, 1891, says:—

'The force of invention can surely go very little farther, for in the "Club" Camera we have as light and as elegant an instrument as any one can wish to handle.

'The one we examined, half-plate size, is the lightest and most compact Camera we have yet seen, and is very easily and quickly set up, and is provided with an arrangement so that wide-angle or long focus lenses can be used, and a turntable with special cam-lever locking arrangement which prevents any shifting when once the subject is arranged on the focussing screen.

'At the same time, the instrument is very firm and rigid, and is of first-class wood and workmanship, and we noted also that nearly all the working parts were of brass and metal worked on metal, thus ensuring perfect firmness and holding power.'

For particulars in Aluminium see next page.

The following prices are subject to **5 per cent discount** when cash companies order, and include 3 double backs, an extra front, a threefold tripod, and revolving turntable complete:—

Sizes in Inches.	Prices.	Extra Double Dark Slides.		Brass Binding.		Size of Camera.	Weight of Camera.		Extends.
		£ s. d.	£ s. d.	£ s. d.	£ s. d.		lbs. ozs.	inches.	
6½ × 4½	10 0 0	0 19 0	1 10 0	8½ × 8½ × 1½	3	0	16		
7½ × 5	11 0 0	1 2 6	1 10 0	9½ × 9½ × 1½	3	12	17½		
8½ × 6½	11 15 0	1 4 0	1 15 0	10½ × 10½ × 1½	4	6	19		
10 × 8	13 10 0	1 10 6	2 0 0	12½ × 12½ × 2½	5	10	22		
12 × 10	16 15 0	1 16 0	2 10 0	14½ × 14½ × 2½	8	12	27		
15 × 12	21 0 0	2 7 6	3 0 0	17½ × 17½ × 3	13	9	33		
18 × 16	30 0 0	3 6 6	4 0 0	21 × 21 × 3	19	0	37		
20 × 18	37 0 0	4 5 6	6 0 0	24 × 24 × 3½	26	0	43		
24 × 20	42 0 0	5 5 0	7 10 0	28½ × 28½ × 4½	33	0	50		

For Complete 'Club' Outfits see next page.

ALL GOODS AT LOWEST STORE PRICES.

# COMPLETE 'CLUB' OUTFITS.

Sizes	6½ × 4½	7½ × 5	8½ × 6½	10 × 8	12 × 10	15 × 12	18 × 16	20 × 18	24 × 20
'Club' Camera, 3 Double Dark Slides, Extra Front, Rotating Turntable and Tripod Stand	£ s. d. 10 0 0	£ s. d. 11 0 0	£ s. d. 11 15 0	£ s. d. 13 10 0	£ s. d. 16 15 0	£ s. d. 21 0 0	£ s. d. 30 0 0	£ s. d. 37 0 0	£ s. d. 48 0 0
'Club' R.R. Lens with Iris Diaphragm	£ s. d. 3 6 6	£ s. d. 3 6 6	£ s. d. 4 0 9	£ s. d. 5 0 0	£ s. d. 5 14 0	£ s. d. 7 12 0	£ s. d. 11 17 6	£ s. d. 25 13 0	£ s. d. 35 13 0
Solid Leather Case, with Spring Lock and Key	£ s. d. 1 7 6	£ s. d. 1 12 6	£ s. d. 1 17 6	£ s. d. 2 5 0	£ s. d. 2 10 0	£ s. d. 3 0 0	£ s. d. 4 5 0	£ s. d. 5 5 0	£ s. d. 6 10 0
Adams & Co.'s Adjustable Shutter, supplied for sizes to 1-plate. For larger sizes, Thornton-Pickard's Time & Instantaneous	£ s. d. 1 7 6	£ s. d. 1 7 6	£ s. d. 1 12 6	£ s. d. 1 5 0	£ s. d. 1 7 6	£ s. d. 1 12 6	£ s. d. 1 17 6	£ s. d. 2 2 6	£ s. d. 2 7 6
Extra for Brass Binding Camera and 3 Slides	£ s. d. 16 1 6	£ s. d. 17 6 6	£ s. d. 19 5 0	£ s. d. 22 0 0	£ s. d. 26 6 6	£ s. d. 33 4 6	£ s. d. 48 0 0	£ s. d. 70 0 6	£ s. d. 76 10 6
Outside Measurement of Camera	£ s. d. 1 10 0	£ s. d. 1 10 0	£ s. d. 1 15 0	£ s. d. 2 0 0	£ s. d. 2 10 0	£ s. d. 3 0 0	£ s. d. 4 0 0	£ s. d. 6 0 0	£ s. d. 7 10 0
Weight of Camera	£ s. d. 17 11 6	£ s. d. 18 16 6	£ s. d. 21 0 0	£ s. d. 24 0 0	£ s. d. 28 16 6	£ s. d. 36 4 6	£ s. d. 52 0 0	£ s. d. 76 0 6	£ s. d. 84 0 6
Extension of Bellows	£ s. d. 8½ × 8½ × 1½ 3 lbs. 12 ozs. 16 ins.	£ s. d. 9½ × 9½ × 1½ 3 lbs. 12 ozs. 17½ ins.	£ s. d. 10½ × 10½ × 1½ 4 lbs. 6 ozs. 19 ins.	£ s. d. 12½ × 12½ × 1½ 5 lbs. 10 ozs. 22 ins.	£ s. d. 14½ × 14½ × 2½ 8 lbs. 12 ozs. 27 ins.	£ s. d. 17½ × 17½ × 3 13 lbs. 9 ozs. 33 ins.	£ s. d. 21 × 21 × 3 19 lbs. 37 ins.	£ s. d. 24 × 24 × 3½ 26 lbs. 43 ins.	£ s. d. 28½ × 28½ × 4½ 33 lbs. 50 ins.

This is the very best quality Outfit it is possible to buy, and is the most portable and compact.

Any of the above items may be had separately from the set at the prices quoted, or other Lenses and Shutters substituted at difference in price. The above prices are subject to 5 per cent. discount for cash with order.

## EXTRA COST FOR ALUMINIUM. Saving about ONE-FOURTH the Weight.

Sizes	6½ × 4½	7½ × 5	8½ × 6½	10 × 8	12 × 10	15 × 12
Full Aluminium Fittings, including Turntable	£ s. d. 3 0 0	£ s. d. 3 0 0	£ s. d. 3 10 0	£ s. d. 4 0 0	£ s. d. 5 0 0	£ s. d. 6 0 0
'Club' R.R. Lens, mounted in Aluminium and Iris Diaphragm, extra	£ s. d. 1 8 0	£ s. d. 1 8 0	£ s. d. 1 14 0	£ s. d. 2 2 0	£ s. d. 2 8 0	£ s. d. 3 4 0



# ADAMS & CO.'S 'ROYAL' CAMERA.



Fig. 110A.



Fig. 111A.

This Camera is built on the same lines as our celebrated 'Club' Camera, and possesses exactly the same movements that that well-known instrument does. Not being quite so light, we have been enabled to construct it at a considerably lower price.

It is made of the best Honduras Mahogany that we have been able to procure, and is square with reversing and swing back, also rising, falling, and swing front. The back portion slides in grooves up towards the front, thus enabling lenses of the widest angle to be used without the view being cut off by a projecting base board, which is frequently the case with cameras of this form. It has plumb indicator on the back, and is of long focus. We can thoroughly recommend this as being an instrument of the highest class.

Price for $\frac{1}{2}$ -plate Camera as above, with 3 double dark slides only	...	...	£6	0	0
Do. do. $8\frac{1}{2} \times 6\frac{1}{2}$	...	...	7	10	0
Price for $\frac{1}{2}$ -plate Camera as above, with 3 double dark slides, revolving turn- table, and 3-fold best quality tripod	...	...	7	10	0
Do. do. $8\frac{1}{2} \times 6\frac{1}{2}$	...	...	9	0	0
Extra double dark slides, $\frac{1}{2}$ -plate, 17/-; $\frac{1}{4}$ -plate, 22/- each.					
<b>Cash Discount, 5 per cent.</b>					

The success of this Camera has led to numerous imitations, of which purchasers should beware.

Free Lessons at either of our Establishments.  
Use of Dark Room Free.

**WE ARE THE LARGEST FIRM OF PHOTO DEALERS AND  
MANUFACTURERS EXTANT.**

ALL GOODS AT LOWEST STORE PRICES.

# ADAMS & CO.'S UNIVERSAL STUDIO CAMERA.



Fig. 118A.

**T**HIS Camera is the most useful Studio Camera extant. It has bellows body, extending in front by sliding and at back by rack and pinion or endless screw, at small addition in cost, so that it has sufficient range to allow of it being used for the longest or shortest focus lens, and it may be used also for copying. It has swinging back, and takes the size plates quoted either way, horizontal or vertical. Made in well-seasoned mahogany, leather bellows body, and of very best workmanship.

With one of these Cameras alone all the work of an ordinary studio may be done, and with much greater convenience than where two or three different Cameras are employed, the trouble of changing one size Camera for another being avoided.

The focussing arrangement may be by endless screw instead of rack and pinion, if preferred, at small extra charge.

Included with each Camera is one single slide and one inner frame, but double slides may be substituted, if preferred, at the difference in cost.

The following Prices are subject to 5 per cent. Discount  
For Cash with Order:—

For Plates.	In Honduras Mahogany.	In best Spanish Mahogany.	Double Swing Back Extra.
6½ in. sq. 6½ × 4½ in. ... ..	£5 0 0 ... ..	£6 10 0 ... ..	17/-
8½ " " 8½ × 6½ " " ... ..	6 6 0 ... ..	7 12 6 ... ..	17/-
9 " " 9 × 7 " " ... ..	7 7 0 ... ..	9 10 0 ... ..	17/-
10 " " 10 × 8 " " ... ..	8 10 0 ... ..	10 0 0 ... ..	17/-
12 " " 12 × 10 " " ... ..	11 0 0 ... ..	13 0 0 ... ..	17/-

The 6½ × 4½ may be used for either two Cartes-de-Visites on one plate 6½ × 4½, or one single picture on any size up to and including 6½ × 4½, focus from 4½ to 18 in.

The 8½ × 6½ will take two Cabinets on 8½ × 6½, and two Cartes-de-Visite on 6½ × 4½, or one picture on any size up to and including 8½ × 6½, length of focus from 5½ in. to 22 in.

The 9 × 7, for either two Cabinets or two Cartes-de-Visite, with Carriers for 8½ × 6½ and 6½ × 4½, focus from 5½ in. to 22 in.

The 10 × 8, for two Boudoir Portraits, two Cabinets, or two Cartes-de-Visite, with carriers for 8½ × 6½ and 6½ × 4½, focus from 6 to 24 in.

The 12 × 10, with carriers 10 × 8 and 8½ × 6½.

ALL GOODS AT LOWEST STORE PRICES.

# CAMERAS.

## ADAMS & CO.'S IMPROVED LONG-FOCUS 'CHALLENGE' CAMERA.



Fig. 114A.



Fig. 115A.

Our own Manufacture, and of Highest Quality and Workmanship.

**T**HIS is the best Square Camera with the latest useful improvements, and will meet every requirement of Tourist and Landscape Photographers. Is made of finest seasoned Mahogany, best Leather Bellows, Double Swing Back, Hinged Focussing Frame, Rack and Pinion Adjustment for Focussing, three Double Backs with improved Folding Shutters, two Inner Frames for smaller plates, Side Wing, Double Action Front, and extra Front, with Reversing Back, for taking Pictures either way without removing Camera. Has Double Extension to Focus, giving very long range; Double Swing Back, Rising and Falling Front. The Dark Slides, Fronts, Clamping Screws, and Nuts made to standard gauges, so as to be interchangeable in the various sizes, while extra ones can at any time be supplied without the necessity of sending Camera to fit them. This model is probably the most practically useful, all-round Camera ever designed, and the demand for it increases steadily. Made only in very highest quality and workmanship, is exceedingly simple in design, can be easily set up and taken down, and is perfectly rigid and steady when in use. After the Camera has been drawn out to its fullest extent and clamped, it can then, by means of screw or rack adjustment, be extended two-thirds of the length of the base-board more. The Dark Slides are of the latest pattern, and are numbered and fitted with hinged metal shutters; is made square.

PRICES INCLUDE THREE DOUBLE DARK SLIDES AND AN  
EXTRA FRONT.

5 per cent. Discount for Cash with Order.

For Plates	Extra Double Backs.	Brass Binding.	Extends to	Closes to
4 $\frac{1}{2}$ × 3 $\frac{1}{4}$ .....	£5 10 0 ...	£0 12 6 ...	£1 0 0 ... 12 inches ...	6 $\frac{1}{2}$ × 7 $\frac{1}{2}$ × 3 $\frac{1}{4}$
6 $\frac{1}{2}$ × 4 $\frac{1}{4}$ .....	7 10 0 ...	0 17 0 ...	1 3 0 ... 18 " ...	8 $\frac{1}{2}$ × 10 $\frac{1}{4}$ × 3 $\frac{1}{4}$
7 $\frac{1}{2}$ × 5 .....	8 0 0 ...	0 19 6 ...	1 5 0 ... 19 " ...	—
8 $\frac{1}{2}$ × 6 $\frac{1}{2}$ .....	9 0 0 ...	1 2 0 ...	1 10 0 ... 21 " ...	11 × 11 $\frac{1}{4}$ × 4 $\frac{1}{4}$
10 × 8 .....	10 10 0 ...	1 5 0 ...	1 15 0 ... 24 " ...	12 $\frac{1}{2}$ × 13 $\frac{1}{4}$ × 4 $\frac{1}{4}$
12 × 10 .....	13 0 0 ...	1 12 0 ...	2 0 0 ... 28 " ...	15 $\frac{1}{2}$ × 16 $\frac{1}{4}$ × 5 $\frac{1}{4}$
15 × 12 .....	16 16 0 ...	2 2 0 ...	2 10 0 ... 34 " ...	17 $\frac{1}{4}$ × 18 $\frac{1}{4}$ × 6 $\frac{1}{4}$

*These are outside sizes, over all screws.*

This form of Camera is also made short focus, prices being about 10 per cent. less than above. For full particulars see Annual (400 pages, 550 illustrations), 6d., post free, 1s.

ALL GOODS AT LOWEST STORE PRICES.

# COMPLETE 'CHALLENGE' OUTFITS.

	4½ × 3½	5 × 4	6½ × 4½	7½ × 5	8½ × 6½	10 × 8	12 × 10	15 × 12	18 × 16
'Challenge' Camera, three double slides and extra front ... ..	£ s. d. 5 10 0	£ s. d. 6 10 0	£ s. d. 7 10 0	£ s. d. 8 0 0	£ s. d. 9 0 0	£ s. d. 10 10 0	£ s. d. 13 0 0	£ s. d. 16 16 0	£ s. d. 25 0 0
'Club' Rapid Rectilinear Lens with Iris Diaphragm ... ..	2 7 6	2 7 6	3 6 6	3 6 6	4 0 9	5 0 0	5 14 0	7 12 0	11 17 6
Solid Leather Case, with spring lock and key (best quality) ... ..	1 2 6	1 5 0	1 10 0	1 12 6	1 17 6	2 7 6	3 17 6	5 5 0	6 15 0
Improved Folding Tripod Stand ... ..	0 15 6	0 15 6	0 15 6	0 15 6	0 18 6	1 2 6	1 5 0	1 15 0	2 10 0
Adams & Co.'s Adjustable Shutter supplied on all sizes to f-plate, and Thornton-Pickard Time and Instantaneous Shutter for larger sizes ... ..	1 5 0	1 5 0	1 7 6	1 7 6	1 12 6	1 6 0	1 7 6	1 12 6	1 17 6
Extra for Brass Binding Camera and three slides ... ..	11 0 6	12 3 0	14 9 6	15 2 0	17 9 3	20 5 0	25 4 0	33 0 6	48 0 0
Extra for fitting with repeating back to take two pictures on one plate, as fitted to our 'Universal Camera' ... ..	1 0 0	1 2 0	1 3 0	1 5 0	1 10 0	1 15 0	2 0 0	2 10 0	3 15 0
Size of Camera when closed. These are outside measurements over all screws... ..	6½ × 7½ × 3½ 12 ins.	7½ × 8½ × 3½ 14 ins.	8½ × 10½ × 3½ 19 ins.	10 × 11 × 4½ 19 ins.	11 × 11½ × 4½ 21 ins.	12½ × 13½ × 4½ 24 ins.	15½ × 16½ × 5½ 28 ins.	17½ × 18½ × 6½ 34 ins.	22 × 24 × 8½ 42 ins.
Extension of Bellows ... ..									

In two cases.

This is an excellent outfit, and is fully 25 per cent below any other house.

Any of the above items may be had separately from the set at the prices quoted, and in the case of Lens and Stand, any other maker may be selected, and price will be quoted accordingly. The above Camera is long focus, but short focus (as page 170) can be supplied at difference in price. FOR PRICES OF EXTRA DARK SLIDES AND IN-SECT CARTRIDGES, see pages 178 and 210.

The above prices are subject to 5 per cent Discount for Cash with order.

## IMPORTANT NOTICE.

**M**ESSRS. LANCASTER & SON have NO Branch Establishment in LONDON and all advertisements leading the public to believe to the contrary, are entirely MISLEADING.

MESSRS. ADAMS & CO. ARE LONDON AGENTS,

And keep all their leading goods in stock, selling them at the LOWEST prices at which they are obtainable.

**WE ALSO PAY CARRIAGE** on Messrs. Lancaster's Goods on all orders of 45/- and upwards, anywhere in the United Kingdom. It is far better to buy direct from us as we only sell the very **LATEST** patterns, and **CAREFULLY EXAMINE** all articles before they are sent out. No old stock.

**ALL LANCASTER'S GOODS IN STOCK SENT OFF PER RETURN**

### THE LE MÉRITOIRE PATENT.

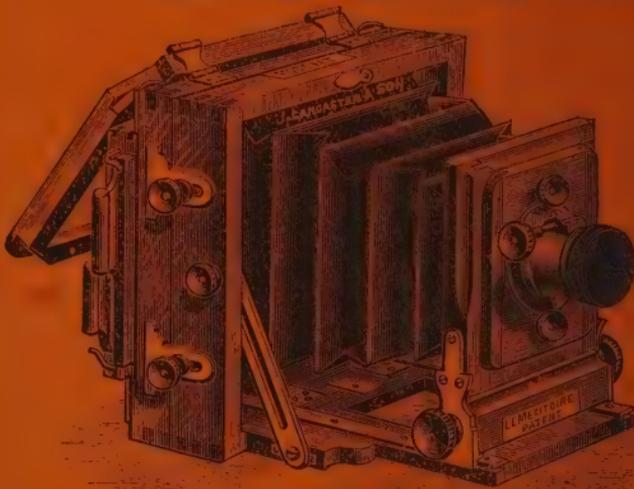


Fig. 121A

1/4-Plate,

£1 10 0

1/2-Plate,

£3 0 0

1 Plate,

£4 5 6

10×8,

£5 14 0

12×10

£7 2 6

15×12

£8 1 6

EXTRA SLIDES.

1/4 1/2 1  
5/3 10/0 17/2

**A** NEW CAMERA with Reversing Back, and will take pictures either way without removing any portion. The Tail Board folds up inside the Camera, and forms a most compact apparatus, without any loose screws or parts. The Lens is a Meniscus Achromatic one, mounted in Rackwork, giving excellent depth, and covering the plate all over from corner to corner. It also has a Double Swing Back, and Universal Moving Front, moving in a horizontal, oblique, or vertical direction. The Stand is of Mahogany, with Brass Top.

We allow 5 per cent off all Lancaster's Advertised Prices.

ALL GOODS AT LOWEST STORE PRICES.

**LANCASTER'S CAMERAS.**  
**THE 1894 INSTANTOGRAPH PATENT.**



**LANCASTER'S  
GOODS  
AT VERY  
LOWEST  
PRICES.**

1/4 Plate ... ..	£1 19 10	1/4 Plate ... ..	£5 19 9	12x10 ... ..	£9 19 8
1/2 " ... ..	3 19 0	10x8 ... ..	7 19 8	15x12 ... ..	11 19 8

The INSTANTOGRAPH has been constructed to give every possible motion with the least bulk and weight. It has leather Bellows, double Swing Back, Reversing Back, Rising and Cross Front, Swing Front, Rack Adjustment, best Instantaneous Lens, with Patent Shutter and Adjustable Diaphragm, with Divided and Engraved Scale, best Mahogany Stand, &c.

EXTRA SLIDES	{	Double Dry Slides ...	7/2	11/11	19/0	10x8	12x10	15x12
		Carriers ... ..	—	1/6	2/6	3/0	3/0	4/0

**THE SPECIAL BRASS BOUND INSTANTOGRAPH PATENT.**



Fig. 124A.

The Camera is of best quality and finish, brass bound, double Swing, Folding Tail-board, Patent Bellows, square and taper, best Lens with Patent See-Saw Shutter.

**EACH SET CONSISTS OF  
CAMERA, SLIDE, LENS, AND  
STAND.**

1/4 Plate ... ..	£2 7 6
1/2 " ... ..	4 15 0
1 " ... ..	7 2 6
10x8 Plate ... ..	8 19 7
12x10 " ... ..	10 19 6
15x12 " ... ..	12 19 6

**WITH RECTIGRAPH LENS AND SEE-SAW SHUTTER IN PLACE OF INSTANTOGRAPH  
LENS AND SHUTTER.**

1/4 plate ... ..	£3 9 0	1/4 plate ... ..	£9 7 9	12x10 plate ... ..	£14 10 0
1/2 " ... ..	6 10 9	10x8 plate ... ..	11 14 3	15x12 " ... ..	17 9 8
<b>EXTRA SLIDES, BRASS BOUND.</b>					
1/4 plate ... ..	£0 9 1	1/4 plate ... ..	£1 1 5	12x10 plate ... ..	£2 0 0
1/2 " ... ..	0 13 10	10x8 plate ... ..	1 8 6	15x12 " ... ..	2 7 6

**ALL GOODS AT LOWEST STORE PRICES.**

# ADAMS & CO.'S 'VESTA' POCKET HAND CAMERA

(PATENT APPLIED FOR).

A Folding Hand Camera for  $4\frac{1}{4} \times 3\frac{1}{4}$  Plates that may be carried in the Pocket, complete with Dark Slide, Lens, Shutter, Focussing Screen, and Reversible Finder.

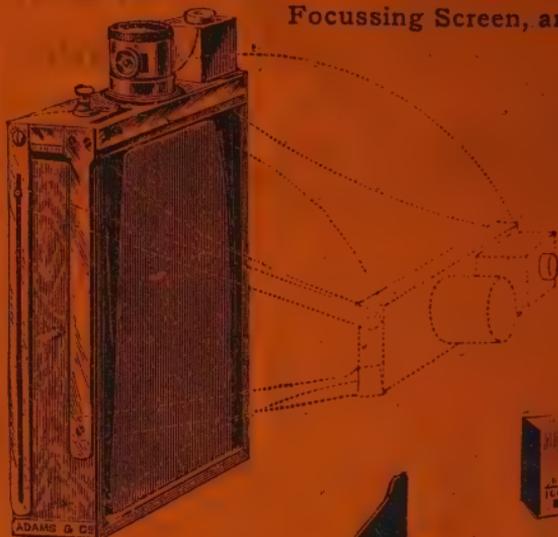


Fig. 2.—Closed for pocket.  
Dotted lines show method of opening.

BEWARE OF  
INFERIOR  
IMITATIONS.



Fig. 1.

**T**HIS beautiful little instrument has been specially designed for portability. It only weighs 1 lb., and is so small that it will easily go into the Pocket, nevertheless, it has all the essential points of a first-class Field Camera, viz.:—



Fig. 3.—Open for use.

1. *Lens*, by Wray,  $5\frac{1}{2}$ -in. focus, with Iris Diaphragms (C Fig. 1). Similar cameras have loose stops only. It can be focussed from

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**'VESTA' POCKET HAND CAMERA** (Continued).

$2\frac{1}{2}$  yards to infinity, the distances being engraved on the lens by its maker, thus the focussing is bound to be absolutely correct.

2. **Shutter.** Fitted with a specially designed shutter, opening and closing to the centre with Hill & Adams' Patent Pneumatic Regulation, capable of giving exposures varying from  $\frac{1}{125}$ -th to 1 second, shown on an index; also time exposures of any duration. The Shutter is set by turning the knob on front (B) and released by pressing the spring (A Fig 1). It is constructed entirely of metal. Similar cameras have long rod projecting when shutter is set, thus shutter must be released even if no picture is taken, before putting away.

3. **Setting Camera.**—The method adopted is absolutely new. The Camera completely sets itself. The bellows are always attached to the front, and it is merely necessary to take hold of the lens and pull it forward—THAT'S ALL!! Cameras which are somewhat in appearance like the 'VESTA' are very faulty in this respect, the bellows being separate and require very awkward and troublesome fitting up every time they are used. They are NEVER ready, whilst the 'VESTA' is ALWAYS ready for use.

4. **Finder,** on a swivel joint, which may be used for both vertical and horizontal pictures. This is fitted with a folding hood.

5. **Dark Slides.**—Three double dark slides, very small, with ebonite shutters, of specially light construction, and draw out ebonite shutters, and well finished. The Camera is arranged to carry one of these *always in position*, and its bulk, *open or closed, is not increased thereby.*

6. **Focussing Screen,** *always in the Camera*, and arranged to spring into register on removal of the Dark Slide.

7. **Swing Back** allowing architectural subjects to be taken without distortion.

**General Description of the Apparatus.**—The complete Camera measures, when closed, about  $7\frac{3}{4} \times 4\frac{1}{2} \times 1\frac{1}{2}$  in., and weighs 1 lb. It is specially manufactured throughout of the finest London workmanship and finish. The mechanical arrangements and general construction are the results of many costly experiments, the design ensuring perfect rigidity when the Camera is set up for use. In fact, the 'Vesta' may be rightly described as the smallest, and, at the same time, the most complete Camera yet introduced.

As all the working parts are of metal, the camera is suitable for use in any climate. All our Hand Cameras are specially constructed for hot or damp climates.

Complete, in Collapsible Morocco Case, with three  
Double Dark Slides, £7 7s. net.

Extra Slides 7s. 6d. Cases and Straps for 2 or 3 slides 5s.;  
6 slides 6s.

# THE 1894 'ADAMS' HAND CAMERA.

(FULLY PROTECTED BY NUMEROUS PATENTS.)

The highest class and most perfect Hand Camera it is possible to buy, it being the most sensibly and scientifically constructed apparatus at present made. It is extremely simple in construction, thoroughly reliable in quality and most exquisite in finish.



Fig. 141A.—Showing Camera used on a Tripod, with object being focussed upon the focussing screen; also showing rising front and swing back in use.

Among its chief and unique features are the following:—

- 1st.—It takes 12 plates, or 24 cut films. Fitted with Roll-holder, 48 films.
- 2nd.—Ross' Lens on  $\frac{1}{2}$  and  $5 \times 4$  sizes; Zeiss on  $\frac{1}{3}$ -plate.
- 3rd.—Specially constructed Shutter. (See Shutter for advantages.)
- 4th.—Hill & Adams' patent pneumatic regulation, hermetically sealed.
- 5th.—An entirely new reliable and smooth working Changing-box.
- 6th.—Rising and cross front for both vertical and horizontal pictures.
- 7th.—Its extremely small size, measuring when closed about 6 inches square only, and when in use the length is only increased by 4 inches.
- 8th.—Boxes of plates or films are interchangeable in daylight.
- 9th.—Can be used as an ordinary Field Camera; objects being focussed on the focussing screen.
- 10th.—Focussing done by rack and pinion to ensure accuracy.
- 11th.—Lens and Finders all can be got at for cleaning.
- 12th.—Its extreme lightness, weighing only about 5 lbs., complete with everything except plates, which weigh about 1 lb. (Films very much lighter.)
- 13th.—Its unobtrusiveness, as when closed no lens aperture even is visible.
- 14th.—It has a double swing back for both vertical and horizontal pictures.
- 15th.—Is specially constructed for hard wear and foreign work, and may be thoroughly relied upon to stand any climate.

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### THE 1894 'ADAMS' HAND CAMERA (*continued*).

- 16th.—Two Finders for vertical and horizontal pictures: containing good Lenses giving clear definition. These Finders are accurately marked.
- 17th.—It can also be fitted with pneumatic release and levels for use for both vertical and horizontal pictures.  $\frac{1}{2}$ -plate has pneumatic release.
- 18th.—Every scale specially marked and engraved for each camera, thus ensuring perfect accuracy.
- 19th.—Is specially suitable for cycling, being dust tight, and rides noiselessly.
- 20th.—All scales and speeds are separately engraved for each camera. We guarantee exactness.



Fig. 142A. — Showing Camera closed.



Fig. 143A. — Showing Camera open for use as an ordinary Hand Camera.

**T**HIS Camera is placed upon the market to meet the growing demand for a really High-class Instrument, and one that is capable of producing work of the highest excellence. In portability it surpasses everything previously produced, yet no point has been sacrificed to obtain this result. It has been designed at very great expense, and is the result of considerable study and many experiments. Each point has been most carefully studied, and special attention has been paid to the wants expressed by our foremost Hand Camera workers. It is the only Hand Camera made that will conveniently take either Roll-holder, Cut Films, or ordinary Dry Plates. It is suitable for the very quickest of Instantaneous Work, Portraiture, Groups, Landscape, or Architecture.

**LENS.**—This is a Ross' 5×4 Rapid Symmetrical of 5½ in. equivalent focus, which is specially selected by Messrs. Ross & Co. for our purpose. The  $\frac{1}{2}$ -plate size is fitted with a No. 4 ZEISS ANASTIGMAT, Series 3. When fitted on the 'Adams' Camera it is placed on a special mount, containing Iris Diaphragm, in connexion with the Shutter, but the original lens-tube, flange, and stops are supplied, so that it may be used on any other camera; the Lens is therefore removable for cleaning purposes.

**SHUTTER.**—This is a very special feature connected with this Camera, and, as it is well known that most Hand Cameras are defective on this point, special attention has been given to get the most perfect Shutter for this purpose. It is fitted with Hill & Adams' latest Patent Pneumatic Regulation, thus any exposure between  $\frac{1}{100}$  and 1 sec. may be given with certainty by merely setting the Indicator at the required speed. Prolonged exposure of any duration can also be given. Another advantage is that it is entirely unaffected by damp, heat, or other climatic influences. It works in the diaphragm slot and opens from and closes to the centre, thus giving 80 per cent. of light. A Shutter going across gives 50 per cent. only. Thus a quicker exposure may be given, and the plate will be as well exposed as when a much slower exposure is made in an ordinary Camera.

**FILMS.**—The Camera is so constructed as to allow of the fitting of an Eastman Roll-holder without alteration, except to the Roll-holder itself. It also takes 24 Cut Films. During exposure the Films are held on four sides.

**FOUSSING.**—The Camera is made to focus from two yards to infinity, and is accurately marked to various distances between, and can be set to work as a fixed focus Camera if desired. A focussing screen is supplied, so that it may be fixed on to a stand, and thus used as an ordinary Camera, and is so arranged as to entirely dispense with a focussing cloth. The focussing is done by rack and pinion, and not by the usual cumbrous method of sliding the camera in and out. The rack and pinion also secures rapid and correct focussing, and is not liable to shift as other methods are.

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## THE 1894-95 'ADAMS' HAND CAMERA (*continued*).

**CHANGING PLATES.**—This is effected in an extremely simple manner. A small Changing-box (Fig 144A), which holds twelve plates or twenty-four films, is contained in the Camera (Fig. 145A), and when a plate has to be changed it is merely necessary to raise the lever, which lifts the plate about one inch into the Changing-bag (Fig. 146A); this is then raised and placed at the back of the series of plates.



Fig. 144A. - Showing Changing-box with Lifter and Front Removable Shutter.

The box is also fitted with a patent stop automatic indicator, showing the number of plates exposed, and also automatically stops each 12th plate, thus entirely preventing the risk of exposing the same plate twice. Previous to recent legal action, many worthless imitations of this patent were placed upon the market, the defective construction of which is answerable for a considerable amount of prejudice against this method of changing. By suitably shaping the Bag the main difficulty has been entirely overcome, and the plates can be changed expeditiously and easily. The Bag is so shaped as to allow the plate to be lifted quite clear of the sides of the Bag, which fall away and do not entangle the plate, as is the case with all other makes, and which must be seen to be thoroughly appreciated. The whole of this changing apparatus has been thoroughly tested, and can be confidently recommended. The Box itself is detachable (Fig 144A), and when the dozen plates or 24 films are exposed, it can be removed and another Box substituted in the open field. Therefore, if six of these small Boxes are carried, six dozen plates may be exposed without either tent or dark-room. It is unnecessary to expatiate upon the many merits possessed by this system.

It will be noticed that our Plates and Films lift from the front; this has several advantages over lifting from the back, as it ensures the certain raising of the plate, whilst many failures arise from back lifting, owing to the variation of the plates in thickness. If the dozen plates happen to be thin, the last one cannot get upon the lifter, and travelling springs very soon become useless, as they naturally lose their power. The front plate must always come to position, and the lifter need not be made variable. Another great disadvantage of back lifting is that the exposed plates go to the front—thus, if only 2 or 3 are exposed, the whole of the other plates have to be lifted out each time to develop. The plates are thus sure to get dusty and finger marked, as it is not always that the whole 12 plates get exposed and developed together.

The leather used in our Changing-boxes is specially made for our own use alone, and is far more expensive, and of better quality than that used by any other maker. It is also specially dressed inside in order that no dust may be created inside the bag.

**FINDERS.**—There are two Finders, one showing the horizontal picture and the other the vertical, and adjusted to each Camera by actual trial, thus ensuring the resulting picture on the plate to contain the same amount of view as seen in the Finder. These are easily got at from the outside for cleaning and removing dust. Good Lenses are used, bright clear pictures being the result.

**RISING FRONTS.**—There are rising and cross fronts for both vertical and horizontal pictures; this feature is a most important one in a high-class Hand Camera. It enables the operator to cut off that objectionable amount of foreground which spoils so much otherwise first-class Hand Camera work. Usually in taking an object, say from one side of the street, more than half the picture is composed of roadway and the house or other object high up on the plate. All this is prevented by our cross fronts.

**SWING BACK.**—In a first-class Hand Camera, and one that is required for good all-round work, a swing back is absolutely essential, and it must be borne in mind that we provide in the 'Adams' Camera a double swing back for both vertical and horizontal pictures. This Camera can therefore be used for all and every kind of work. The swing back ensures straight lines in interiors and all kinds of architecture, as well as ensuring the perpendicularity of high buildings, cathedrals, &c.

## THE 1894-95 'ADAMS' HAND CAMERA (continued).



Fig. 145A.—Shows top of Camera open, with Changing-box.



Fig. 146A.—Showing a Plate being changed.

**GENERAL REMARKS.**—Every small point has been carefully considered in the construction of this Camera. The Sheaths used are patented, and bring either Plates or Films accurately into focus without regard to the thickness. A Tablet is provided, as will be seen in Fig 145A, for making notes of the exposures. It is fitted with two bushes and screw for use on a tripod stand. Exposures may be made by means of a cap when desired. It is covered in real morocco leather, is exquisitely finished, and every part is of the very highest quality and workmanship. Every part can be got at for cleaning.

The complete Instrument is enclosed in a handsome cloth-lined, solid leather case, with nickel spring lock and sling strap. Size of  $\frac{1}{2}$ -plate closed,  $7\frac{1}{2} \times 5\frac{1}{2} \times 6\frac{1}{2}$ ; open,  $10 \times 5\frac{1}{2} \times 6\frac{1}{2}$ . Weight, complete with Changing-box, about 5 lbs. only.  $4\frac{1}{2} \times 3\frac{1}{2}$ , complete in Case, with Changing-box and 12 Sheaths (either for Plates or Films. If more than 12 sheaths are required they are extra).

#### FIFTEEN GUINEAS NET CASH.

Extra Changing-boxes, 45/- net. Sheaths, 3/- per dozen; or made of Aluminium, 6/- per dozen.

Roll-holder and Fitting, 47/6 net. Size of  $5 \times 4$  closed,  $7\frac{1}{2} \times 6\frac{1}{2} \times 7$ ; open,  $10 \times 6\frac{1}{2} \times 7$ . Weight, complete with Changing-box, about  $5\frac{1}{2}$  lbs.

#### 5x4 ditto, EIGHTEEN GUINEAS NET CASH.

Extra Changing-boxes, 55/- net. Sheaths, 4/- per dozen; or made of Aluminium, 8/- per dozen. Roll-holder and Fitting, 52/6 net.

#### HALF-PLATE ZEISS LENS, TWENTY-THREE POUNDS NET.

Extra Changing-boxes, 72/6 net. Sheaths, 7/6 per dozen (12 are supplied free); or in Aluminium, 15/- per dozen. Roll-holder and Fitting, 60/-.

As very few people require the following additions, they are not fitted unless required, but are supplied as extras:—

Pneumatic Release for Shutter, 7/6. Two Levels, correctly and neatly fitted, 7/6.

'LIGHTNING' Tripod, specially fitted for use with the 'Adams' Camera, 21/6 net.

For the  $5 \times 4$  size we prefer to recommend the larger one at 30/- net.

We can strongly recommend this Camera for Foreign and Colonial work with every confidence, as the working parts are of Metal, and the Mahogany used is of picked quality, and is thoroughly well clamped wherever it is possible to do so.

ALL GOODS AT LOWEST STORE PRICES.

# THE 'IDEAL.'

## ADAMS & CO.'S '1894 IDEAL HAND CAMERA.



Fig. 147A.

**I**N the New 'Ideal' we claim to have created a standard of excellence, not only in principle, but in the details of construction, that is quite unapproached by others, and have added every improvement that study and capital can secure.

THE SIMPLEST  
AND HANDIEST OF ALL  
HAND CAMERAS.

**SIZE.**—Takes twelve plates or cut celluloid films,  $4\frac{1}{4} \times 3\frac{1}{4}$ , vertical or horizontal. Measures outside,  $8 \times 4\frac{3}{4} \times 8\frac{3}{4}$  in., and weighs  $4\frac{1}{4}$  to  $4\frac{1}{2}$  lbs., filled complete with sheaths.

**CHANGING PLATES.**—This is effected by pulling out Knob E, and returning same to its original position. In the simplicity and rapidity of this operation lies the important advantage of this style of Camera. The same movement also registers the number of plates exposed. Particular attention is called to this easy and effective manner of changing, as it enables the operator to take several pictures quickly in succession, with intervals of not more than one second, the register obviating any risk of confusion as to the number of unexposed plates remaining.

**APPEARANCE.**—It is covered in Black real Morocco Leather, and provided with a good strong leather handle.

**LENS.**—It is fitted with our 'IDEAL' DETECTIVE Lens, and works to F/8. The diaphragms may be changed by moving lever (A) underneath. This Lens is a Rapid Rectilinear of best make, and is of  $5\frac{1}{2}$  in. equivalent focus. Further particulars of Lens may be seen under heading 'Lenses.'

**SHUTTER.**—This (B) is an entirely new Shutter, which we have specially designed for this Camera, and is fitted with Hill & Adams' Patent Pneumatic Regulation. It is a great improvement on the old form, having no vent hole to permit dust. By means of this important improvement, we are enabled to make our specialities far in advance of any other Hand Cameras at present made. This shutter is absolutely unique, as exposures may be made with certainty and exactness. Another advantage is, the fact of the whole Shutter being made entirely of suitable metal, making it the only reliable and effective one for hot and tropical climates. It permits of exposures varying from 1 to  $\frac{1}{1000}$  second, and any speed between. For example: when indicator (C) is set at 1 second, it will always be the same; and, if set to  $\frac{1}{32}$  or  $\frac{1}{4}$  second, the speeds will always be correct. Prolonged exposure of any duration may also be given. Another distinct

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**THE 'IDEAL' HAND CAMERA** (continued).

advantage, and one that will be appreciated by every Hand Camera worker, is

that the Shutter is always 'ever set.' It works in the diaphragm slot, and has a self-capping device which works automatically, and has, which is most important, a DIRECT movement across the Lens.

**FOCUSSING.**—The No. 1 pattern is fixed focus, anything about 5 yards and beyond being in sharp focus. When the small stop is used

objects will be in focus at a still nearer distance. The Plates are brought up to *exact* register by means of a spiral spring behind them. The No. 2 pattern is fitted with Wray Lens, and is made to focus to various distances, the nearest being 6 ft., the same being plainly marked upon a focussing scale.

**FINDERS.**—There are two Finders, one showing the horizontal picture and the other the vertical. In most Hand Cameras a very great objection to Finders is the prominence of the small Lenses, which always attract such attention. This we have overcome by closing them with shutters at the same time that the Lens is closed. The one movement closes both the Finders as well as the Lens. Another advantage of this is, that when the Lens is closed nothing can be seen on the Finders, thus preventing that which sometimes happens, namely, releasing the shutter, changing the plate, and then finding that the Lens was closed, consequently no picture, and most probably a spoilt plate. The glasses are also kept free from dust. The finders have large hoods which fold in flush, and which enable the view to be clearly and distinctly seen. They are also accurately marked, and the picture on the plate is therefore identical with that seen on the finder.

**GENERAL REMARKS.**—The Camera is made throughout of the finest seasoned mahogany, and guaranteed light-tight in every part, and is of the very best workmanship. It can be held in the hand or fitted to a tripod. In construction it is of the simplest, a point too frequently overlooked now-a-days by Patentees of Hand Cameras. We consider the 'Ideal' to be the acme of perfection where automatic changing is required. Specially constructed for use in hot and damp climates.

**PRICES.**

No. 1, with 'Ideal' Lens	£7 0 0	Net Cash.
No. 2, with 'Wray' Lens, made to focus at different distances	8 10 0	"
No. 3, TWIN LENS	12 12 0	"

Parcel Post, 1s. 6d. extra.

Stuff Waterproof Cases, lined with baize, and with shoulder straps, and fitted with lock and key, 15s. each. Best quality, Solid Leather, ditto, 21s.

Waterproof Overalls, which can be taken off and carried in pockets, 4s. 6d. each.

Clear and concise Instructions with each.

For those requiring a Tripod Stand we can recommend our 'Lightning,' as advertised on another page, as being rigid and easy of erection.

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[See next page.]

**P****PROMISES** may get friends, but it is  
**PERFORMANCE** that keeps them.

VARIOUS makers are very fond of saying what their Cameras CAN do; but, unfortunately, they can seldom get them to take a FIRST-CLASS picture. Now the 'IDEAL' performs, and wins every one's approbation.

The 'IDEAL' is the ONLY Hand Camera that has taken the HIGHEST POSSIBLE AWARDS at EVERY Exhibition.

**EVERY EXPERT RECOMMENDS IT!**

'PHOTOGRAPHY' competitions are the most difficult and most representative ever organized. In 1891 800 pictures were sent in, 53 different Cameras competing. The 'IDEAL' was the only Camera awarded the silver medal, this being the HIGHEST POSSIBLE AWARD. In 8 classes the 'IDEAL' took 6 FIRST-POSITION medals, and yet only 10 'Ideals' competed.

**ISN'T IT WONDERFUL?**

In the 1892 competition 1,041 prints were sent in. Leaving out home-made instruments, 28 figure in the award list. Out of these 15 'Ideals' carry off the prizes. Thus, in this gigantic competition, the 'IDEAL' has beaten all the other Cameras put together.

**THIS IS MORE WONDERFUL!**

But the most severely critical and technical test is the Pall Mall Exhibition. Just as we go to press we find the 'IDEAL' has here again won the Highest Possible Medal for work the result of the Hand Camera. NO OTHER Hand Camera obtained any award whatever.

**THIS IS MOST WONDERFUL!!**

**ADAMS & Co**

71 ALDERSGATE S.E.C.  
FACING THE STATION  
20 CHARING CROSS R.W.C.  
(BEHIND THE LONDONERS  
CHARING CROSS END)

**LONDON**

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# → † 'THE OTTO.' † ←

A New, Cheap, and Good Hand Camera for 1894.



Fig. 136A.

It takes 12 plates,  $4\frac{1}{2} \times 3\frac{1}{4}$  in sheaths, and measures outside  $11 \times 5 \times 6$ , and weighs, complete *with* the 12 plates, under 4 lbs. Is supplied with two finders, one showing the vertical and one the horizontal picture, a new patent self-capping shutter for both time and instantaneous exposures, and a really first-class single lens working at  $f/11$ . Is covered with black French Morocco Leather, and made of well-seasoned mahogany throughout.

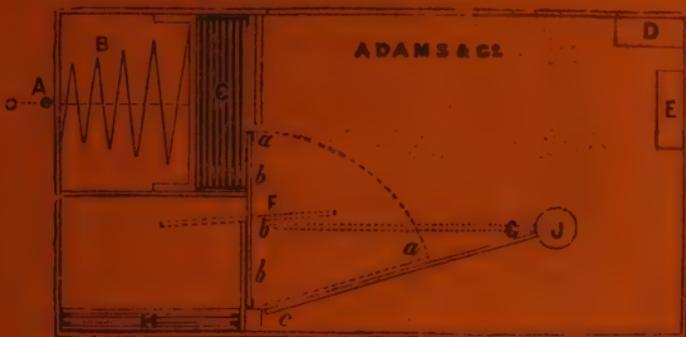


Fig. 137A.

Fig. 137A shows a section of the Camera. **B** is a spiral spring pushing plates (**C**) forward, and keeping them in focus. **H** are exposed plates. **D** is finder, and **E** lens and shutter. To change a plate, slightly pull **A**, when the front will fall upon plane **G**. Then turn knob **J** and it will slide into exposed chamber **H**. The dotted lines show the action, the plate falling face downwards. As will be plainly seen, the movement is so entirely simple as to prevent a hitch of any kind. 12 plates can with absolute certainty be changed in about as many seconds. There are no complications or mechanisms of any kind whatsoever.

There is also an index showing the number of plates exposed.

A door is fitted at the side of the Camera enabling the operator to get to any of the interior parts, and to withdraw the lens for the purpose of dusting, &c.

50/- net. **Full and concise instructions sent with each.** 50/- net.  
*Post free per return post, carefully packed, 51/6.*

ALL GOODS AT LOWEST STORE PRICES.

A REMARKABLE INVENTION!

# The Twin Lens 'Ideal'

(Fully Protected by Several Patents).



This Camera is simply a marvel of simplicity and ingenuity. The full size picture is seen both ways, horizontally and vertically, and is perfectly distinct in the brightest sunshine. These two strong important features have never been attained before. It also has rising and cross front.

**ADAMS & Co** 31 ALDERSGATE S. E.C. LONDON  
(OPPOSITE THE STATION) & 26 CHARING CROSS R. W.C.  
 (ADJOINING THE CAMERA CLUB)  
 (CHURCHING CROSS END)

Factories: 2, 3, & 4 ALDERSGATE BUILDINGS, E.C.

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## THE TWIN LENS 'IDEAL'—(continued).

*Below we give the working of the Camera in detail, but will, first of all, tabulate a few of the advantages of this Instrument as follows:—*

- 1st. Its small size, its unobtrusiveness, and its lightness of weight.
  - 2nd. First-class R. R. Lens (Wray's).
  - 3rd. Full-size pictures seen horizontally as well as vertically.
  - 4th. Picture distinctly seen in open air (another feature which no Camera attempting to give a large picture has ever before succeeded in obtaining).
  - 5th. A Shutter which never requires setting.
  - 6th. Pneumatic Shutter, which is accurately marked in speeds varying from 1 second to 100th, and speeds which are always alike; also Time Exposures.
  - 7th. Simplicity and absolute certainty of plate changing.
  - 8th. Rising and Cross Front, thus enabling the operator to dispense with the usual excess of foreground.
  - 9th. It is the ONLY Twin Lens Camera having automatic and rapid changing.
- LASTLY.** It is a thoroughly well and carefully-made instrument, and taking into account the amount of work contained in it, is placed upon the market at a remarkably low figure.

**SIZE.**—Takes twelve plates or films,  $4\frac{1}{4} \times 3\frac{1}{4}$ , vertical or horizontal. Measures outside,  $8\frac{1}{2} \times 4\frac{3}{4} \times 9\frac{3}{4}$  ins., and weighs 5 to  $5\frac{1}{2}$  lbs., filled complete with sheaths.

**CHANGING PLATES.**—Same as ordinary 'Ideal,' see page 282, but knob is at top instead of bottom.

**APPEARANCE.**—It is covered in best quality Black Leather, and provided with a good strong leather handle.

**LENS.**—It is fitted with Wray's  $5\frac{1}{2}$  in. R. R. Detective Lens, and works to F/8. Two smaller apertures are also provided.

**SHUTTER.**—This is an entirely new Shutter, which has been specially designed for this Camera, and is fitted with Hill and Adams' Patent Pneumatic Regulation. This is a very great improvement over the old-fashioned pattern, there being no vent hole to permit dust. It is absolutely unique, as exposures may be made with certainty and exactness. Another advantage is the fact of the whole Shutter being made entirely of suitable metal, making it the only reliable and effective one for hot and tropical climates. It permits of exposures varying from 1 to  $\frac{1}{100}$  second, and any speed between. For example, when indicator is set at 1 second it will always be the same; and if set to  $\frac{1}{2}$  or  $\frac{1}{4}$  second the speeds will always be correct. Prolonged exposure of any duration may also be given. Another distinct advantage, and one that will be appreciated by every Hand Camera worker, is the Shutter is always 'ever set.' It works in the diaphragm

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**THE TWIN LENS 'IDEAL'—(continued).**

slot, and has a self-capping device which works automatically, and has, which is most important, a DIRECT movement across the lens. This, together with the easy manner in which the Shutter is released, entirely avoids any chance of vibration.

**FOCUSSING.**—This is done on a FULL SIZE Finder by an entirely new method (see Finders), and may be focussed up to the time of exposure. There is also a focussing scale marked for various distances, which may be used when the Finders are not required.

**FINDERS.**—There are two Finders, one showing the horizontal picture and the other the vertical, and these show the picture, FULL SIZE.

This feature is an absolute novelty, the showing of the full-size picture, both vertical and horizontal, never having been attempted by any other makers. The most important point, however, is that they can be distinctly seen in broad daylight; in fact, the brighter the light the brighter the picture upon the reflecting surface.

We have entirely overcome the old-fashioned method of using a reflecting mirror and ground glass, as with this style of Finder it is utterly impossible to distinctly see the picture out of doors, and if the light is very bright no image whatever can be seen.

'Twin Lens Cameras' would have been far more popular had it been possible to clearly see what one was doing, and as we have now overcome this difficulty, it is anticipated that the Twin Lens 'Ideal' will come very prominently into use, and have a most extensive sale.

The brightness of the pictures strikes one very peculiarly at first, as the colours are so vivid. The illustration shows how the focussing is accomplished, viz., merely by turning the milled head screw, and the shutter release is so conveniently arranged that it can be immediately let off, thus ensuring the exposure being made at the moment the picture is seen to be in focus.

**RIISING AND CROSS FRONT.**—This is a most decided acquisition, and we believe is not possessed by any other automatic camera whatever. Its principal advantage is to reduce the amount of foreground that is usually so conspicuous in hand camera work, and it enables the operator to centre his picture more conveniently.

**GENERAL REMARKS.**—The Camera is made throughout of the finest seasoned Mahogany, and guaranteed light-tight in every part, and is of the very best workmanship. It can be held in the hand or fitted to a tripod. In construction it is of the simplest, a point too frequently overlooked nowadays by Patentees of Hand Cameras.

---

**PRICE TWELVE GUINEAS, NET CASH.**

PARCEL POST, 1/6 EXTRA.

---

Stiff Waterproof Cases, lined with baize, and with shoulder straps, and fitted with lock and key, 15/- each. Best quality, Solid Leather ditto, 21/-  
Waterproof Overalls, which can be taken off and carried in pockets, 4/6 each.

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Clear and concise Instructions with each. Every Camera is sent out in perfect order, after having been fully tested.

ALL GOODS AT LOWEST STORE PRICES.

## THE BRITISH JOURNAL OF PHOTOGRAPHY,

*Published by Messrs. Adams & Co.,* Of Sept. 1st,

In a long and highly favourable notice, says that the improvement may be termed revolutionary, and finishes up its interesting criticism as follows:—

'Taken all in all, it is an instrument of which Adams & Co. may well feel proud.

*The following appears in the May number of*

## THE PHOTOGRAPHIC REVIEW OF REVIEWS,

(the High Class and Exquisite 6d. Monthly),

*and is written by MR. WALTER D. WELFORD, the able  
worker and authority upon the Hand Camera.*

I HAVE lately had the opportunity of trying the new 'TWIN LENS IDEAL,' and feel sure that it will meet with great approval. The principal feature, undoubtedly, is the doing away with the mirror and ground glass. The idea is simplicity itself, and the enormous advantage is gained of being enabled to see the picture both horizontally and vertically. Those who have used Twin Lens Hand Cameras with a mirror will at once appreciate this point. Nowadays it is not safe to describe anything as new, but to this firm may justly be placed the credit of commercially introducing a principle which is a distinct step in advance in hand-camera construction. Even in the strongest sunlight the image is clearly defined, with a marvellous wealth of colouring, the images being bright and attractive. The various parts are most conveniently arranged, the focussing being done by the right hand, whilst the left supports the camera, and one finger fires the shutter. The space necessitated by the double magazine is in this pattern utilised, so that it is not surprising to find that the total bulk exceeds the well-known 'Ideal' only very slightly. There are other improvements, too, a most useful one being a rising and cross front, which, of course, gives the same movement whichever way the picture be taken. The shutter, too, is a new one, and the range of speed has been increased, being now from 1 second to  $\frac{1}{100}$  second. The setting of diaphragms, speed of shutter, and rising front clamp are all in the front, whilst the discharge and time arrangement of the shutter only are underneath. The 'Everset' principle is again employed. Altogether, here we have a camera giving the full-sized picture either way, capable of being focussed up to the firing of the shutter, with automatic magazine changing for twelve plates, and rising and cross fronts, a conjunction of conveniences not before offered to the public.'

ALL GOODS AT LOWEST STORE PRICES.

# ADAMS & CO.'S 'HAT' DETECTIVE CAMERA.

(PATENT.) Takes Plates  $4\frac{1}{2} \times 3\frac{1}{4}$ .

42/- Net

INCLUDING FITTING.



Fig. 150A.



Fig 150A.

A practical secret Camera that defies detection. Is worn with comfort, and is always ready for use.

Innumerable attempts have been made to construct Cameras that may be carried easily and secretly about the person; but whilst possessing many points of ingenuity, it has hitherto been only possible to class them with toys. The size of the plate is usually no larger than a postage stamp, but, as will be seen, our 'Hat' Camera takes plates  $4\frac{1}{2} \times 3\frac{1}{4}$ , thus making it a really useful instrument, and one which is capable of producing very good work.

**LENS.**—This is a rapid rectilinear of special construction, working at  $f/11$ , at which aperture it covers a quarter-plate *sharply* to the corners, and renders everything in focus from about a distance of 8 feet and upwards.

**SHUTTER.**—This works between the two lenses, and permits of time as well as instantaneous exposures being given.

**FITTING TO HAT.**—They are sent out correctly focussed, and no difficulty need be experienced in fitting to hat. But if preferred, upon receipt of hat, we undertake the fitting ourselves free of charge. The figures above show the application.

**WEIGHT.**—The Camera alone weighs  $2\frac{1}{2}$  ozs. only. It is not necessary to carry the lens and shutter, as this may be immediately placed in position by a bayonet joint. Even with lens and shutter, the weight is only  $3\frac{1}{4}$  ozs. A Focussing Screen is also supplied, and one Dark Slide.

Price £2 2s. net, including fitting.

Extra Dark Slides, 4/- each. A neat leather case is supplied for the lens and shutter.

ALL GOODS AT LOWEST STORE PRICES.

**YOU  
MOVE A  
BUTTON.  
THAT'S ALL!**

Takes 72 Cut Films,  $4\frac{1}{2} \times 3\frac{1}{4}$ , of any make. No backings, preparation, or interleaving whatsoever.

**THE 'LEDO'**

Don't buy Cameras with inconvenient and messy Rollable Films or Films with slits or notches, or requiring SPECIAL manipulation.

**YOU  
MOVE A  
BUTTON.  
THAT'S ALL!**

*See following pages.]*

**ADAMS & CO.**

The GREATEST HAND CAMERA  
SPECIALISTS ON EARTH. OUR  
WORK IS OF HIGHEST FINISH  
AND EXCELLENCE.

ALL GOODS AT LOWEST STORE PRICES.

## A MARVELLOUS REVOLUTION IN HAND CAMERAS !

No such advance has taken place since the old Wet Process was superseded by Dry Plates.

# THE 'LEDO.'

Patent applied for. Will also be patented in France, Germany and America.

Absolutely no knowledge of Photography required.



LEARNED IN FIVE MINUTES.

**TAKES 72** Cut Films,  $4\frac{1}{4} \times 3\frac{1}{4}$ , without Backing, Cutting, Sheaths, or any preparation whatsoever.

**YOU MOVE A BUTTON. THAT'S ALL!!!**

READ FOLLOWING PAGES.

ALL GOODS AT LOWEST STORE PRICES.

# ADAMS & CO.'S 'LEDO' HAND CAMERA.

Taking 72 Cut Films  $4\frac{1}{4} \times 3\frac{1}{4}$ , by any maker, without any preparation or backing whatever.

## YOU MOVE A BUTTON. THAT'S ALL!

We claim the 'LEDO' to be a complete revolution in photographic apparatus. The fact of stating that you take any number of cut films from 1 to 72 without any previous preparation or interleaving whatever, and insert them in the camera like a pack of cards, sounds incredible. The difficulty will be to get the public to believe in such a truly marvellous feat. Every inventor hitherto has deemed such a proceeding utterly impossible. But we have succeeded in accomplishing it in a peculiarly simple and perfect manner. Amongst all our numerous inventions and patents in Photographic Apparatus (of which we own over 70), never before have we had anything so remarkably successful.

## YOU MOVE A BUTTON. THAT'S ALL!

Hitherto Film Cameras have had numerous drawbacks. One largely advertised instrument has large notches cut out of each film, and behind each another notched card has to be inserted. There are, of course, reasons why the close packing of cardboard and films are injurious to the latter, but the greatest trouble is in having special films which can only be obtained with very great difficulty, and whilst travelling they are absolutely unobtainable, without writing all the way to the makers. It is sheer waste of money and the causing of very great inconvenience to purchase any kind of camera whatsoever that requires special films.

## YOU MOVE A BUTTON. THAT'S ALL!

Now, in the case of the 'LEDO,' all this is overcome. You can buy any make of film you choose and in any part of the world. If a dealer has not a  $\frac{1}{2}$ -plate size in stock, any other will do, as they can easily be cut with either penknife or scissors to the required size. Therefore you are never inconvenienced under any circumstances whatsoever. Then, probably, a worker has a preference for a certain maker's films, if so, the 'LEDO' is the only camera permitting this advantage. The 'LEDO' further allows of the use of double the number of films than can be obtained in any other camera. It therefore very seldom requires refilling, as it works with certainty, whether 1 film or 72 be in.

## YOU MOVE A BUTTON. THAT'S ALL!

It would be idle to waste space describing its advantages over cameras using rollable films. They are so inconvenient and messy, that they have had their day with all persons having even a smattering of modern requirements. Flimsy filmy material that has a habit of rolling itself up like a toothpick, is utterly out of place in these days of modern improvements, discoveries, inventions and resource.

## YOU MOVE A BUTTON. THAT'S ALL!

ALL GOODS AT LOWEST STORE PRICES.

**'LEDO' HAND CAMERA** — (*Continued.*)**ADAMS & CO.'S LATEST INVENTION.****YOU MOVE A BUTTON. THAT'S ALL!**

But a Hand Camera possessing a thoroughly RELIABLE, CERTAIN, and SIMPLE method of changing Films would be of but little use if it lacked other good points. Fortunately, in the matter of conveniences and clever and ingenious adaptability, there is no firm or firms in the trade that stand in such high and widely-known repute as ourselves as regard Hand Cameras. We will therefore give, as briefly as possible, the other points of the instrument, which will clearly show it to be entirely unapproachable for the necessary construction of an instrument that meets with serious, scientific, and popular requirements. Of course if a complete Hand Camera and complete Field Camera in one be required, the 'ADAMS' is the ONLY instrument made that will fulfil such duties. And for those wishing to use either plates or films there is no camera made that can equal the 'IDEAL.' In the case of the 'VESTA,' this holds a unique position of its own, as it does not compete with our other patterns, but may be termed supplementary to them. Most people using a Hand Camera would have a 'VESTA' as well, as it can always be carried in the pocket. But to return to the 'LEDO.'

**YOU MOVE A BUTTON. THAT'S ALL!**

Fig. 1A

**SIZE.**—We think we can say, without fear of contradiction, that it is the smallest Camera of its kind ever made. It measures only  $8 \times 4\frac{3}{4} \times 6\frac{1}{2}$ , and thus contains 248 cubic inches, whilst a  $\frac{1}{2}$ -plate Camera taking notched films measures about  $11\frac{1}{2} \times 4\frac{1}{2} \times 5\frac{1}{2}$  or 283 cubic inches, a cubical measurement in favour of the 'LEDO' of 35 cubic inches! We cannot at the moment of going to press give the exact weight, but we believe it will be below 3 lbs.!!! filled with the 6 doz. films.

**CHANGING FILMS.**—You move a button, that's all! This is shown as E Fig. 1A. It only has to be moved to the end of the short slot and returned to its proper position. This movement has then succeeded in removing the exposed film into the exposed reservoir, and placed another film in position ready for a picture. It is **UTTERLY IMPOSSIBLE** for it ever to miss. There is no sliding or rubbing of the films whatever, the front film being entirely separated from the back ones before being changed. It is a positive fact that a baby of two years old could successfully manipulate it. An automatic indicator shows number of films exposed.

**YOU MOVE A BUTTON. THAT'S ALL!**

ALL GOODS AT LOWEST STORE PRICES.

## 'LEDO' HAND CAMERA—(Continued.)

**APPEARANCE.**—Covered in black Morocco leather, with good strong leather handle. Not a single ugly projection. No disfiguring and bulky cranks. Finder Hoods (F) fold in flat. It is Focussing Key, which is sunk into case. There is not a single projection of any kind.

**LENS.**—Is fitted with our now world-famed 'IDEAL' Lens. No other Film Camera is being sent out with a lens of such high quality. It would be foolish for us to spoil so good an instrument by inserting a common lens, therefore we thoroughly recommend the 'IDEAL' as by far and away the best, unless one cares to go to the expense of a Goerz Anastigmat. We shall also fit this truly wonderful lens at a cost of £4 4s. extra. The 'Ideal' is a rapid rectilinear, working to  $f/8$ , and also having stops  $f/11$  and  $f/22$ . Other Film Cameras are sending out lenses that work to  $f/11$  only. We consider this most unwise, as it is far too slow, poor, weak, under-exposed negatives being the result.

**SHUTTER.**—Exactly the same as our 'IDEAL' Camera. See full particulars under heading 'Shutter,' on page 282. Nothing can beat it. Never requires setting.

**FOCUSSING.**—Can be focussed all distances from two yards to infinity by merely setting Key H. A plainly marked focussing scale is engraved on the bottom of the Camera. Each scale is separately and correctly focussed in each Camera.

**FINDERS.**—One showing horizontal and the other one showing vertical picture. Exact size is shown, and they are exceedingly bright and clear, being shielded by folding metal hoods.

**RISING FRONT.**—This is far preferable to a swing back, as the lens does not need refocussing. We allow a rise of  $\frac{3}{4}$  of an inch. This permits of buildings and monuments being obtained without distortion, and does away with the unpleasant excess of foreground that spoils so much otherwise good hand camera work. The finder is so marked as to show the amount of picture secured when the rising front is used. It is moved by simply giving a turn or two to a screw. A rising front on a hand camera is a perfect boon.

### YOU MOVE A BUTTON. THAT'S ALL!

**GENERAL REMARKS.**—Is finished in best style, and made of well-seasoned mahogany, properly clamped in every part. All working parts are of suitable metal, aluminium being used wherever permitted. There is nothing even approaching intricacy about it. We cannot speak in higher praise of it than by saying it is both RELIABLE AND CERTAIN. Each Camera is separately examined. Any-one can fill it. We also undertake all developing, printing, &c. Charges and particulars can be obtained upon application. Fitted with tripod screws if desired.

£7 7s. net cash, with IDEAL R.R. Lens, or with GOERZ ANASTIGMAT Lens, £11 11s. net cash.

It is not probable the above prices will be increased, but the public will be duly notified by advertisements in the Photographic press, should any change be necessary. Cases, &c., extra as per foot of page 288.

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**IF YOUR DEALER DOES NOT STOCK IT, ORDER IT DIRECT FROM US,** as it will save probably over a week's delay. Orders received from the general public always command our first attention.

ALL GOODS AT LOWEST STORE PRICES.

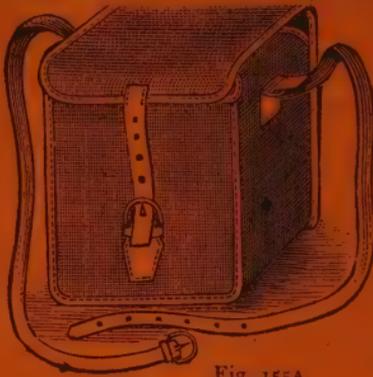


Fig. 155A.

# CAMERA CASES.

## STRONG WATERPROOF CASES.

Will carry Camera, Lens, Slides, &c., with Shoulder Strap.

|               |               |               |      |       |       |
|---------------|---------------|---------------|------|-------|-------|
| $\frac{1}{4}$ | $\frac{1}{2}$ | $\frac{3}{4}$ | 10x8 | 12x10 | 15x12 |
| 4/9           | 7/2           | 9/6           | 12/- | 15/-  | 19/-  |

## STRONG WATERPROOF STIFFENED CASES.

Well made and durable, lined with Green Baize, will carry Camera, Lens, 3 Slides, Top of Stand, &c. &c.

|               |               |               |      |       |       |
|---------------|---------------|---------------|------|-------|-------|
| $\frac{1}{4}$ | $\frac{1}{2}$ | $\frac{3}{4}$ | 10x8 | 12x10 | 15x12 |
| 10/6          | 13/-          | 17/6          | 24/- | 27/6  | 31/6  |



Fig. 156A.

## BEST LEATHER CASES.

These are made out of best Hide, hand sewn throughout, lined with Velvet, with Partitions to carry Camera, Lens, 3 Slides, &c. Fitted with best Spring Lock and Key.

VERY BEST QUALITY.

|               |               |               |      |       |       |
|---------------|---------------|---------------|------|-------|-------|
| $\frac{1}{4}$ | $\frac{1}{2}$ | $\frac{3}{4}$ | 10x8 | 12x10 | 15x12 |
| 21/-          | 27/6          | 37/6          | 45/- | 50/-  | 60/-  |



Fig. 157A.

## CASE FOR HAND CAMERAS.

Sling Straps for Cases, 3/6 each.

Prices and particulars of these will be found at the foot of the descriptions of each Camera.



Fig. 158A.

## CASES FOR STANDS.

Strong Waterproof, with solid leather ends, made square, with handle, &c., complete.

$\frac{1}{4}$ -plate, 4/-;  $\frac{1}{2}$ -plate, 5/-;  $\frac{3}{4}$ -plate, 7/-.

Ditto, in Solid Leather,  $\frac{1}{4}$ -plate, 10/6;  $\frac{1}{2}$ -plate, 11/6;  $\frac{3}{4}$ -plate, 12/6.

ALL GOODS AT LOWEST STORE PRICES.

# CAMERA BELLOWS. (Square Shape.)

| Size of Plate. | Outside Size.                       | Pull. Inches. | Price. In Leather. | Price. In Cloth. |
|----------------|-------------------------------------|---------------|--------------------|------------------|
| Quarter        | 5 x 5                               | 8             | 3 3                | 2 9              |
| 5 x 4          | 6 x 6                               | 9             | 4                  | 3                |
| Half           | 7 $\frac{1}{2}$ x 7 $\frac{1}{2}$   | 12            | 6 6                | 4 8              |
| ..             | 7 $\frac{1}{2}$ x 7 $\frac{1}{2}$   | 18            | 10                 | 6 9              |
| Whole          | 9 $\frac{1}{2}$ x 9 $\frac{1}{2}$   | 15            | 9 9                | 6 9              |
| ..             | 9 $\frac{1}{2}$ x 9 $\frac{1}{2}$   | 21            | 13 9               | 9 6              |
| 10 x 8         | 11 $\frac{1}{2}$ x 11 $\frac{1}{2}$ | 17            | 14                 | 9 3              |
| 10 x 8         | 11 $\frac{1}{2}$ x 11 $\frac{1}{2}$ | 24            | 18 9               | 13               |
| 12 x 10        | 13 $\frac{1}{2}$ x 13 $\frac{1}{2}$ | 19            | 16 6               | 12               |
| 12 x 10        | 13 $\frac{1}{2}$ x 13 $\frac{1}{2}$ | 30            | 27 6               | 18               |
| 15 x 12        | 17 x 17                             | 22            | 25                 | 17 6             |

# CONIC SHAPE.

| Outside Size of Back.               | Outside Size of Front.            | Pull. Inches.   | Price. In Leather. | Price. In Cloth. |
|-------------------------------------|-----------------------------------|-----------------|--------------------|------------------|
| 3 $\frac{1}{2}$ x 5                 | 3 $\frac{1}{2}$ x 3 $\frac{1}{2}$ | 6 $\frac{1}{2}$ | 4                  | 3 9              |
| 7 $\frac{1}{2}$ x 7 $\frac{1}{2}$   | 3 $\frac{1}{2}$ x 3 $\frac{1}{2}$ | 9               | 7 9                | 4 9              |
| 7 $\frac{1}{2}$ x 7 $\frac{1}{2}$   | 4 x 4                             | 14              | 11 3               | 7 9              |
| 7 $\frac{1}{2}$ x 7 $\frac{1}{2}$   | 6 x 6                             | 16              | 12 6               | 8 9              |
| 8 $\frac{1}{2}$ x 8 $\frac{1}{2}$   | 4 $\frac{1}{2}$ x 4 $\frac{1}{2}$ | 15              | 12 6               | 8 9              |
| 7 $\frac{1}{2}$ x 7 $\frac{1}{2}$   | 5 x 5                             | 17              | 12 6               | 8 9              |
| 9 $\frac{1}{2}$ x 9 $\frac{1}{2}$   | 5 x 5                             | 19              | 18 9               | 12 9             |
| 9 $\frac{1}{2}$ x 9 $\frac{1}{2}$   | 5 x 5                             | 24              | 24 6               | 16               |
| 11 $\frac{1}{2}$ x 11 $\frac{1}{2}$ | 5 x 5                             | 24              | 27 9               | 18               |
| 12 $\frac{1}{2}$ x 12 $\frac{1}{2}$ | 5 $\frac{1}{2}$ x 5 $\frac{1}{2}$ | 19              | 25                 | 18 9             |



Fig. 172A.

## ADAMS & CO.'S TRIPOD FOR HEAVY CAMERAS

A Good, Strong, Serviceable Stand.  
Price complete, £1 12s. 3d.



Fig. 173A.

## PATENT UNIVERSAL STAND.

New Stand, Threefold, with Patent Universally Adjusting Top, giving any position to Camera, and with Adjustable Legs.

|           |           |           |
|-----------|-----------|-----------|
| 10 x 8    | 12 x 10   | 15 x 12   |
| 10 - 14 3 | 20 - 23 9 | 28 6 33 3 |

ALL GOODS AT LOWEST STORE PRICES.

**THREE-FOLD STAND.**

This forms a most compact Stand, folding into a little over half the usual size (Fig. 166a).

|               |               |               |                 |                  |
|---------------|---------------|---------------|-----------------|------------------|
| $\frac{1}{4}$ | $\frac{1}{2}$ | $\frac{1}{1}$ | $\frac{1^0}{8}$ | $\frac{1^2}{10}$ |
| 6/2           | 9/6           | 12/-          | 14/3            | 20/-             |

**CIRCULAR TOPS.**

(EXTRA.)

|               |               |               |                 |                  |
|---------------|---------------|---------------|-----------------|------------------|
| $\frac{1}{4}$ | $\frac{1}{2}$ | $\frac{1}{1}$ | $\frac{1^0}{8}$ | $\frac{1^2}{10}$ |
| 1/6           | 2/-           | 2/6           | 3/-             | 3/6              |

**TRIANGLE, ditto.**

(EXTRA.)

|               |               |               |                 |                  |
|---------------|---------------|---------------|-----------------|------------------|
| $\frac{1}{4}$ | $\frac{1}{2}$ | $\frac{1}{1}$ | $\frac{1^0}{8}$ | $\frac{1^2}{10}$ |
| 2/6           | 3/-           | 4/-           | 5/-             | 6/-              |



Fig. 166a.

**ADAMS & CO.'S,  
'CLUB' TRIPODS**

Fig 167a.

HANDY, PORTABLE, LIGHT, AND RIGID.

This is a reliable stand of the very best make, and we thoroughly recommend it in every particular.

Four-fold, for use when cycling, and where lightness and compactness is imperative.

|        |     |     |                |
|--------|-----|-----|----------------|
| Closed | ... | ... | 16 in.         |
| Open   | ... | ... | 4 ft. 7 in.    |
| Weight | ... | ... | 2 lbs. 12 ozs. |
| Price  | ... | ..  | 19/-           |

The loose head measures 4 in.

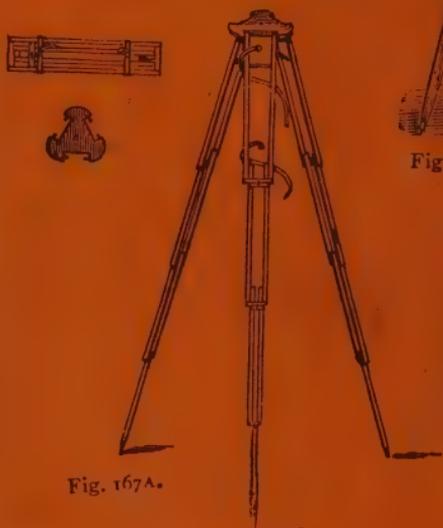


Fig. 167a.

**THREE-FOLD SERIES.**

|                     | Closed.      | Open.             | Weight.             | Price.        | Head.       |
|---------------------|--------------|-------------------|---------------------|---------------|-------------|
| $\frac{1}{2}$ plate | ..... 23 in. | ..... 4 ft. 9 in. | ..... 3 lbs. 0 ozs. | ..... £0 19 0 | ..... 4 in. |
| $\frac{3}{4}$ "     | ..... 23 "   | ..... 4 " 9 "     | ..... 3 " 4 "       | ..... 1 1 0   | ..... 6 "   |
| $\frac{1}{1}$ "     | ..... 23 "   | ..... 4 " 9 "     | ..... 4 " 0 "       | ..... 1 3 6   | ..... 8 "   |
| $\frac{1^0}{8}$ "   | ..... 23 "   | ..... 4 " 9 "     | ..... 5 " 4 "       | ..... 1 6 0   | ..... 10 "  |

ALL GOODS AT LOWEST STORE PRICES.



Fig. 169A.

Fig. 170A.

**ADAMS & CO.'S 'TOURIST' STAND.** A three-fold stand without any loose parts whatever. Height when erected 57 inches, and folds to 21½ inches. The great advantage of this stand is, that it has a sliding leg. Is fixed instantly, there being no loose top, and is wonderfully compact and perfectly rigid, elegant in appearance, being polished walnut. Suitable for ¼ or ½ plates. Price 15/6. (Fig. 169A. ¼ plate size, 18/-.

**ADAMS & CO.'S 'UMBRELLA' TRIPOD.** Exact size, and has every appearance of being an ordinary umbrella. Fits in usual umbrella cases. A most convenient, compact, and rigid stand. Perfect for touring. This stand is a great improvement on that usually sold. A further advantage is, that the ordinary camera screw fits it. Other makes require special brass plate to be let up to Camera.

An adjustable sliding tube is also supplied, whereby it can be regulated to any height.

Its portability, firmness, and appearance alike strongly recommend it for use with our Detective Camera whilst touring. Price 21/- complete. (Fig. 170A.)

**ADAMS & Co**

21 ALDERSGATE S. E. C.  
(FACING THE STATION) & 21  
20 CHARING CROSS R. W. C.  
(BEGINNING THE SPINNEY GARDEN)  
(CHARING CROSS END)

**LONDON**

ALL GOODS AT LOWEST STORE PRICES.

# ADAMS & CO.'S 'IDEAL' TRIPOD.

This stand has been specially devised for use with Hand Cameras, and when not in use looks exactly the same as a walking stick; is set up or taken down in less than five seconds, and is perfectly rigid.

Weight complete, 1 lb. 6 ozs.

Price, 20/-



Fig. 176A.



Fig. 178A.



Fig. 179A.

Fig. 178A is a heavier article than one set out above, and is fitted with Springs into Head, thus rendering same always closed when not in use, and also making Stand very rigid when in use. Weight, 1½ lbs. Price, complete with Platform Top, 15/-.

Fig. 179A opens readily, and is very elegant and rigid. It has nickelled fittings, and is neat and unobtrusive. Walking stick size, 38½ inches } 12/6.  
Alpenstock " 40 " }

ALL GOODS AT LOWEST STORE PRICES.

# ADAMS & CO.'S LIGHT BAMBOO STANDS

Wonderfully Rigid, Effective, Cheap  
and Portable.



Fig. 174A.

Made to order  
with  
2, 3, or 4 Joints  
for  
portability.



Fig. 175A.

| No. | Diameter of Head. | Height of Stand. |                     | Weight. | Head, Shape of | PRICES. |
|-----|-------------------|------------------|---------------------|---------|----------------|---------|
|     |                   |                  | Rigid Heads         |         |                | £ s. d. |
| 1.  | 1 3/8-in.         | 47-in.           |                     | 12-oz.  | Round ...      | 0 5 6   |
| 2.  | 2 1/2-in.         | 47-in.           | " "                 | 16-oz.  | Triangular     | 0 6 0   |
| 3.  | 3-in.             | 47-in.           | " "                 | 20-oz.  | "              | 0 7 0   |
| 4.  | 1 3/8-in.         | 47-in.           | Ball & Socket Joint | 13-oz.  | Round ...      | 0 6 0   |
| 5.  | 2 1/2-in.         | 47-in.           | " "                 | 21-oz.  | Triangular     | 0 7 6   |
| 8.  | 3-in.             | 47-in.           | " "                 | 25-oz.  | "              | 0 11 0  |

Joints for Nos. 1 and 4 ... .. 6d each mounted.  
 " " 2 " 5 ... .. 9d " "  
 " " 3 " 6 ... .. 1/3 " "

If cut shorter than above lengths, any length less than 40-in. can be sent by Parcels Post.

**ADAMS & Co** 31 ALDERSGATE S. E.C. LONDON  
 SOLELY BY THE CHARING CROSS BANK  
 (INCORPORATED IN THE UNITED KINGDOM)  
 BANKING BY APPOINTMENT TO HER MAJESTY THE QUEEN

A.L.L. GOODS AT LOWEST STORE PRICES.

# ADAMS & CO.'S 'LIGHTNING' TRIPOD

(PATENT).

IT ERECTS ITSELF!!!

The Sensation of the Season, and is  
A REALLY GOOD THING.

Is thoroughly rigid, free from anything that can possibly get out of order, and is so extremely portable as to be suitable for cyclists and every kind of tourist.

It is made of polished walnut, with brass and steel fittings, and is a handsome as well as a reliable piece of workmanship. When in use it measures 4 ft. 4 in., when closed 20 in., and weighs  $2\frac{1}{2}$  lbs. only.  $\frac{1}{2}$ -plate is higher.

There is not a single screw, spring, or catch OF ANY KIND that requires adjustment, and it literally erects itself *instantaneously*, and is closed in *five seconds*. Each leg when folded is FLAT, but when open becomes a RECTANGLE, and is therefore as strong as if each length were in one piece instead of three fold.

The *Amateur Photographer* of August 7th, 1891, says:—'Well deserves the name given it, for with the unbuttoning of a strap, shown in the illustration, three legs unfold and give us a most rigid Tripod. Is sold for 21s., and is the cheapest Tripod in the market, taking into account the extreme portability and rigidity.'

*Photographic Scraps* says:—'A rigidity that is not as a rule possessed by the ordinary STANDS, which need unfolding, setting, and screwing up. This new Stand is one of the few REAL novelties introduced recently, and it deserves every recommendation we can give it.'

Directions: Take hold of the top at arm's length, when it will immediately fall into position.

Any size to  $\frac{1}{2}$ -plate, 21s. 6d. ;  $\frac{1}{2}$ -plate, 30s. net cash.

**ADAMS & Co**

21 ALDERSGATE S. E. C.

FACING THE

20 CHARING CROSS RAIL

QUAYING THE

CHARING CROSS END

**LONDON**

ALL GOODS AT LOWEST STORE PRICES.

# CAMERA STANDS FOR THE STUDIO.

Good, strong serviceable  
Stands, of our own  
manufacture.



Fig. 186A.



Fig. 187A.

SUPPLIED WITH OR WITHOUT CASTORS.

The 7/6, 17/6, and 27/6 sizes have no castors. The other sizes are fitted with one; but two will be supplied if desired without additional cost.

Plain Pine Studio Stand, with rising pillar, 11x12 top, and legs 1½x1 in. thick ... .. £0 7 6

This is a very handy little stand, and is suitable for either  
Photography or Lantern Work.

Studio Stand, Polished Pine, rising pillar and rackwork (Fig. 187A) 11x14 top and 1½ in. legs ... .. 0 17 6

Ditto, ditto, ditto, large size, best make, 14x16 top and 1½ in. legs ... .. 1 7 6

ADAMS & CO.'S 'CHALLENGE' Studio Stand is the most perfect that can be obtained. Fitted with Archimedean Screw and Rackwork for raising and lowering Camera. Endless Screw for elevating top table, and Double Tables to allow Camera to be placed in any position. Guaranteed to be very best finish, and very massive, with shaped legs (Fig. 186A), 16x18 top, and 2 in. legs ... .. 3 0 0

This is our Spécialité, and is the cheapest and best Stand to be obtained in the world, the usual price being £4.

The same Stand, but a size smaller than the 'Challenge' (usual price, £3), 14x16 top and 1½ in. legs ... .. 2 5 0

Extra massive, in pine, 18x20 top, 2½ in. legs ... .. 4 5 0

The same Stand, handsomely made in polished mahogany ... .. 5 0 0

A magnificent Stand, usual price £6 5s.

ALL GOODS AT LOWEST STORE PRICES.

# CHANGING BAGS.

## ADAMS & CO.'S 'CLUB' CHANGING BAG.

This having an aperture for the eyes, and being fitted with a safe light, the manipulation of changing may be comfortably watched. The head being entirely outside of the bag, the operator does not stand the risk of being asphyxiated.

$\frac{1}{2}$ -plate, 7/-;  $\frac{1}{4}$ -plate, 9 6.  
Postage 6d. each.

Another form of the above is supplied in neat japanned metal case, which forms a support when opened out, and makes the bag into a rectangular receptacle, suitable for  $\frac{1}{2}$ -plate and under. Size closed,  $11 \times 7\frac{1}{2} \times 1\frac{1}{2}$  inches.

Price 12 6.

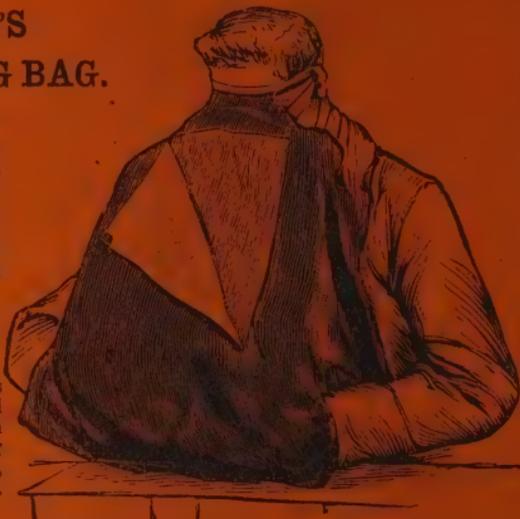


Fig. 192.

## THE 'ECLIPSE' CHANGING BAG.

This useful article enables the operator to change an unlimited number of plates in open sunlight with perfect ease and safety. It is made in three sizes, to take  $\frac{1}{2}$ ,  $\frac{1}{4}$ , or  $\frac{1}{8}$  plates, or other sizes on application.

It is extremely simple and portable, and can readily be carried in the pocket.

There is now an improvement made by the addition of three inside pockets, two of which are light-tight, and are intended to receive the exposed and unexposed plates or films. The third pocket may be used as a receptacle for carriers, dusting brush, &c. The addition of these pockets is a great advantage, as it entirely obviates the necessity for carrying a multiplicity of envelopes or plate boxes. As the interior of the bag is in absolute darkness, it is quite safe for Isochromatic and Rapid plates and films.

### PRICES:—

Without Pockets,  $\frac{1}{2}$ -plate size, 4 9;  $\frac{1}{4}$ -plate, 7/-;  $\frac{1}{8}$ -plate, 9/-  
With Pockets, all sizes, 2/6 per bag extra.  
Postage 4½d. on all sizes.

## THE 'PARAGON' CHANGING BAG.

This Bag is especially designed for the use of those who object to changing plates by touch. It is about the same size and weight as the 'Eclipse,' and is provided with a window which affords a safe light, and an eye-piece through which the operation of changing may be comfortably watched.

PRICES:— $\frac{1}{2}$ -plate size, 7/-;  $\frac{1}{4}$ -plate, 9/-;  $\frac{1}{8}$ -plate, 11/6.

## THE 'ECLIPSE' LIGHT-TIGHT CASE.

For use with Changing Bag, to hold six plates, made of black and ruby fabric, strong and durable, very portable and convenient.

PRICES:— $\frac{1}{2}$ -plate size, 1,-;  $\frac{1}{4}$ -plate, 1 6;  $\frac{1}{8}$ -plate, 2/-

ALL GOODS AT LOWEST STORE PRICES.

# THE 'ADAMS' CHANGING BOX.

For Hand or Field Cameras. Takes 12 Plates or 24 Films.

(PROTECTED BY SEVERAL PATENTS.)

Manufactured at our own Factories, and none are genuine unless bearing our name.

## IMPORTANT NOTICE.

We strongly warn purchasers to be sure they obtain the 'Adams' Boxes, as they contain several improvements, conveniences, and further patents over other Boxes worked under the original patent.



Fig. 193A.



Fig. 194A.

Fig. 193A is Field Pattern with large front.

Fig. 194A is Hand Camera Pattern.

**WE** draw Customers' attention to the following very essential points of divergence between the 'Adams' Box and those of any other make:—

1. The 'Adams' Changing Box, when required for Field Cameras, is made to the *same register as ordinary dark slides*, and allows of their being interchangeable, thus obviating the necessity of another focussing screen.
2. The 'Adams' Changing Box takes 12 Plates or 24 Cut Films equally well, and either can be exposed out of turn if required.
3. When required for a Hand Camera, they can also be supplied with  $\frac{1}{4}$ -inch register, but this is only necessary when ordinary dark slides are required to be interchangeable. When ordering, it is better to state

ALL GOODS AT LOWEST STORE PRICES.

## THE 'ADAMS' CHANGING BOX (*continued*).



FIG. 195A.

whether the boxes are required for Field or Hand Cameras, as, if for the latter, one of 7-16ths will be sent with a separate focussing-screen, exactly as supplied with the 'Adams' Hand Camera, and without the large outside front, as this is only necessary for ordinary Cameras.

4. The 'Adams' Changing Box registers automatically every plate exposed.

5. The 'Adams' Changing Box has an automatic lock, which comes into operation when the last plate is exposed, and prevents the inadvertent exposing of the same plate twice. Plates of varying rapidities may be placed in the box and exposed out of turn if desired.

The bag is made of specially prepared leather, and is so shaped that the carriers work with absolute freedom. Being smoothly dressed inside, it prevents all risk of dust, which is so troublesome a factor with other makes.

PLATE CARRIERS.—Each box contains twelve patent Carriers for Plates, but if not required the cost may be deducted. Film carriers are charged extra.

A very important point with these Plate and Film Holders is that the sensitive surface itself comes into contact with the register of the box; thus the thickness of plates or films is of no consequence, each one registering perfectly.

Boxes for Hand Cameras, 7-16ths inch register, complete with Focussing-screen.

Prices, &c., see next Page.

**ADAMS & Co** 31, ALDERSGATE S.E.C.  
(FACING THE STATION) & 26, CHANCERY LANE, E.C. 4.  
 (JOINING THE CAMERA CLUB)  
 (CHANCERY CROSS E.C. 4.) **LONDON**

ALL GOODS AT LOWEST STORE PRICES.

## PRICES OF THE 'ADAMS' CHANGING BOX.

|                                           |      |       |  | Outside Measurement.                        |
|-------------------------------------------|------|-------|--|---------------------------------------------|
| $4\frac{1}{2} \times 3\frac{1}{2}$ ... .. | 45/- | ..... |  | $5 \times 2\frac{3}{8} \times 4\frac{3}{4}$ |
| $5 \times 4$ ... ..                       | 55/- | ..... |  | $5\frac{3}{4} \times 3 \times 5\frac{1}{2}$ |
| $6\frac{1}{2} \times 4\frac{3}{4}$ ... .. | 72/6 | ..... |  | $7 \times 3\frac{1}{4} \times 6\frac{1}{2}$ |

The following boxes are sent out with a large front, in order that they may be cut and fitted to any Camera, and are of  $\frac{1}{4}$ -inch register, requiring no loose focussing-screen :—

| Plates.                                  |      | Carriers,<br>per dozen. |      | Film-holders,<br>per dozen. |
|------------------------------------------|------|-------------------------|------|-----------------------------|
| $4\frac{1}{2} \times 3\frac{1}{2}$ ..... | 55/- | .....                   | 3/-  | ..... 3/-                   |
| $5 \times 4$ .....                       | 60/- | .....                   | 4/-  | ..... 4/-                   |
| $6\frac{1}{2} \times 4\frac{3}{4}$ ..... | 72/6 | .....                   | 7/6  | ..... 7/6                   |
| $8\frac{1}{2} \times 6\frac{1}{2}$ ..... | 84/- | .....                   | 10/6 | ..... 10/6                  |

These prices are Net Cash.

*IMPORTANT.*—Sheaths can now be had in Aluminium at double above prices. They are very much lighter.

## THE ONLY SIMPLE AND RELIABLE CHANGING BOX ON THE MARKET.

There is **NEVER** a hitch in using it.

Read what Mr. J. TRAILL TAYLOR says about it in the *British Journal of Photography* of September 22nd, 1893 :—

“When we say that we have, without previous experience in its use, effected the transformation from back to front of the 24 film-sheaths enclosed in this new Changing Box of Messrs. Adams & Co., it will be seen that there is no difficulty in using it.”—(A long and highly favourable notice follows, which is too lengthy to quote here.)

No one could **TRUTHFULLY** write like the above about **ANY** other Changing Box whatever.

The *Amateur Photographer* of same date says :—

‘This Changing Box is **WELL MADE**, and answers **PERFECTLY**, and it is a decided blow to the use of dark slides.’

## BE SURE YOU HAVE AN 'ADAMS,'

And don't let your dealer recommend you something else **MERELY** because he gets an extra profit out of an inferior article.

# CHEMICALS.

These Prices are subject to change according to the fluctuations of the market.

Not less than  $\frac{1}{2}$  lb. supplied at pound rates. Bottles extra.

Always of the freshest and highest possible quality.

|                                                                                                          |                                                | Per oz. |    | Per lb. |    |
|----------------------------------------------------------------------------------------------------------|------------------------------------------------|---------|----|---------|----|
|                                                                                                          |                                                | s.      | d. | s.      | d. |
| Acid, Glacial Acetic, 50°                                                                                | 4 ozs. in stoppered bottle, 7d.                | 0       | 2  | 1       | 0  |
| „ Citric, Cryst.                                                                                         | 2 „ „ „ 7d.                                    | 0       | 3  | 2       | 2  |
| „ Nitric (1·420) pure                                                                                    | 4 „ „ „ 7d.                                    | 0       | 2  | 1       | 0  |
| „ Hydrochloric, pure                                                                                     | 4 „ „ „ 6d.                                    | 0       | 1  | 0       | 6  |
| „ Oxalic                                                                                                 | „ „ „ „                                        | 0       | 2  | 1       | 0  |
| „ Pyrogallic (Schering's), in 1 oz. bottles (25 oz., 11 $\frac{1}{2}$ d. pr oz.)                         | „ „ „ „                                        | 1       | 0  | —       | —  |
| „ Sulphuric, pure                                                                                        | 4 ozs. in stoppered bottle, 6d.                | 0       | 1  | 0       | 6  |
| „ Sulphurous                                                                                             | 4 „ „ „ 6d.                                    | 0       | 1  | 0       | 6  |
| Alum, pulv.                                                                                              | „ „ „ „ 7 lbs. 1/-                             | —       | —  | 0       | 2  |
| „ Chrome                                                                                                 | „ „ „ „                                        | 0       | 1  | 0       | 6  |
| „ Potash                                                                                                 | „ „ „ „                                        | 0       | 1  | 0       | 6  |
| Aluminium Powder                                                                                         | „ „ „ „                                        | 1       | 6  | —       | —  |
| Amidol                                                                                                   | „ „ „ „                                        | 1       | 10 | —       | —  |
| Amidol Cartridges, 3d. each; 5 in box, 1/10; 10 in box, 3/8.                                             | „ „ „ „                                        | —       | —  | —       | —  |
| Ammonia, liq., '880                                                                                      | 4 ozs. in stoppered bottle, 6d.                | 0       | 1  | 0       | 7  |
| „ Original Winchester, stoppered bottle included, 3/6.                                                   | „ „ „ „                                        | —       | —  | —       | —  |
| Ammonium, Bromide                                                                                        | „ „ „ „                                        | 0       | 4  | 3       | 0  |
| „ Chloride, pure                                                                                         | „ „ „ „                                        | 0       | 1  | 0       | 10 |
| „ Citrate                                                                                                | „ „ „ „                                        | 0       | 6  | 5       | 0  |
| „ Sulpho-cyanide                                                                                         | „ „ „ „                                        | —       | —  | 3       | 0  |
| Balsam, Canada                                                                                           | „ „ „ „                                        | 0       | 4  | 3       | 6  |
| Borax, Powdered                                                                                          | „ „ „ „                                        | 0       | 1  | 0       | 8  |
| Caustic Potash                                                                                           | 1 oz. in stoppered bottle, 6d.                 | 0       | 2  | 1       | 8  |
| Collodion, Mawson's, 2 ozs., 9d.; 5, 1/8; 10, 2/9; 5 pts., 22/11                                         | „ „ „ „                                        | —       | —  | —       | —  |
| „ „ „ for Enamelling                                                                                     | „ „ „ „ 1/9 per $\frac{1}{2}$ lb.              | —       | —  | 3       | 0  |
| Cotton Wool                                                                                              | „ „ „ „                                        | 0       | 2  | 1       | 6  |
| Eikonogen (Dr. Andresen's)                                                                               | „ „ „ „                                        | 1       | 0  | 11      | 0  |
| „ Cartridges, 4d. each, 2/10 box of 10.                                                                  | „ „ „ „                                        | —       | —  | —       | —  |
| Fixing Cartridges, 2 $\frac{1}{2}$ d. each for 8; 10 in box, 1/9; large size, 4/9, or 6d. per Cartridge. | „ „ „ „                                        | —       | —  | —       | —  |
| French Chalk                                                                                             | „ „ „ „                                        | 0       | 1  | 0       | 6  |
| Gelatine (for Enamelling, &c.)                                                                           | „ „ „ „                                        | 0       | 2  | 1       | 6  |
| „ Nelson's No. 1                                                                                         | „ „ „ „                                        | 0       | 6  | 4       | 1  |
| Glauber Salts                                                                                            | „ „ „ „                                        | —       | —  | 0       | 2  |
| Glycerine, pure, 1·260                                                                                   | 2 ozs. in stoppered bottle, 5 $\frac{1}{2}$ d. | 0       | 2  | 1       | 1  |
| Glycin                                                                                                   | „ „ „ „                                        | 2       | 6  | —       | —  |
| Gold, Chloride, 15-grain tubes (Johnson's), 1/8 per tube.                                                | „ „ „ „                                        | —       | —  | —       | —  |
| „ „ „ (19/- per doz., cash with order.)                                                                  | „ „ „ „                                        | —       | —  | —       | —  |
| „ „ „ in solution, 1 dr., 3d.; 2 drs., 5d.; 4 drs., 8d.                                                  | „ „ „ „                                        | 1       | 1  | —       | —  |
| „ Toning Bath                                                                                            | „ „ „ „                                        | —       | —  | 1       | 0  |
| „ „ „ and Fixing, for Solio and P.O.P., 2/3 pt. Postage 6d.                                              | „ „ „ „                                        | —       | —  | —       | —  |
| „ „ „ Cartridges, 5d. each; box of 10, 3/7; large, 8/6 for 10.                                           | „ „ „ „                                        | —       | —  | —       | —  |
| Gun Cotton                                                                                               | „ „ „ „                                        | 1       | 4  | 14      | 0  |
| Hydrogen Peroxide, 20 vol.                                                                               | „ „ „ „                                        | —       | —  | 2       | 2  |
| Hydrokinone, Schering's                                                                                  | „ „ „ „                                        | 1       | 0  | —       | —  |
| „ Byk's Permanent                                                                                        | „ „ „ „                                        | 1       | 3  | —       | —  |

ALL GOODS AT LOWEST STORE PRICES.

## CHEMICALS.—Continued.

|                                                                                                                       | Per oz.<br>s. d. | Per lb.<br>s. d. |
|-----------------------------------------------------------------------------------------------------------------------|------------------|------------------|
| India-rubber Solution, per bottle, 1/- and 1/6.                                                                       |                  |                  |
| Iron, perchloride ... ..                                                                                              | 0 2              | 1 3              |
| „ protosulphate ... .. 7 lbs. 1/-                                                                                     | —                | 0 2              |
| Lead Acetate ... ..                                                                                                   |                  | 0 9              |
| Litmus Papers, red and blue, per book, -/2; per dozen books, 1/6                                                      |                  |                  |
| Magnesium Powder, best quality ... ..                                                                                 | 1 6              | 20 0             |
| „ Ribbon, ¼-oz. coils, 1/1; 1-oz. coils, 1/8.                                                                         |                  |                  |
| Mercury, Bichloride, powdered ... ..                                                                                  | —                | 4 6              |
| Metal ... ..                                                                                                          | 2 2              | —                |
| Metal Cartridges, 6 in box, per box, 2/9.                                                                             |                  |                  |
| Potash, Bichromate, powdered ... ..                                                                                   | —                | 1 0              |
| „ Carbonate, pure ... ..                                                                                              | 0 1              | 0 9              |
| „ Citrate (Neutral) ... ..                                                                                            | 0 3              | 3 0              |
| „ Nitrate, recryst. ... ..                                                                                            | —                | 0 6              |
| „ Oxalate Neutral ... ..                                                                                              | 0 2              | 0 9              |
| Potassium, Bromide... ..                                                                                              | 0 3              | 2 8              |
| „ Chloro-platinate, 6/- per drachm.                                                                                   |                  |                  |
| „ Ferridcyanide ... ..                                                                                                | —                | 5 0              |
| „ Hydrate, 2 ozs. in stop bottle, 5½d.                                                                                | 0 2              | 1 8              |
| „ Iodide ... ..                                                                                                       | 1 2              | 15 0             |
| „ Meta-bisulphite ... ..                                                                                              |                  | 3 6              |
| Rodinal, 1/6, 3/-, and 5/- per bottle.                                                                                |                  |                  |
| Silver, Nitrate, double cryst. (Johnson & Sons') ... ..                                                               | 2 6              | —                |
| (10 oz. 2/5, 50 oz. 2/3, net. Subject to market fluctuations.<br>Cash must accompany order.) 1 oz. bottles 1d. extra. |                  |                  |
| Soda, Acetate, double cryst. ... .. 7 lbs. 3/6                                                                        | 0 1              | 0 7              |
| „ Bicarbonate ... ..                                                                                                  | 0 1              | 0 4              |
| „ Carbonate, pure crystals ... ..                                                                                     | 0 1              | 0 6              |
| „ Caustic (pure) sticks... .. 2 ozs. in stop bottles 5½d.                                                             | 0 2              | 1 8              |
| „ Citrate... ..                                                                                                       | 0 4              | 3 6              |
| „ Hydrate ... .. 2 oz. in stop bottle 5½d.                                                                            | 0 2              | 1 8              |
| „ Hyposulphite, (best) 7 lbs. 1/-, 14, 1/8, per cwt. 8/6 cash                                                         | —                | 0 2              |
| „ Phosphate ... ..                                                                                                    | 0 1              | 0 10             |
| „ Sulphate ... ..                                                                                                     | —                | 0 3              |
| „ Sulphite (commercial) ... ..                                                                                        | 0 1              | 0 6              |
| „ „ re-crystallized ... ..                                                                                            | 0 2              | 1 0              |
| „ Tungstate ... ..                                                                                                    | 0 2              | 1 4              |
| Sulpho-Pyrogallol, per bottle 2/2                                                                                     |                  |                  |
| Talc, finest photographic ... ..                                                                                      | 0 1              | 0 6              |
| Uranium Nitrate ... ..                                                                                                | 2 4              | —                |
| Varnish, ADAMS & CO.'S ( <i>See Chemical Preparations</i> ).                                                          |                  |                  |
| „ Bates' Black, 5d. and 11d.                                                                                          |                  |                  |
| Water, distilled, 6d. per gallon; Carboys (returnable), 7/6.                                                          |                  |                  |

BOTTLES EXTRA.

ALL GOODS AT LOWEST STORE PRICES.

**ADAMS & CO'S DEVELOPERS.**

ADAMS & CO.'S 'CHALLENGE' Pyro and Ammonia Developer for all makes of Plates. In two solutions. Will keep for months. Price 1/-; postage, 6d.

ADAMS & CO.'S 'HYDROKINONE' Two-solution Developer. 10-oz. bottles. Price 1/-. A most admirable Developer, no stains, and suitable for all makes of Plates, Opals, Papers, and Lantern Slides; postage, 6d.

**ADAMS & CO'S REDUCER.**

A Rapid Reducer, and specially adapted for local reduction; does not alter colour of Negatives; is clean and certain. 1/-; postage, 6d.

**ADAMS & CO'S INTENSIFIER.**

A perfect medium for increasing the density of Negatives. Easy to use, certain in its action, in two solutions. Price 1/-; postage, 6d.

**ADAMS & CO'S 'SPECIAL' VARNISH.**

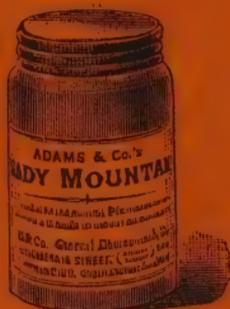
A special Varnish for Dry Plates. Hard and tough, does not become tacky, and is very repellent to moisture. No other make even approaches it for clearness and hardness.

|       |        |        |        |         |
|-------|--------|--------|--------|---------|
| 5-oz. | 10-oz. | 20-oz. | 40-oz. | Gallon. |
| 1/-   | 1/6    | 2/10   | 5/6    | 18/-    |

**ADAMS & CO'S 'ORDINARY' VARNISH.**

A good hard Varnish for every-day use. Kind to the Retouching Pencil.

|       |        |        |        |         |
|-------|--------|--------|--------|---------|
| 5-oz. | 10-oz. | 20-oz. | 40-oz. | Gallon. |
| -/9   | 1/3    | 2/3    | 4/3    | 16/-    |

**ADAMS & CO'S MATT VARNISH.**

For giving a ground-glass surface to backs of Negatives for working upon, &c.

*No Spirit Varnishes may be sent by post, or packed with other goods.*

|       |        |        |
|-------|--------|--------|
| 4-oz. | 10-oz. | 20-oz. |
| 1/-   | 2/4    | 4/-    |

**ADAMS & CO'S 'READY' MOUNTANT.**

A splendid medium; always ready and certain.

Strongly recommended. 6d. and 1/-; postage, 4½d.

**ADAMS & CO'S ENCAUSTIC PASTE.**

For giving to Photos a highly polished surface; very useful where Rolling is not attainable. 6d. and 1/- per bottle; postage, 3d.

**ADAMS & CO'S LUBRICATOR.**

FOR BURNISHING PRINTS.

No more prints spoiled in burnishing by using this solution. Price 6d. and 1/-

**ADAMS & CO'S HYPO-ELIMINATOR.**

It will eliminate every trace of hyposulphite of soda from your prints and plates in five minutes. 10-oz. bottles. 1/-; 20 oz. 1/10; 40-oz. 3/6.

**ADAMS & CO'S DEAD BLACK.**

Half the failures of amateurs arise from neglecting to occasionally overhaul their apparatus. The Dead Black can be used on wood, metal, or leather, dries quickly, and is a perfectly dead surface when dry. Price 6d. per 2-oz. bottle.

ALL GOODS AT LOWEST STORE PRICES.

**ADAMS & CO.'S INDIA-RUBBER SOLUTION.**

For mounting all chloride of silver papers, and preventing any deterioration of the surface. As specially recommended by the Britannia Works Company for their printing-out paper. 1/- and 1/6 per bottle; postage, 6d.

**ADAMS & CO.'S****'LUMINOTYPE' TONING AND FIXING BATH.**

For 'Luminotype,' Ilford Printing-Out, and Sollo Papers.

This is a special formula, which simplifies the processes of toning and fixing, as they are done in one bath and in a very short space of time. It is the best bath upon the market.

20-oz. bottle, 2/3; post free, 2/9.

**ADAMS & CO.'S TONING SOLUTION.**

Suitable for both ready-sensitized and other papers.

5 oz. bottles, 6d.; 16-oz. bottles, 1/-; postage, 4½d.

**ADAMS & CO.'S RETOUCHING MEDIUM.**

For giving a perfect surface or 'tooth' to negatives for retouching upon. May be used before or after varnishing.

Bottles, 6d. and 1/-; postage, 3d.

**ADAMS & CO.'S 'SPOTTING' SOLUTION.**

For spotting and blacking out skies or other objectionable portions of negatives, and will be found extremely useful for spotting silver and P. O. P. prints.

Price 6d. per bottle; postage, 3d.

**CONCENTRATED PREPARATIONS FOR TOURISTS.****PHOTOGRAPHIC TABLOIDS.**

These being prepared by dry compression do not decompose.

|                      |     |     |                     |                    |
|----------------------|-----|-----|---------------------|--------------------|
| Pyro Tabloids        | ... | ... | bottles of 25, 6d.; | bottles of 70, 1/- |
| Quinol               | ... | ... | ,, 25, 6d.;         | ,, 70, 1/-         |
| Accelerator Tabloids | ... | ... | ,, 30, 4d.;         | ,, 100, 9d.        |

**DEVELOPING CARTRIDGES.**

|           |     |     |     |                  |
|-----------|-----|-----|-----|------------------|
| AMIDOL    | ... | ... | ... | boxes of 6, 2/6. |
| METOL     | ... | ... | ... | ,, 6, 3/-        |
| EIKONOGEN | ... | ... | ... | ,, 10, 2/9.      |

**FIXING CARTRIDGES.**

Boxes of, containing 10 cartridges, each making 5 ozs. of fixing solution, 1/9.

Larger size, each making 20-ozs. solution, 5/-

TONING AND FIXING CARTRIDGES, BOXES OF TEN, 3/9.

## CARBON FILM CLOUD NEGATIVES.

These are the finest Cloud Negatives yet introduced, and will supersede all others; they embrace all the advantages of Glass, and Waxed Paper Negatives without the disadvantages of either.

They are *absolutely Permanent and Structureless*; a result hitherto unattainable except in Glass Negatives, which are heavy, fragile, and difficult to store.

The new Films are so transparent that they print *very quickly*, and can be used from *either side* to suit the lighting of view; they are not easily damaged, and can be preserved perfectly between the leaves of a book.

PRICES—Cab., 1/9; 8½ × 6½, 3/1; 10 × 8, 4/-; 12 × 10, 4/10; 15 × 12, 6/8 each.

## CUTTING GLASSES.

|                 |     |                  |     |
|-----------------|-----|------------------|-----|
| C.-D.-V. ... .. | 4d. | 8 × 6 ... ..     | 1/2 |
| 4 × 3 ... ..    | 5d. | 8½ × 6½ ... ..   | 1/4 |
| 4½ × 3½ ... ..  | 6d. | 9½ × 7½ ... ..   | 2/6 |
| 5½ × 3½ ... ..  | 6d. | 11½ × 9½ ... ..  | 3/- |
| Cabinet ... ..  | 7d. | 14½ × 11½ ... .. | 4/3 |
| 6½ × 4½ ... ..  | 8d. |                  |     |

These prices are for best quality plate glass, without handles.

These Cutting Shapes are of ground glass at bottom, enabling the print to be distinctly seen, and preventing the picture from slipping whilst cutting. It can be securely held by the handle (Fig. 201A).



Fig. 201A.

|          |     |       |          |     |     |         |           |
|----------|-----|-------|----------|-----|-----|---------|-----------|
| C.-D.-V. | ½   | 5 × 4 | Cabinet. | ½   | ½   | 9½ × 7½ | 11½ × 9½  |
| /8       | 1/1 | 1/2   | 1/2      | 1/3 | 2/6 | 3/6     | 5/- each. |

Complete in boxes, 1d. extra to ½ plate size, 2d. extra on larger sizes.

## ADAMS & CO.'S PARALLEL PRINT TRIMMER.

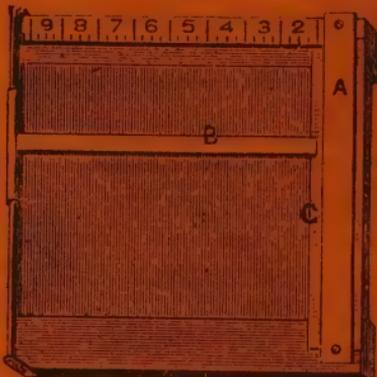


Fig. 203A.

Cuts any size of print exactly *true and square*, and is thus an advance on ordinary cutting shapes, the sides of which are rarely parallel. Not only does it cut the prints perfectly square, but also the exact size required by the operator. While not so costly as a complete set of cutting shapes, it is far more effective.

|                                |     |
|--------------------------------|-----|
| Price, to trimit up to 8½ × 6½ | 7/6 |
| 12½ × 10                       | 9/6 |

A larger size, suitable for 15 × 12 prints, or for cutting half-sheets of sensitized or albumenized paper, is 15/-

**25% SAVED** by dealing direct with **ADAMS & Co.**

# CISTERNS. — GALVANIZED IRON.



Fig 198A.

Made to hang, and fitted with brass tap or union, so that the cistern may be placed in any position by attaching a piece of india-rubber tubing.

PRICES.—12×8×10, 3½ gall., 6/6; 15×8×12, 5 gall., 8/6; 20×8×12, 7 gall., 11/-. Other sizes to order.



Fig 199A.

## GALVANIZED IRON CISTERN

### And Nickel-Plated Swing Tap.

This Cistern is made to hang against wall and holds three gallons.

The Nickel-Plated Swing Tap when in use is brought at right angles to cistern, when the spray will be over the sink or dish. When not in use the arm can be swung back. The rose will unscrew to fill bottles, etc.

Height, 13½ inches.

PRICES.

|                                |     |      |
|--------------------------------|-----|------|
| Cistern .. .. .                | 4/- | each |
| Brass Tap or Union ... ..      | 1/6 | „    |
| Nickel-Plated Swing Tap ... .. | 5/6 | „    |

**ADAMS & Co** 21 ALDERSGATE ST. E.C. (FACING THE STATION) AND 26 CHARING CROSS R.W.C. (ADJOINING THE CAMERA CLUB) (CHARING CROSS END) **LONDON**

ALL GOODS AT LOWEST STORE PRICES.

## ADAMS & CO.'S "A1" VENTILATED PORTABLE TENT.

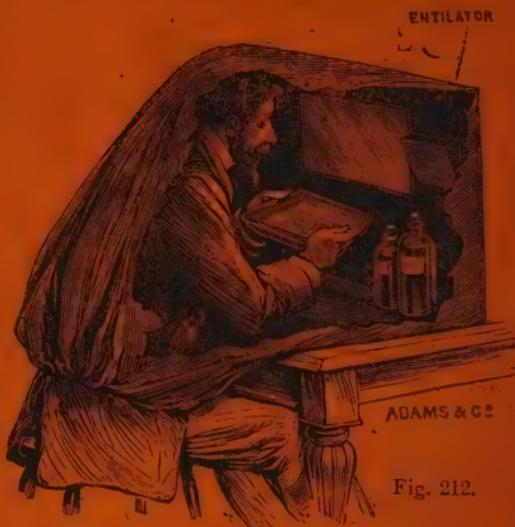


Fig. 212.

This is, without exception, the most perfect changing tent ever manufactured, and is extremely portable, the size when folded being only  $18\frac{1}{2} \times 13 \times 1$ , and the weight 5 lbs. When open, the working space from right to left is 33 inches, the rigid portion being 18 inches long  $\times$  12 broad  $\times$  12 high, and the remainder made flexible.

A greatly improved and efficient ventilator is now fitted.

Price 20/- net; postage -/9.

## ADAMS & CO.'S "CHALLENGE" DARK TENT.

This tent is specially recommended for travellers, as it is substantially made, and will stand much rough usage. It is made in the form of a neat case, the sides of which form the rigid sides of the tent. It is fitted with a window on runners, so that white light may be obtained if desired. It is suitable for developing any size plates up to  $8\frac{1}{2} \times 6\frac{1}{2}$ .

Size,  $24 \times 17 \times 5$ .

Weight 12 lbs.

Price £2.

Tripod for same, 18/6.

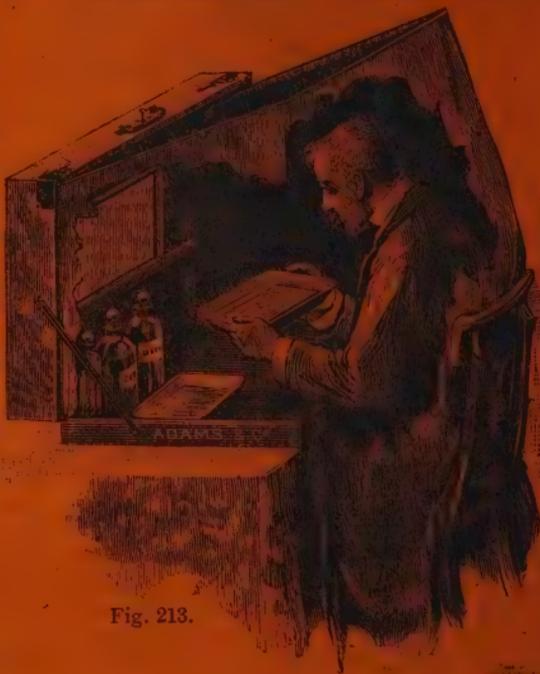


Fig. 213.

ALL GOODS AT LOWEST STORE PRICES.

## DARK SLIDE PROTECTORS.

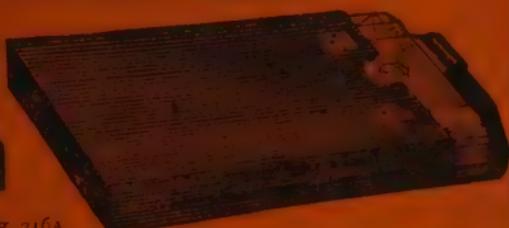


Fig. 216A.

Cloth covered, flannel lined. Keep your slides from getting scratched, or light from getting to them. In ordering state width, length, and thickness of slides. These are best quality. Usual sizes in stock.

|            |            |            |         |       |               |
|------------|------------|------------|---------|-------|---------------|
| 1/4-plate. | 1/4-plate. | 1/4-plate. | 10x8    | 12x10 | 15x12         |
| -/0        | ... -/9    | ... 1/3    | ... 1/6 | ... 2 | ... 2/9 each. |

## DEVELOPING DISH SCREENS



Fig. 217A.



Fig. 218A.

They are strongly made and covered in red cloth, and fold quite flat for travelling. Any size can be made to order. Are extremely handy in the dark-room.

|                 |           |           |           |        |       |        |                |
|-----------------|-----------|-----------|-----------|--------|-------|--------|----------------|
|                 | 1/4-plate | 1/4-plate | 1/4-plate | 10x8   | 12x10 | 15x12  | 16x14          |
| Length ... ..   | 7 1/4     | 9 1/4     | 11 1/4    | 12 1/4 | 15    | 18     | 19 1/2 inches. |
| Width ... ..    | 6         | 7         | 9 1/4     | 10     | 13    | 15 1/4 | 17 1/4 "       |
| Depth ... ..    | 2         | 2 1/4     | 2 1/4     | 2 1/4  | 2 1/4 | 2 1/4  | 2 1/4 "        |
| PRICE, EACH ... | -/8       | -/9       | -/10      | 1/-    | 1/3   | 1/6    | 2/-            |

Postage extra.

## ADAMS & CO.'S DEVELOPING DISH BOX.



These are made of japanned tin, and are perfectly light-tight. With the dish inside they may be taken into the daylight without risk of fogging the plate. These boxes are invaluable for slow and prolonged development.

Fig. 219A.  
(Registered No. 165237.)

|                        |           |       |                       |           |
|------------------------|-----------|-------|-----------------------|-----------|
| For 5x4-plates. ... .. | 2/6 each. | ..... | For 1/4 plates ... .. | 4/6 each. |
| " 1/4 " ... ..         | 3/6 "     | ..... | " 12x10 " ... ..      | 6 "       |

ALL GOODS AT LOWEST STORE PRICES.

**WHITE PORCELAIN DISHES.**



Fig. 230A.

| Size.         | Shallow, with Spout. | Deep with Spout. | Size.   | Shallow, with Spout. | Deep, with Spout. |
|---------------|----------------------|------------------|---------|----------------------|-------------------|
| 3 1/4 x 3 1/4 | ... -/5              | ... -/6          | 14 x 12 | ... —                | ... 4/2           |
| 4 1/4 x 3 1/4 | ... -/6              | ... -/7          | 16 x 12 | ... —                | ... 5/8           |
| 5 x 4         | ... -/7              | ... -/8          | 16 x 14 | ... —                | ... 8/2           |
| 7 x 5         | ... -/8              | ... -/10         | 18 x 16 | ... —                | ... 9/8           |
| 8 x 6         | ... -/9              | ... -/11         | 20 x 17 | ... —                | ... 15/-          |
| 9 x 7         | ... -/11             | ... 1/2          | 24 x 19 | ... —                | ... 21/8          |
| 10 x 8        | ... 1/2              | ... 1/4          | 24 x 20 | ... —                | ... 23/9          |
| 12 x 10       | ... 1/10             | ... 2/3          | —       | ... —                | ... —             |

**THE 'CLUB' DEVELOPING DISH**

Entirely prevents Stained Fingers, Air Bells, and Streaks. The simplest and most convenient dish made. Has a glass bottom, and a well at one end to hold developer when held perpendicularly. In use it is merely held to the light, when the developer runs into the well, and the density of plate can be seen without removing plate.



Fig. 228A.

1/4, 1/-    1/2, 1/6    3/4, 1/8    1, 2/9    1 1/2, 3/6    1 3/4, 4/6    1 1/2, 6/-

**LIGHT-TIGHT DEVELOPING DISH.**



Fig. 230A.

1/2-plate 1/8, post free 1/11  
 1/2 " 2/6, " 2/11  
 1 " 3/9, " 4/2  
 12 x 10 5/-, " 5/8

See its Advantages :

1. More light can, with perfect safety to the most sensitive plates, be used in the dark room. Isochromatic and other very sensitive plates requiring the greatest possible protection during development to avoid veiled negatives. 2. The operator may leave or go into the dark room at will during development of most rapid plate. 3. The sides being straight or upright, there is less tendency to spill the developer. 4. On tour the cover or lid may be used for fixing purposes if required. 5. Light, portable, and unbreakable.



### EBONITE OR CELLULOID DISHES.

Celluloid are in three different colours.

| For plates. | Each.   | Doz. | For plates. | Each.   | Doz. |
|-------------|---------|------|-------------|---------|------|
| 3½ × 3½     | ... -/5 | 4/6  | 8½ × 6½     | ... 1/2 | 13/6 |
| 4½ × 3½     | ... -/6 | 5/3  | 10 × 8      | ... 2/- | 20/6 |
| 5 × 4       | ... -/6 | 5/9  | 12 × 10     | ... 3/7 | 40/- |
| 6½ × 4½     | ... -/8 | 7/9  | 15 × 12*    | ... 5/- | 55/- |
| 7½ × 5      | ... 1/4 | 16/- | —           | —       | —    |

\* Celluloid only.

Fig. 222A.

### TRANSPARENT WHITE XYLONITE DISHES.

First quality, Clear as Glass, and Unbreakable.

| For Lantern Slides | each | s. | d. |
|--------------------|------|----|----|
| ¼-plate            | ...  | 0  | 9  |
| 5 × 4              | ...  | 1  | 0  |
| 7½ × 5             | ...  | 1  | 2  |
| 8½ × 6½            | ...  | 1  | 8  |
| 10 × 8             | ...  | 2  | 9  |
| 12 × 10            | ...  | 7  | 0  |
| 15 × 12            | ...  | 9  | 0  |



Fig. 223A.



### PAPIER MACHE DISHES.

Deep, and Finest Quality.

|           | each | s. | d. |           | each | s. | d. |
|-----------|------|----|----|-----------|------|----|----|
| 4½ × 3½   | ...  | 0  | 8  | 14½ × 12½ | ...  | 4  |    |
| 5½ × 4½   | ...  | 0  | 9  | 16½ × 14½ | ...  | 6  | 0  |
| 6½ × 4½   | ...  | 1  | 0  | 20½ × 16½ | ...  | 7  | 6  |
| 8½ × 6½   | ...  | 1  | 6  | 23½ × 19½ | ...  | 10 | 0  |
| 8½ × 10½  | ...  | 2  | 6  | 26 × 22   | ...  | 17 | 6  |
| 12½ × 10½ | ...  | 3  | 0  | 29½ × 25½ | ...  | 21 | 0  |

### GLASS DISHES.

With Spout, Ridges, and Place for Inserting Finger.

|         |     |   |   |
|---------|-----|---|---|
| 3½ × 3½ | ... | 0 | 8 |
| 4½ × 3½ | ... | 0 | 8 |
| 5 × 4   | ... | 0 | 9 |
| 6½ × 4½ | ... | 1 | 3 |
| 8½ × 6½ | ... | 2 | 0 |
| 10 × 8  | ... | 2 | 8 |
| 12 × 10 | ... | 3 | 4 |



### GLASS BOTTOM VARNISHED WOOD TRAYS.



|         | s.  | d.  |     | s.      | d.  |     |     |
|---------|-----|-----|-----|---------|-----|-----|-----|
| 3½ × 3½ | ... | 0   | 8   | ¼ size  | ... | 2   | 0   |
| ¼ size  | ... | 0   | 11  | 10 × 8  | ... | 2   | 6   |
| 5 × 4   | ... | 1   | 3   | 15 × 12 | ... | 4   | 0   |
| ½ size  | ... | 1   | 3   | 19 × 17 | ... | 8   | 0   |
| 24 × 19 | ... | ... | ... | 10s.    | ... | ... | ... |

Fig. 226A.

ALL GOODS AT LOWEST STORE PRICES.

# ADAMS & CO.'S 'CLUB' OPTICAL & ENLARGING LANTERN



Unrivalled for Enlarging from  $\frac{1}{4}$ -plate Negatives or for Lantern Exhibition.

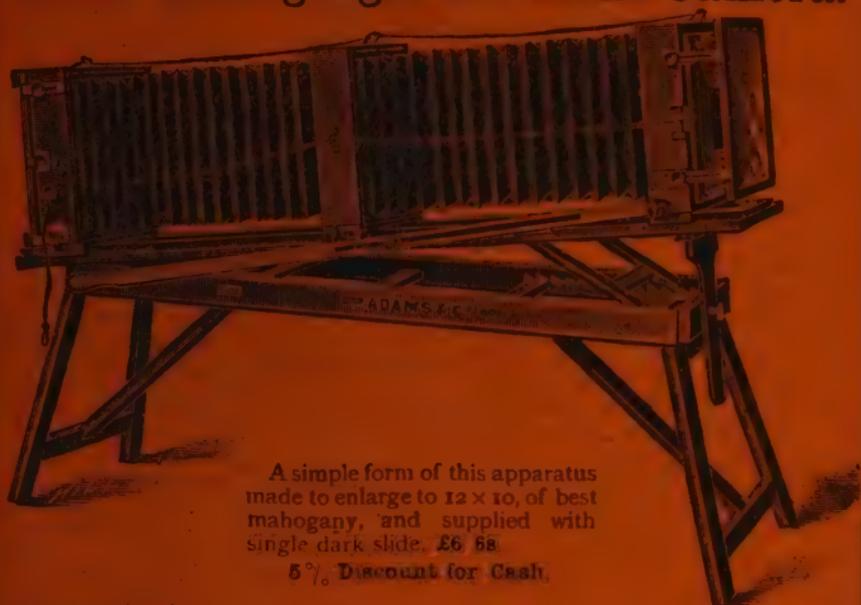
**T**HIS Lantern possesses many features which render it peculiarly distinct from any other form in the market. Many workers have been deterred from the fascinating pleasure of enlarging their good but small negatives simply on account of the cumbersome apparatus that has been hitherto required, and, moreover, because these large and expensive outfits are of no use for any other purpose. Seeing this, we have been enabled to design a Lantern which combines perfectly the every requirement of Lantern Exhibitors as well as enlargers. Through a new patent we have fitted this Lantern with a **Rectangular Condenser**, and this brilliantly illuminates every portion of a  $\frac{1}{4}$ -plate negative without the enormous loss of light which occurs in the bulky circular form. Moreover, when used for showing Lantern Slides it will cover every portion of a lantern plate more effectually than the ordinary 4-in. condenser ever does. Being of a longer focus, it has a flatter field, and this, in conjunction with a portrait combination objective of the highest quality, enables perfect definition to be obtained on the screen. It has bellows front, easily adjustable in any position, and, as the back portion of the bellows runs up to the front, it permits of the insertion of a small table between the objective and the condenser, so that it may be used for scientific purposes. It has a polished mahogany body with two panelled and moulded doors, with brass-bound sight holes, and sliding shutters lined with japanned tin; and has sliding tray and rod, best quality lime-light jet, double-pinion rack front with removable  $5\frac{1}{2}$ -in. portrait objective (permitting the insertion of a longer focus lens where required, without the slightest alteration to the lantern), the Patent Rectangular Condenser,  $4\frac{1}{2} \times 3\frac{1}{2}$ , and Carriers for Lantern and  $\frac{1}{4}$ -plates. The sliding front enables the Lantern to be closed very compactly, and the base board only measures  $17\frac{1}{2} \times 10\frac{1}{2}$  inches.

The Price, complete for everything as above, in case, with lock and key, is **£11 11s.**, less 5% for cash.

10-ft. Cylinders of Oxygen Gas, fitted with nipple, union, and key } **£2 8s. 6d.**  
complete, less 5% ... .. }

ALL GOODS AT LOWEST STORE PRICES.

## ADAMS & CO'S 'Club' Enlarging & Reducing Camera.



A simple form of this apparatus made to enlarge to 12 x 10, of best mahogany, and supplied with single dark slide. £6 6s.

5% Discount for Cash.

**T**HE difficulty of manipulating the fronts of enlarging Cameras, has previously been very great, but by means of a novel and simple piece of mechanism this has been entirely overcome, and the negative or transparency may be moved horizontally or vertically to any desired position, while the operator under the focussing cloth can clearly see what portion of the negative he requires in position. While the front permits of this easy adjustment from the rear, it is at the same time perfectly light-tight, and no light can reach the lens excepting through the negative.

A swing back is another important point in this instrument, and enables the operator to correct any errors in the lines of the negative when enlarging or reducing from it.

The bellows being detachable, the whole of the front portion may be at once removed, and the remaining portion then becomes an ordinary 15 x 12 **Studio Camera**, with swing back, and permits of upright or oblong pictures being taken.

Camera is of mahogany, French polished, rack-and-pinion adjustment to back, best cloth bellows, reversing front, with carriers from  $\frac{1}{4}$ -plate upwards, and with horizontal and vertical movements, which may be worked from the rear, dark slide with carriers to  $\frac{1}{4}$ -plate, swing back, &c. When closed, it packs into a very small compass.

**PRICES.** To Enlarge or Reduce from—

$\frac{1}{4}$ -plate to 12 x 10, £11 11s., 7 ft. extension. |  $\frac{1}{4}$ -plate to 15 x 12, £13 13s., 9 ft. extension.  
Portable Enlarging Table, £4 4s.

ALL GOODS AT LOWEST STORE PRICES.

# WATKINS' EXPOSURE METER.

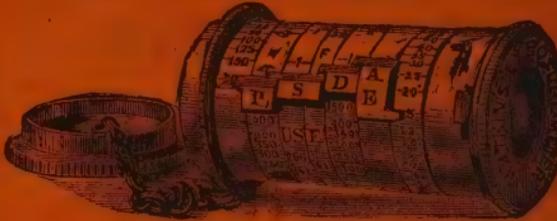


Fig. 243A.

It is equally applicable for Landscapes, Shutter Work, Sky Views, Sea Views, Portraits, Interiors, Architecture, Copying, Enlarging, Photo-Micrographs.

Rolls of Bromide Paper for Refilling, post free, 7d.

Price **13/3**; Postage *3d.*  
 Special form for Enlarging, and Copying, **16/6.**  
 Postage, *3d.*  
 New Junior Pattern, **7/-**  
 Postage, *3d.*  
 Complete with Full Instructions.



Fig. 242A.

WATKINS' EXPOSURE NOTE-BOOK, 1/4.

# THE ILFORD EXPOSURE METER.

THE Instrument is very neatly made in red and black vulcanite, and is so small that it will go in the waistcoat pocket. It is 3 inches in diameter, and weighs only 1 oz.

PRICE, complete in pigskin Purse; **4/9**, post free.



Fig. 244.

# THE 'INFALLIBLE' EXPOSURE METER

Is an unerring guide to the correct exposure required for every speed of plate, on every kind of subject and *under every condition of light.* Move the slide of the instrument until the Actinometer time in seconds upon the exposure slide is opposite the plate speed number. Then the correct exposure in seconds will be found *simultaneously* against each of the 27 graduated stops from the largest to the smallest.

The influence of every factor of exposure is in this simple rule calculated for.

Price, with Actinometer, Store of Sensitive Paper and Book of Instructions, complete, **4/6.** Per post **4/9.**

This is a very good thing indeed.

| NO. OF STOPS | ACTINOMETER | EXPOSURE |
|--------------|-------------|----------|
| 1            | 100         | 1/100    |
| 2            | 50          | 1/50     |
| 3            | 33 1/3      | 1/33 1/3 |
| 4            | 25          | 1/25     |
| 5            | 20          | 1/20     |
| 6            | 16 2/3      | 1/16 2/3 |
| 7            | 14 2/7      | 1/14 2/7 |
| 8            | 12 1/2      | 1/12 1/2 |
| 9            | 11 1/9      | 1/11 1/9 |
| 10           | 10          | 1/10     |
| 11           | 9 0/9       | 1/9      |
| 12           | 8 1/3       | 1/8 1/3  |
| 13           | 7 2/3       | 1/7 2/3  |
| 14           | 7           | 1/7      |
| 15           | 6 2/3       | 1/6 2/3  |
| 16           | 6           | 1/6      |
| 17           | 5 2/3       | 1/5 2/3  |
| 18           | 5           | 1/5      |
| 19           | 4 2/3       | 1/4 2/3  |
| 20           | 4           | 1/4      |
| 21           | 3 2/3       | 1/3 2/3  |
| 22           | 3 1/3       | 1/3 1/3  |
| 23           | 3           | 1/3      |
| 24           | 2 2/3       | 1/2 2/3  |
| 25           | 2 1/2       | 1/2 1/2  |
| 26           | 2 1/3       | 1/2 1/3  |
| 27           | 2           | 1/2      |

Fig. 245A.

## ADAMS & CO.'s FILM SUPPORT.

For Washing and Drying Celluloid Films.



Registered

No. 188,629.

Fig. 249A.

THIS has been specially designed by Captain Abney. One of the greatest objections to the use of Films has been the difficulty experienced in effectually washing them. By themselves they curl, and the film becomes damaged, and the water not coming into free contact with the surface, the hypo is not eliminated. By using the above support, these objections are overcome. The film is held perfectly flat, and may be placed in any washer in the same manner as a glass plate. They may afterwards be placed in a drying rack in the same way. They are made of non-corrosive and suitable metal, consequently the film is quite unaffected.

$\frac{1}{2}$  5x4  $\frac{1}{2}$   $7\frac{1}{2}$ x5  $8\frac{1}{2}$ x6 $\frac{1}{2}$  10x8 12x10 15x12  
-/5 ... -/6 ... -/7 ... -/9 ... -/10 ... 1/- ... 1/- ... 1/3 each.

## ADAMS & CO.'S PINHOLE LENS.

THIS Apparatus has been designed on the most improved principles to provide an easy method of taking the now popular 'pin-hole' pictures. Four different apertures are supplied, and their diameters are distinctly marked. They are accurately and carefully drilled and measured, the edges being smooth and thin, and properly blacked. Beautifully made in Aluminium.

PRICE 12/6 EACH NETT.



Fig. 347A.

# HERE!

Don't forget that we sell at very lowest trade prices. It PAYS to buy DIRECT from us, as you always receive the very Latest Patterns of all goods, and

THE FRESHEST OF PLATES AND CHEMICALS.

ALL GOODS AT LOWEST STORE PRICES.

# F I L M S.

It is most important that Films should be quite fresh. We have them in every few days.

## PRICES PER DOZEN.

|                                                                       | 4½ × 3½ |    | 5 × 4 |    | 6½ × 3½ |     | 6½ × 4½ |    | 7½ × 5                |    | 8½ × 6½ |    | 10 × 8 |           | 12 × 10                               |            | 15 × 12 |     |
|-----------------------------------------------------------------------|---------|----|-------|----|---------|-----|---------|----|-----------------------|----|---------|----|--------|-----------|---------------------------------------|------------|---------|-----|
| ADAMS & CO'S 'Perfect' ... }<br>Thickly Coated, Sens No. 24-25. }     | s.      | d. | s.    | d. | s.      | d.  | s.      | d. | s.                    | d. | s.      | d. | s.     | d.        | s.                                    | d.         | s.      | d.  |
|                                                                       | 1       | 11 | 3     | 2  | 3       | 6   | 4       | 3  | 6                     | 3  | 7       | 4  | 12     | 6         | 20                                    | 0          | 81      | 6   |
| THOMAS' Thick. Coat. Ex. Rapid, }<br>or Thickly Coated Landscape... } | 1       | 5  | 2     | 2  | 3       | 0   | 3       | 3  | 4                     | 2  | 6       | 0  | 9      | 3         | 13                                    | 3          | 21      | 0   |
| Do. Sandell do. 28 W. ... per doz.                                    | 2       | 4  | 3     | 7  | 4       | 9   | 5       | 3  | 7                     | 6  | 9       | 6  | 13     | 10        | 19                                    | 6          | 37      | 0   |
| Do. do. per ½-dozen                                                   | 1       | 5  | 2     | 1  | 2       | 7   | 2       | 10 | 4                     | 1  | 5       | 3  | 7      | 5         | 10                                    | 6          | 19      | 6   |
| FITCH'S Negative ... }<br>" extra thick }                             | 1       | 8  | 3     | 0  | 3       | 4   | 3       | 10 | 6                     | 0  | 6       | 8  | 11     | 6         | 19                                    | 0          | 30      | 0   |
| EDWARDS & Co.'s Isochromatic }<br>or Special Instantaneous ... }      | 3       | 6  | 4     | 6  | ...     | ... | 8       | 0  | 12                    | 0  | 14      | 0  | 18     | 0         | ...                                   | ...        | ...     | ... |
| EDWARDS' A, also supplied in }<br>½-dozen ... }                       | 1       | 6  | 2     | 6  | 3       | 0   | 3       | 8  | 5                     | 3  | 6       | 6  | 10     | 0         | 16                                    | 0          | 24      | 0   |
| EASTMAN'S Spools to fit Roll- }<br>holder for 24 exposures ... }      | 2       | 0  | 3     | 0  | ...     | ... | 4       | 6  | (26 expo- }<br>sures) | 8  | 0       | 12 | 0      | 9 × 12 CM | 13 × 18 CM }<br>(27 expo- }<br>sures) | 18 × 24 CM | ...     | ... |
| Ditto, ditto, 48 exposures ... }                                      | 4       | 0  | 6     | 6  | ...     | ... | 9       | 6  | 12                    | 6  | 16      | 6  | 25     | 0         | 5                                     | 0          | 12      | 6   |
|                                                                       | 8       | 0  | 13    | 0  | ...     | ... | 19      | 0  | 25                    | 0  | 33      | 0  | 50     | 0         | 10                                    | 0          | 25      | 0   |

ALL GOODS AT LOWEST STORE PRICES.

### FOCUSSING CLOTHS.

Made Focussing Cloths, ready for use, of best velvet, lined with yellow, and loaded in the corners to prevent blowing about. Very handy and complete, and suitable sizes, and strongly recommended.

| No.                                                              | Size    | Lined. | Unlined. | Postage. |
|------------------------------------------------------------------|---------|--------|----------|----------|
| No. 1.                                                           | 36 × 22 | 4-     | 3-       | - 3      |
| " 2.                                                             | 44 × 30 | 5/6    | 4-       | - 4½     |
| " 3.                                                             | 44 × 36 | 7/-    | 5/6      | - 6      |
| The new Waterproof Cloth ... 36 × 30 in., 4/- ; 36 × 63 in., 7/- |         |        |          |          |
| Best Black Velvet, 25 in. wide, 1 2 per yard.                    |         |        |          |          |

### FOCUSSING SCREENS.

Celluloid Screens, same thickness as ground glass, but light and unbreakable.

|          |       |          |        |          |          |
|----------|-------|----------|--------|----------|----------|
| ¼-plate. | 5 × 4 | ¼-plate. | 7½ × 5 | ¼-plate. | 10 × 8   |
| 7/8      | - 10  | 1 2      | 1 8    | 2-       | 3- each. |

### ADAMS & CO.'S NEW FRAME MOUNTS.

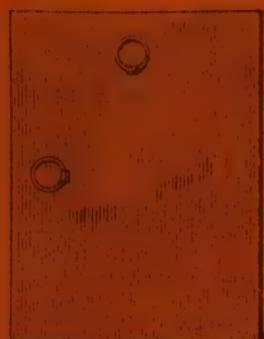
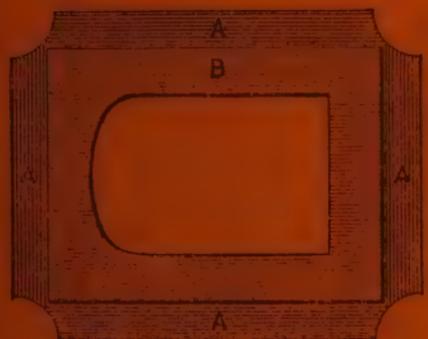


Fig. 256A.

The Frame Mounts are for holding and exhibiting Photos, and are intended for the purpose of using up waste negatives by mounting, either by optical contact or merely placing the prints behind the glass.

They consist of an imitation leather frame, with the edges glued for folding over, and are supplied with cardboard backs, fitted with rings suitable for hanging either landscape or portrait pictures. They have the appearance of real leather, and are of different shapes, and can be made in all sizes.

¼ and ½-plate 1/- per packet, postage 3d. The ¼-plate packet contains 12 complete frames of three shapes, and of six different patterns. The ½-plate, 8 frames, ditto, ditto. ¾-plate, 3/- per dozen. 1 1/8-plate, 4/6 per dozen, postage 6d.

ANY SIZE TO ORDER.

ALL GOODS AT LOWEST STORE PRICES.

# ADAMS & CO.'S RETOUCHING & SPOTTING SET



This is a capital new set, and one that has been very much wanted. It contains everything necessary, and of best quality.

One Retouching Pencil, one box re-fill Leads (three grades), one bottle Spotting Medium, one bottle Retouching Medium, one small Spotting Brush, and one large ditto. All fitted complete in a neat small covered case.

Price 2s. complete.  
Postage 3d.

Wonderfully cheap and thoroughly recommended.

HEAD REST  
RULE JOINT

Fig. 1.—A good simple Head-Rest, and a very cheap line. 9/10 each. Packing 2d.



## Adams & Co.'s Cheap and Effective Head-Rests

HEAD REST  
RULE JOINT

Fig. 2.—Similar to No. 1, but with Back Rest. 13/6 each. Packing 3d.



# ADAMS & CO.'S 'CHALLENGE' LAMP.



OIL or GAS. Fig. 274A.

Size of front glasses,  $7\frac{1}{2} \times 9\frac{1}{2}$  inches. Regulated and filled from outside. Is well ventilated.

RUSSIAN IRON TOP, RUBY GLASS AND CANARY FABRIC (in metal frame).

*When ordering kindly state whether for Gas or Oil*

Price complete, 8/-



Fig. 269A.

The 'ACCURATE,' 4/6.



Fig. 270A.

The 'FOLDING LAMP,' 3/6. (Open)



Fig. 271A.

No. 2. 'GEM,' 3/-  
Reg. Glass Sliding Door.

ALL GOODS AT LOWEST STORE PRICES.

## ADAMS & CO.'S 'Perfect' GAS LAMP.

Fig. 278A.

Glasses are removable, and permit of any colour, fabric, or glass being used. Chimney is of Russian iron, thus avoiding the unpleasant smell of japan. It is a first-class article in every respect.

Price ... '12/6.

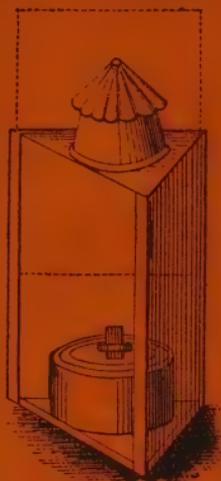


Fig. 276A.

Fig. 276A.  
Triangle, with lamp to burn Colza, 1/-, or square for Night Light, price 7½d.

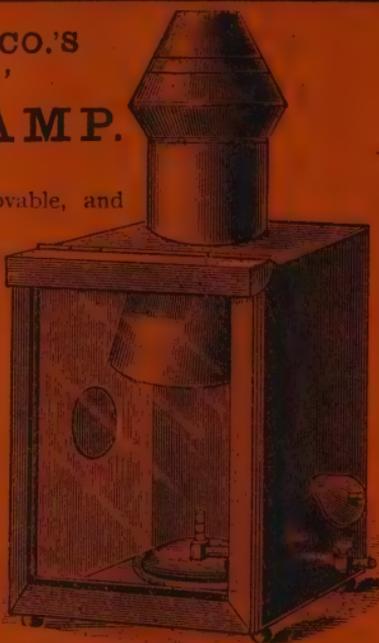


Fig. 278A.

## ADAMS & CO.'S Holiday Lamp.

This handsome and portable lamp is equally suitable for the drawing-room or dark-room.

Portable—Cleanly—Handsome.

Post free, 10/-.



Fig. 289A.—Open for use. Special candles for same, 1/- box.



Fig. 290A.—Packed for travelling.

## Adams & Co.'s 'Club' Folding Lamp.

This, as will be seen by illustration, folds perfectly flat.

Price, complete, 2/-.

Postage, 3d.

Extra lights, 2d. each.

Or in neat cloth-covered travelling case, with elastic band, 2/6; postage, 3d.  
Cheap Form, but not recommended, 1/-.

Postage, 3d.



Fig. 291.

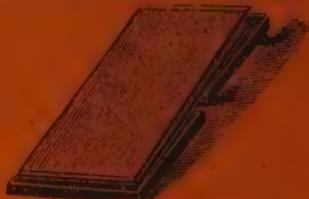


Fig. 292.

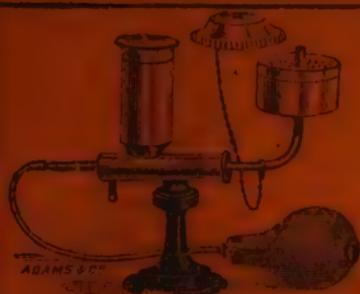


Fig. 297A.

## ADAMS & CO.'S 'Repeating' Flash Lamp.

Holds about two dozen charges without refilling. The powder is sent into the centre of the flame, and is therefore wholly consumed without waste.

Price 8/-; postage, 4½d.

## 'Challenge' Flash Lamp.

Cheapest in the market, and simple in construction and working. The funnel having previously been charged with powder, the spirit lamp is lit and the powder blown through the flame. Two or three lamps will supply, at a trifling cost, sufficient illumination for large interiors or groups, and can, by means of the connecting pieces, be all operated from one mouth-piece. Price 1-; postage, 3d. Connecting pieces for using any number of lamps up to three, 6d. each.



Fig. 298A.

## 'CONTINUOUS' MAGNESIUM LAMP.

For Instantaneous or Continuous Exposures.



Fig 302A.

The special features of this Lamp are:—The production at will of an **INSTANTANEOUS** or **CONTINUOUS** Flash; complete combustion of the powder; flash in form of large sheet, thus affording a large illuminating surface; can be used singly or in batteries of two, three, or more lamps, and is suitable for interiors, single-figure subjects, small and large groups, copying pictures, &c.

Complete, 11/6; by post, 11/9.

ALL GOODS AT LOWEST STORE PRICES.

## ADAMS & CO.'S 'PERFECTION' RUSSIAN IRON LANTERN.

COMPACT! LIGHT! PORTABLE!

£3 10s. 0d.

Entire brass fronts, best Lenses, compound 4-inch plano-convex Condensers, and fitted with 'Club' 4-wick Lamp of marvellous illuminating power, nearly equal to limelight.

Complete, in Case, £3 10s.



Fig. 302A.

## ADAMS & CO.'S 'SPECIALITE.'

25/-

Japanned Tin Lantern, with sliding front tube and brass O.G., fitted with a 4 inch compound condenser, in brass cell (two plano-convex lenses), and a double combination achromatic front objective, with rack and pinion adjustment and flash shutter, and a 3-wick Russian iron paraffin lamp, with wicks  $1\frac{1}{2}$ -inch wide and jointed Russian iron chimney, in stained and varnished wood box, with hooks and eyes and brass handle, price 25/- net; or with BRASS fronts, 29/- net.

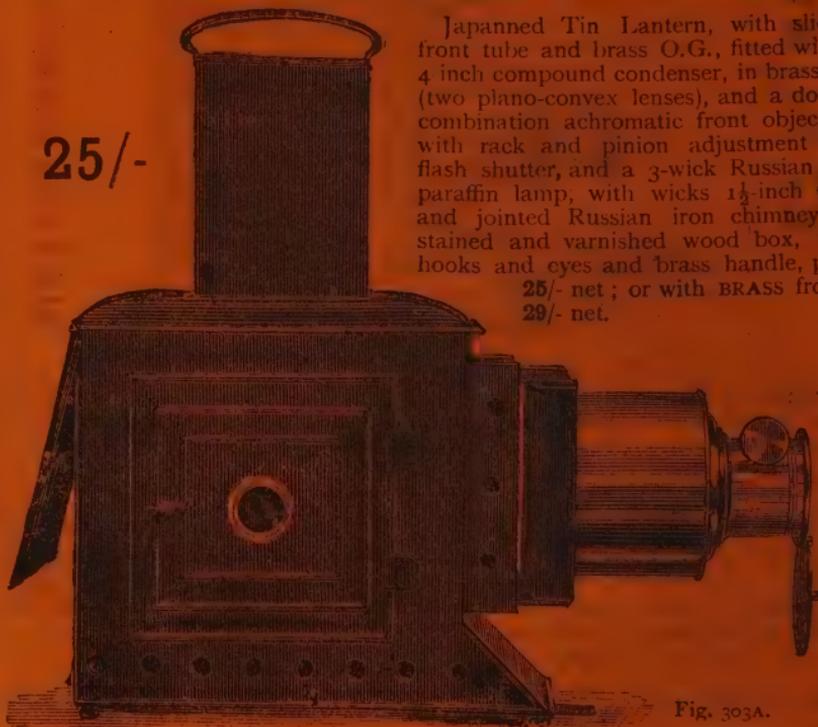


Fig. 303A.

ALL GOODS AT LOWEST STORE PRICES.

SPECIALITY FOR 1894-95:

THE CHEAPEST HIGH-CLASS LANTERN EVER  
PLACED ON THE MARKET.

ADAMS & CO.'S

'CHALLENGE' BI-UNIAL LANTERN.

£7 7s. NET CASH.



IT DEFIES COMPETITION.

Fig. 304A.

**T**HIS high-class Dissolving-View Lantern is made of well-seasoned polished mahogany, and lined with japanned tin. It is fitted with entire brass fronts and lens tubes, beautifully lacquered, also brass rail handles and flashers, and has rolling-curtain effect. It has two 4-in. double plano-convex Condensers of an improved form, which permits of their being easily cleaned. Great attention has been paid to the Lenses, which are specially selected, and are of a large size, giving a very brilliant picture. The Lenses have also double rack and pinion and slot at the front for tinting glasses. This Lantern is equally serviceable for the drawing-room, or the largest public hall.

**PRICE SEVEN GUINEAS NET CASH.**

Blow-through Jets for the above from 12s. each. Cases, with Lock and Key, 15s. each. Dissolving Taps, 15s. each.

Send for Adams & Co.'s Annual and Catalogue, 6d., post free, 1s.

ALL GOODS AT LOWEST STORE PRICES

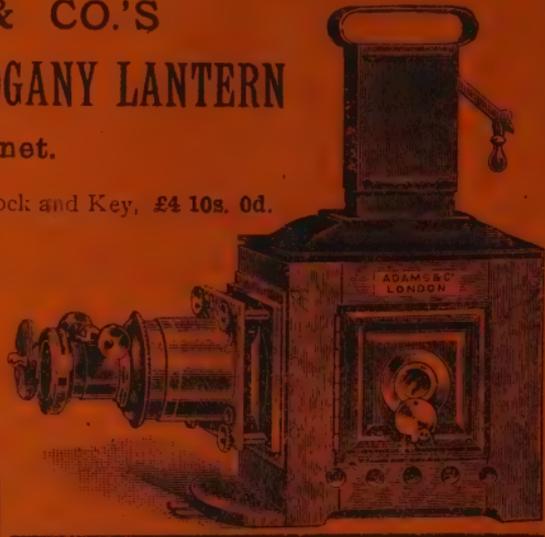
# ADAMS & CO.'S 'CHALLENGE' MAHOGANY LANTERN

£4 10s. net.

Fitted complete, in Case with Lock and Key, £4 10s. 0d.

Best polished mahogany, two panelled doors, entire brass fronts, large diameter Lenses with double pinion adjustment and fitted with the new 'Club' Lamp, giving greatly increased illuminating power.

May also be had for Limelight.



# ADAMS & CO.'S 'CLUB' Bi-unial Lantern.

Highest quality & Finish throughout.

£18 18s. 0d.

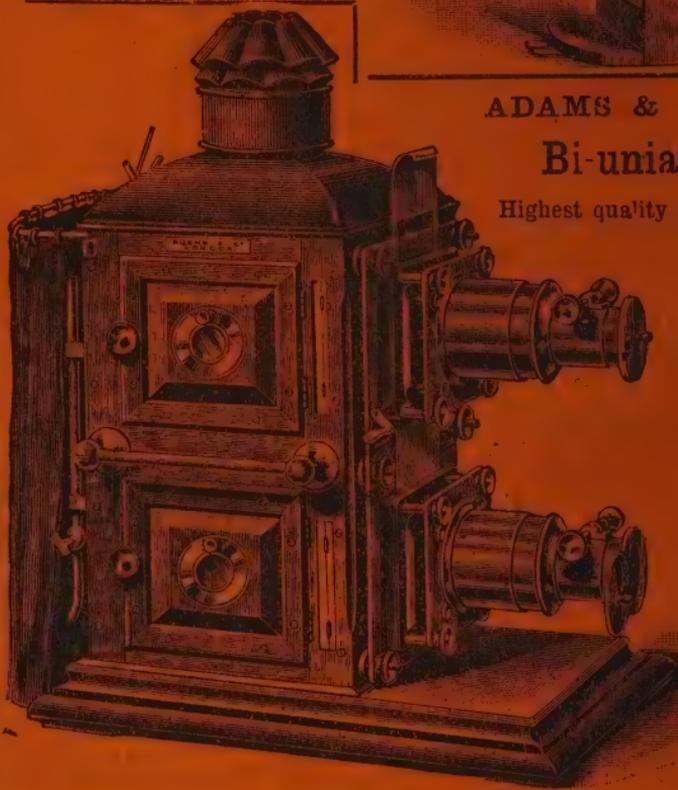
NET CASH.

Complete with all Fittings.

Made throughout of very best mahogany, panelled doors, entire brass fronts, brass rails, brass supply tubes and bye pass dissolver, plush velvet curtains at back, 4-in. compound condensers, extra large combination front lenses with interchangeable barrels, pair of best safety blow-through lime-light jets, and Rack-work Rolling Curtain effect. The whole fitted complete, in strong case, with two locks and keys.

£18 18s. 0d.

NET CASH.



**ADAMS & Co** 21 ALDERSGATE ST. E.C. LONDON  
FACING THE STATION & 20, CHARING CROSS R.W.C. ADJOINING THE CHERRY TREE (CHARING CROSS END.)

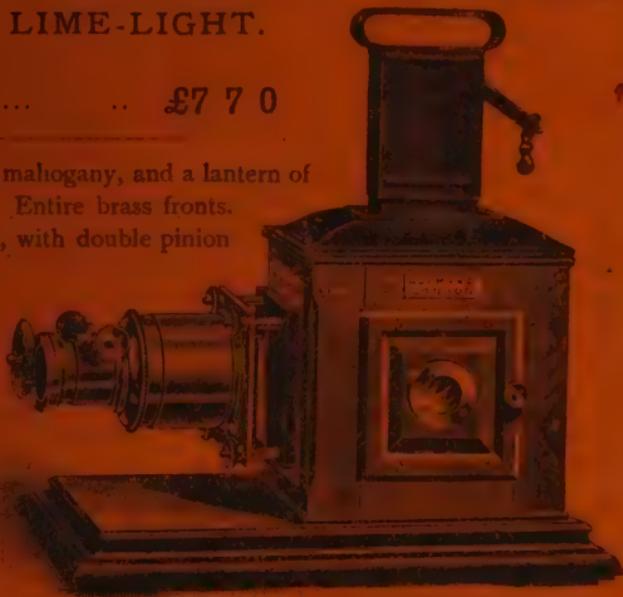
ALL GOODS AT LOWEST STORE PRICES.

# ADAMS & CO.'S 'CLUB' MAHOGANY LANTERN,

OIL OR LIME-LIGHT.

Complete ... .. £7 7 0

Made in very best mahogany, and a lantern of the highest class. Entire brass fronts. Extra large Lenses, with double pinion adjustment, and fitted with new 'Club' Lamp, or blow through lime-light jet.



Price complete, in case with lock and key, .. .

£7 7 0

FIG. 305A.

PURCHASE ALL YOUR  
LANTERN REQUISITES  
FROM ADAMS & CO.

DON'T FORGET that we only charge 11½d. per dozen for Lantern Plates by the leading first-class makers.

We GUARANTEE NEVER to sell you OLD STOCK.

If you fail to make clean, clear slides, it is most probably because you are not buying plates QUITE FRESH.

SEND TO US AND YOU WILL BE SAFE.

ALL GOODS AT LOWEST STORE PRICES.

# ADAMS & CO.'S 'CLUB' LANTERN SLIDE CAMERA



Fig. 306A.

**THE** only Lantern Slide Camera that perfectly fulfils every requirement of the practical worker. It is made of polished mahogany, and has reversing front with horizontal and vertical movements, enabling the operator to correct any small error in the negative. The swing back is also another most important point, especially to hand camera workers, allowing, as it does, the operator to correct lines that are out of the perpendicular. It is made so that it will take customer's own  $\frac{1}{2}$ -plate or  $\frac{1}{4}$ -plate lens, and has rack and pinion focussing for fine adjustment.

$\frac{1}{2}$ -Plate with  $\frac{1}{4}$ -plate Carrier, £3 3s. ;  $\frac{1}{4}$ -plate with  $\frac{1}{2}$  and  $\frac{1}{4}$ -plate Carriers, £3 15 ; 12x10 with Carriers, £4 15s. Cash discount, 5 per cent. Or fitted with R. R. Lens, 20/- each extra.

## ADAMS & CO.'S LANTERN REQUISITES.

(Insist on seeing our label on box, as they are the most perfect on the market. Any sized opening cut to order, 1s. 3d. per 100.)



### Lantern Masks, white one side, same price.

- |                                                                           |                                                                     |
|---------------------------------------------------------------------------|---------------------------------------------------------------------|
| No. 1. Dome shape.                                                        | No. 12. Oblong cushion, $2\frac{1}{4} \times 2\frac{1}{4}$ opening. |
| " 2. Circle "                                                             | " 13. Do. do. $2\frac{1}{4} \times 2\frac{1}{4}$ "                  |
| " 3. Cushion "                                                            | " 14. Do. do. $2\frac{1}{4} \times 2\frac{1}{4}$ "                  |
| " 4. Oblong cushion for reductions.                                       | " 15. Square opening, $2\frac{1}{4}$ sq.                            |
| " 5. Oval shape.                                                          | " 16. Circle $2\frac{1}{4}$ diameter.                               |
| " 6. Assortment of 50, with sufficient binding for 50 slides.             | " 17. " $2\frac{1}{4}$ "                                            |
| " 7. Adhesive binding for 100 slides, in black, orange, maroon, or green. | " 18. " $2\frac{1}{4}$ "                                            |
| " 8. 100 Masks only, assorted.                                            | " 19. Cushion $2\frac{1}{4} \times 2\frac{1}{4}$                    |
| " 9. Oblong cushion, $2\frac{1}{4} \times 1\frac{1}{4}$ opening.          | " 20. " $2\frac{1}{4} \times 2\frac{1}{4}$                          |
| " 10. Do. do. $2\frac{1}{4} \times 2\frac{1}{4}$ "                        | " 21. " $2\frac{1}{4} \times 2\frac{1}{4}$                          |
| " 11. Do. do. $2\frac{1}{4} \times 2\frac{1}{4}$ "                        | " 22. Oval, $2\frac{1}{4} \times 1\frac{1}{4}$                      |
|                                                                           | " 23. " $2\frac{1}{4} \times 1\frac{1}{4}$                          |
|                                                                           | " 24. " $2\frac{1}{4} \times 2\frac{1}{4}$                          |

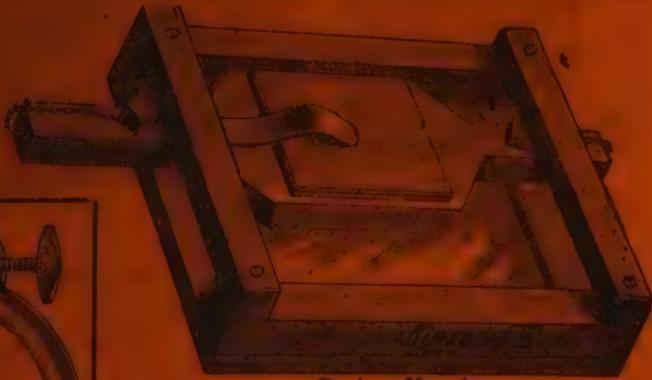
Sufficient for 100 Slides, Price 1/-

### Lantern Cover Glasses.

$3\frac{1}{2} \times 3\frac{1}{2}$  Best crown, -/4 $\frac{1}{2}$  per dozen ; 4/- per gross. Extra thin, white, very best quality, -/7 $\frac{1}{2}$  per dozen ; 7/- per gross.

ALL GOODS AT LOWEST STORE PRICES.

## ADAMS & CO.'S REGISTERED LANTERN SLIDE-FRAME.



Register No. 163,571.

By using this frame any part of a negative may be selected, even the extreme corners; and, should any part of the picture be out of the upright, it can at once be adjusted, and the lantern plate cannot slip or get scratched. Takes any size up to  $\frac{1}{4}$ -plate.

*Photography says*—'Is extremely simple, and will commend itself to all makers of lantern slides.' Price 3/6; postage -/6. Polished mahogany and best finish 6/6; postage -/6. Carriers,  $\frac{1}{4}$  and  $\frac{1}{4}$ -plate, -/6 the two.



Fig. 600a.

## ADAMS & CO.'S

## REVOLVING VICES

For facilitating the troublesome operation of binding lantern slides. The rubber cheeks of this machine press the slide, mat, and cover glass into close contact; the whole can then be revolved. This leaves both hands at liberty for manipulating the gummed binding slip, which can then be more readily and neatly applied, as there is no possibility of the glasses slipping.

Fig. 600a Price 1/- Postage 4½d.

Fig. 601a 2/- Postage 6d.

Extra Finish and Nickel 3/-



Fig. 601a.

ALL GOODS AT LOWEST STORE PRICES.



## ADAMS & CO'S 'CLUB' OPAQUE LANTERN SCREENS (AND BACKGROUNDS).

**C**AN be fastened to a wall or suspended from a ceiling in a moment. They are made of strong cloth with distemper surface, and are beautifully smooth and quite Opaque. They are supplied on rollers with pulleys and cords complete, ready for use.

### PRICES:

6 ft. x 6 ft. 20/-; 7 ft. x 7 ft. 23/-; 8 ft. x 8 ft. 25/-; 9 ft. x 9 ft. 30/-;  
10 ft. x 10 ft. 35/-; 12 ft. x 12 ft. 53/6; 15 ft. x 15 ft. 100/-.

## Adams & Co.'s 'Blotting' Books. SMOOTH PAPER.

**T**HESE books are unequalled for drying prints.

They are made of a specially prepared and highly absorbent paper, with a SMOOTH, hard surface. Prints are therefore dried evenly and without objectionable markings or the unsightly fluff caused by ordinary blotting papers.

7 x 5 6d.; 9 x 7 9d.; 12 x 10 1/6 each.



## ADAMS & CO'S 'IDEAL' EURYSCOPE.

Made in Quarter-plate size only.

**W**E can supply this first-class Lens as fitted to our 'Ideal,' separately. It is of 5 1/2 in. equiv. focus, and works at f/6. Complete with stops, 35/- With Iris Diaphragms, 25/- Less 10 per cent. discount. A Magnificent Lens.

# ADAMS & Co

31 ALDERSGATE S. E.C.  
FACING THE STATION & AT  
THE CHARGING CROSS, E.W.C.

# LONDON

ALL GOODS AT LOWEST STORE PRICES.

## LANTERN DEVELOPING DISH.



Fig. 369A.

Wooden sides, doubly varnished, and glass bottom with spout. The very best for developing.

Price 8d. each.

## TRANSPARENCY COLOURS.

For Painting Lantern Slides (either Oil or Water-Colours.)



Fig. 337A.

The OIL SET is an extremely handsome japanned Pin-Box of Varnish Painting Colours, containing Ten Tubes, Bottle of Varnish, Brushes, Palette, etc. 5/10. Post free, 4/2. Extra large size, 8/- Complete, post free.

The WATER COLOUR SET is packed in a Mahogany Slide-top Box, and consists of Twelve Colours, Varnish, Palette and Brushes, with Instructions.

Price 3/10; Post-free 4/2.

## LANTERN SLIDE-MAKING CAMERA



Fig. 388A.

Three sizes, the smallest making Slides from  $\frac{1}{2}$ -plate negatives, the next from whole plate, and the largest, an adjustable one, taking all sizes from  $12 \times 10$  downwards. Prices complete, with excellent Lens,  $\frac{1}{2}$ -plate, 11/0, whole-plate, 13/9,  $12 \times 10$ , adjustable to any size, 23/-

These Cameras are square, and take in the full width of the negative, and an equal extent of the length; but when desired, they are made in the same shape as the negative, so as to take in the whole of it. The latter form of Camera is 2/- extra on the  $\frac{1}{2}$ -plate, and 2/0 extra on the whole-plate.

ALL GOODS AT LOWEST STORE PRICES.

# NEW TELE-PHOTO LENS.



Fig. 352A

**T**HIS Lens is constructed to give rapid pictures of distant objects, the details of which can only be discerned with a telescope, and may be used on all ordinary long-focus tourist cameras.

It consists of the 'Panorthoscopic' Extra Rapid Rectilinear Lens in front of the instrument, forming the positive system of the combination, and of a negative-amplifying system placed at the back, and controlled by a rack and pinion adjustment for varying the amplifying powers, as shown on the engraved scale. The numbers marked on the tube opposite those of powers, 'or times,' show the correspondent extension of camera necessitated for these powers, and measured from the back lens (negative system) to the ground glass.

Supposing we wish to work with power 6, we place the indicating arrow against this number. We read at once in regard of 6, number 16, this means that our ground glass must be distant of 16 inches from back lens of the Tele-Objective.

It is now easy to appreciate the great advantage of this regulation, which avoids necessity of focussing the object on the screen, and assures a perfect result in all cases.

The negative system (amplifier) is formed of two Meniscus Concavo Lenses, made with the new Jena glass, of which the indexes of refraction as well as the dispersive powers admirably suit the construction of this special optical system.

The latter, in combination with the 'Panorthoscopic' Lens, gives splendid pictures, perfectly rectilinear, of great brilliancy and depth of focus. It possesses enormous advantages when used for

## Marine Views and Mountainous Sceneries.

Architectural subjects, in which the defects of perspective (more or less inherent to all wide-angle lenses), are totally destroyed.

The 'Panorthoscopic' Lens may be detached and used on the front board of the Camera for Instantaneous subjects, Portraits, Groups, Landscapes, &c.

### PRICES OF THE TELE-PHOTO LENS.

|                                                  |                           |        |
|--------------------------------------------------|---------------------------|--------|
| For 5 x 8 or $\frac{1}{2}$ -plate Cameras ... .. | In Brass mounting ...     | £5 4 0 |
| Varying powers : 3 to 8 times ... ..             | In Aluminium mounting ... | 7 4 0  |
| For 7 x 9 or $\frac{1}{4}$ -plate Cameras ... .. | In Brass mounting ...     | 6 8 0  |
| Varying powers : 5 to 10 times ... ..            | In Aluminium mounting ... | 8 16 0 |

*In Morocco Case, with Instructions for Use.*

ALL GOODS AT LOWEST STORE PRICES.

# ADAMS & CO.'S 'CHALLENGE' LENSES.

Subject to 10 per cent. Discount for Cash with Order.

These Lenses are specially manufactured for us to our instructions, and now sufficiently well known to be classed amongst first-class Lenses. They are supplied upon seven days' approval, and if not approved of during that time, they can be exchanged for any other make.

We absolutely guarantee all our Lenses to possess marvellous depth of focus, wonderful brilliancy of image, and extraordinary flatness of field.

## ADAMS & CO.'S

### 'Challenge' Rapid Rectilinear.

With set of 'Waterhouse' Diaphragms, in leather case, cut and working to the standard sizes of the British Photographic Society.

For Groups, Landscapes, Architectural and Instantaneous Work, and Copying.



Fig. 343A.

| Back Focus.             | Size Covered.                               | Waterhouse Stops. | Iris Diaphragms. |
|-------------------------|---------------------------------------------|-------------------|------------------|
| 4 $\frac{3}{4}$ inches. | 4 $\frac{1}{2}$ x 3 $\frac{1}{2}$ and 5 x 4 | £1 7 0            | £1 15 6          |
| 7 $\frac{1}{2}$ .....   | 6 $\frac{1}{2}$ x 4 $\frac{1}{2}$ and 7 x 5 | 1 13 0            | 2 5 0            |
| 11 .....                | 8 $\frac{1}{2}$ x 6 $\frac{1}{2}$           | 2 15 0            | 3 10 0           |
| 13 $\frac{1}{2}$ .....  | 10 x 8                                      | 4 0 0             | 4 17 6           |

## ADAMS & CO.'S 'CHALLENGE' PORTRAIT LENSES.

With Rack and Pinion Adjustment, and with set of 6 Waterhouse Diaphragms, in leather case.

|                                                                                                                                                               |         |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| 1/2 plate. Diameter of lenses, 1 $\frac{1}{2}$ in.; back focus, 4 $\frac{1}{2}$ in.; distance from subject for full-length Carte-de-Visite, 15 feet           | £1 15 0 |
| 2/3 plate. Diameter of lenses, 2 $\frac{1}{2}$ in.; back focus, 6 $\frac{1}{2}$ in.; distance from subject for full-length Cabinet, 14 feet                   | 3 0 0   |
| 3/4 plate. Diameter of lenses, 2 $\frac{3}{4}$ in.; back focus, 8 $\frac{1}{2}$ in.; distance from subject for full-length Cabinet, 16 feet                   | 4 10 0  |
| 4 plate. Diameter of lenses, 3 $\frac{1}{2}$ in.; back focus, 10 $\frac{1}{2}$ in.; distance from subject for full-length Cabinet, 19 feet. Promenade 14 feet | 6 5 0   |



Fig. 343A.

## THE 'SPECIAL CHALLENGE' PORTRAIT LENS.

This is a quick-acting Portrait Lens of the same combination as those made by Dallmeyer, and are constructed entirely in English materials. The mounting is with rack and pinion fitted with eight Waterhouse Diaphragms.

| Diameter.          | Focus.          |                                                                           | £  | s. | d. |
|--------------------|-----------------|---------------------------------------------------------------------------|----|----|----|
| 2B 2 $\frac{1}{2}$ | 6 $\frac{1}{2}$ | 18 feet for full length C.D.V., also suitable for Cabinet heads and busts | 7  | 10 | 0  |
| 3B 3 $\frac{1}{4}$ | 9 $\frac{1}{2}$ | 18 feet for full length Cabinet                                           | 11 | 0  | 0  |

Less 10 per cent. Cash Discount.

ALL GOODS AT LOWEST STORE PRICES.

# ADAMS & CO.'S 'CLUB' LENSES.

(Used by Capt. ABNEY and other leading workers.)

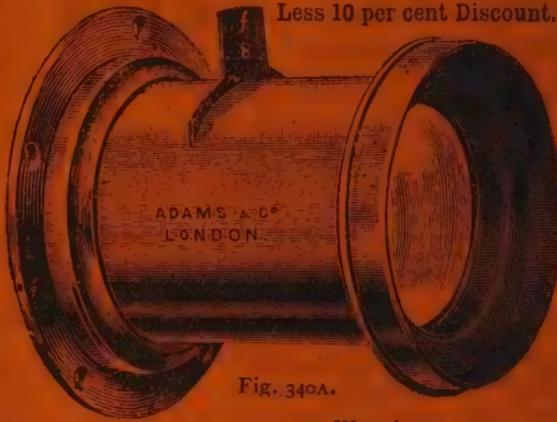


Fig. 340A.

Less 10 per cent Discount.

Guaranteed to give brilliant and sharp definition, and to equal in every respect any Lens hitherto placed upon the market. Exchanged for any other make if not approved of.

## RAPID RECTILINEAR.

(Fig. 340A.)

For Groups, Views, Interiors, Copying, and all kinds of Outdoor Photography.

| To cover.   | Equiv. Focus. | Waterhouse Diaphragm. | Iris Diaphragm. | Aluminium Mounts & Iris Diaphragms. |
|-------------|---------------|-----------------------|-----------------|-------------------------------------|
| 5 × 4 ...   | 5½ in. ...    | £2 0 0 ...            | £2 10 0 ...     | £3 10 0                             |
| 7 × 5 ...   | 8½ " ...      | 2 12 6 ...            | 3 10 0 ...      | 4 18 0                              |
| 9 × 7 ...   | 11 " ...      | 3 10 0 ...            | 4 5 0 ...       | 5 19 0                              |
| 10 × 8 ...  | 13½ " ...     | 4 5 0 ...             | 5 5 0 ...       | 7 7 0                               |
| 12 × 10 ... | 17½ " ...     | 4 15 0 ...            | 6 0 0 ...       | 8 8 0                               |
| 15 × 12 ... | 21 " ...      | 6 10 0 ...            | 8 0 0 ...       | 11 4 0                              |
| 20 × 15 ... | 25½ " ...     | 9 10 0 ...            | 12 10 0 ...     | 17 10 0                             |
| 24 × 20 ... | 31 " ...      | 24 10 0 ...           | 27 0 0 ...      | 37 16 0                             |

Subject to 10 per cent Discount against Cash with Order.

## EURYSCOPES.

| To cover.  | Equiv. Focus. | Waterhouse Stops. | Iris Diaphragm. | Aluminium Iris. |
|------------|---------------|-------------------|-----------------|-----------------|
| 5 × 4 ...  | 5½ in. ...    | £2 10 0 ...       | £3 0 0 ...      | £4 5 0          |
| 7 × 5 ...  | 8½ " ...      | 3 10 0 ...        | 4 5 0 ...       | 5 15 0          |
| 9 × 7 ...  | 10½ " ...     | 4 10 0 ...        | 5 10 0 ...      | 9 10 0          |
| 10 × 8 ... | 13½ " ...     | 7 10 0 ...        | 9 10 0 ...      | 11 10 0         |

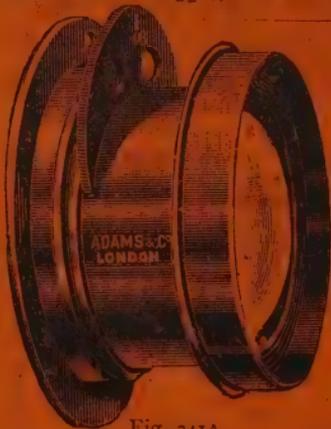


Fig. 341A.

## WIDE-ANGLE RECTILINEAR.

| To Cover.   | Equiv. Focus. | Mounts in Aluminium. |
|-------------|---------------|----------------------|
| 5 × 4 ...   | 3½ in. ...    | £1 12 6 ...          |
| 7 × 5 ...   | 5½ " ...      | 3 3 0 ...            |
| 9 × 7 ...   | 7 " ...       | 3 12 6 ...           |
| 10 × 8 ...  | 9 " ...       | 4 4 0 ...            |
| 12 × 10 ... | 10½ " ...     | 5 5 0 ...            |
| 15 × 12 ... | 15½ " ...     | 6 5 0 ...            |
| 20 × 15 ... | 22½ " ...     | 9 0 0 ...            |

Subject to 10 per cent Discount against Cash with Order.

ALL GOODS AT LOWEST STORE PRICES.

# THE 'GOERZ' LENS

(MANUFACTURED BY ROSS & CO.),

**C**ONSTITUTES the greatest advance in Lenses for many years. They are absolutely free from astigmatism, the sharpness at the margins with the largest stop, *F* 7.7, being equally as good as in the centre of the plate. It gives a perfectly flat field, and defines perfectly with the full aperture.

## THE DOUBLE ANASTIGMAT, *F* 7.7, SERIES III.

This is a Universal Lens, and is highly suitable for Portraits, Groups, Instantaneous Work, and Architecture.

| No. | Equiv. Focus. | Plate covered. <i>F</i> 8. | Plate covered. <i>F</i> 16. | Plate covered. <i>F</i> 64. | Price with Waterhouse Stops. | Prices with Iris Diaphragms. |
|-----|---------------|----------------------------|-----------------------------|-----------------------------|------------------------------|------------------------------|
|     | Inch.         | Inch.                      | Inch.                       | Inch.                       | £ s. d.                      | £ s. d.                      |
| 00  | 4             | 3 × 3                      | 4½ × 3½                     | 5 × 4                       | 4 5 0                        | 5 0 0                        |
| 0   | 5             | 4½ × 3½                    | 5 × 4                       | 6½ × 4½                     | 4 10 0                       | 5 5 0                        |
| 1   | 6             | 5 × 4                      | 6½ × 4½                     | 8 × 5                       | 5 5 0                        | 6 0 0                        |
| 2   | 7             | 6½ × 4½                    | 8 × 5                       | 9½ × 6½                     | 6 10 0                       | 7 5 0                        |
| 3   | 8½            | 8 × 5                      | 8½ × 6½                     | 9 × 7                       | 8 0 0                        | 8 15 0                       |
| 4   | 9½            | 8½ × 6½                    | 9 × 7                       | 10 × 8                      | 9 15 0                       | 10 10 0                      |
| 5   | 10½           | 9 × 7                      | 10 × 8                      | 12 × 10                     | 12 0 0                       | 12 15 0                      |
| 6   | 12            | 10 × 8                     | 12 × 10                     | 15 × 12                     | 14 10 0                      | 15 5 0                       |
| 7   | 14            | 12 × 10                    | 15 × 12                     | 18 × 16                     | 18 15 0                      | 19 15 0                      |
| 8   | 19            | 15 × 12                    | 18 × 16                     | 22 × 18                     | 30 0 0                       | 31 0 0                       |
| 9   | 24            | 18 × 16                    | 22 × 18                     | 25 × 22                     | 45 0 0                       | 47 0 0                       |
| 10  | 30            | 22 × 18                    | 25 × 22                     | 30 × 24                     | 75 0 0                       | 77 10 0                      |
| 11  | 35            | 25 × 22                    | 30 × 24                     | 36 × 28                     | 150 0 0                      | 155 0 0                      |

## THE DOUBLE ANASTIGMAT, *F* 11, SERIES IV.

Wide-Angle Lens especially suitable for Copying, Enlarging, Architecture, Interiors, Groups, &c. Gives an angle of 75°. With a smaller stop an angle of 90° is included.

| No. | Equiv. Focus. | Plate covered. <i>F</i> 11. | Plate covered. <i>F</i> 22. | Plate covered. <i>F</i> 45. | Prices with Waterhouse Stops. | Price with Iris. |
|-----|---------------|-----------------------------|-----------------------------|-----------------------------|-------------------------------|------------------|
|     | Inch.         |                             |                             |                             | £ s. d.                       | £ s. d.          |
| 6   | 12            | 12 × 10                     | 15 × 12                     | 18 × 16                     | 15 10 0                       | 16 5 0           |
| 7   | 14            | 15 × 12                     | 18 × 16                     | 22 × 18                     | 20 0 0                        | 20 15 0          |
| 8   | 19            | 18 × 16                     | 22 × 18                     | 25 × 22                     | 32 10 0                       | 33 5 0           |
| 9   | 24            | 22 × 18                     | 25 × 22                     | 30 × 24                     | 48 15 0                       | 49 15 0          |
| 10  | 30            | 25 × 22                     | 30 × 24                     | 36 × 28                     | 80 0 0                        | 81 0 0           |
| 11  | 35            | 30 × 24                     | 36 × 28                     | 44 × 32                     | 155 0 0                       | 156 0 0          |
| 12  | 47            | 36 × 28                     | 44 × 32                     | 48 × 36                     | 280 0 0                       | 283 0 0          |

THE ABOVE PRICES ARE NET.

ALL GOODS AT LOWEST STORE PRICES.

## MASKS AND DISCS.

A good variety of sizes and shapes, cleanly cut and easy of registration.

|                                                               |          |     |             |
|---------------------------------------------------------------|----------|-----|-------------|
| The 'C. D. V.' contains Masks and Discs, well assorted ... .. | 6 dozen, | 8d. | per packet. |
| The 'Cabinet' .. .. .. .. ..                                  | 4 ..     | 8d. | "           |
| The 'Whole-plate' .. .. .. .. ..                              | 2 ..     | 8d. | "           |

### ADAMS & CO.'S 'KENSINGTON ART' SERIES.

Registered No. 136,606 and 163,572.



These are extremely effective, especially in the larger sizes. They are published in two series, Nos. 1 and 2. Very artistic designs, and useful for both Professional and Amateur work. The designs include Palettes, Shell, Floral Designs, Vases, Easel, Heart, and others equally fanciful and neat. Supplied in three sizes,  $\frac{3}{4}$ ,  $\frac{1}{2}$ , and  $\frac{1}{4}$ -plate, each containing an assortment of eight different designs. Price 1s. per packet, postage 2d.

ALL GOODS AT LOWEST STORE PRICES.

# MEASURES (GRADUATED, GLASS).



Fig. 378A.



Fig. 379A.



Fig. 380A.

Prices of 378A.

|         |         |       |       |       |       |       |        |        |        |        |
|---------|---------|-------|-------|-------|-------|-------|--------|--------|--------|--------|
| 1-dram. | 2-dram. | 1-oz. | 2-oz. | 4-oz. | 6-oz. | 8-oz. | 10-oz. | 16-oz. | 20-oz. | 40-oz. |
| 1/4     | 1/2     | 1/5   | 1/5   | 1/3   | 1/10  | 1/10  | 1/1    | 1/3    | 1/5    | 2/1    |



Fig. 383A.

## NEW PATENT OPAQUE MEASURES.

|                     |      |                      |      |
|---------------------|------|----------------------|------|
| 1-dram (Fig. 379A)  | 1/10 | 4-ounce (Fig. 380A)  | 2/6  |
| 2-dram (Fig. 379A)  | 2/1  | 6-ounce (Fig. 380A)  | 2/10 |
| 1-ounce (Fig. 380A) | 1/8  | 10-ounce (Fig. 380A) | 3/11 |
| 2-ounce (Fig. 380A) | 2/1  | 20-ounce (Fig. 380A) | 4/7  |

## MEASURING JUG (CLEAR GLASS).

This Jug is accurately engraved from half pint to one quart, as shown on the engraving. It is extremely useful, not only to the Photographer, but to the Householder, for checking the measure of milk, &c.

Price 1/6 each.

## ADAMS & CO.'S GUMMED LABELS FOR LANTERN SLIDES.

For numbering and marking top of slide.

300 ready gummed in box, 1/5 postage, 1/1.

On red or white paper. The red are for the white side of duplex masks.



# MOUNTS.

**UNPRINTED, WITH ROUND CORNERS, ASSORTED COLOURS, VERY BEST QUALITY.**

Not less than 50 supplied at 100 rate, or 500 at 1,000 rate.

All dark colours and bevelled edged Mounts are 6 sheet, unless otherwise stated.

**SIZES.**

|                                                         | Bristol Plain Edges. |       | Enamel Plain Edges. |       | Dark Colours Plain Edges. |       | Dark or Light En. Pure Gold Bevel Edges. |       |
|---------------------------------------------------------|----------------------|-------|---------------------|-------|---------------------------|-------|------------------------------------------|-------|
|                                                         | Doz.                 | 1,000 | Doz.                | 1,000 | Doz.                      | 1,000 | Doz.                                     | 1,000 |
| Midgets, Carte, $2\frac{1}{8} \times 15\frac{1}{8}$     | ...                  | ...   | ...                 | ...   | ...                       | ...   | ...                                      | ...   |
| Midgets, Promenade, $3\frac{1}{8} \times 11\frac{1}{8}$ | ...                  | ...   | ...                 | ...   | ...                       | ...   | ...                                      | ...   |
| C.-D.-V., $4\frac{1}{8} \times 2\frac{3}{8}$            | ...                  | ...   | ...                 | ...   | ...                       | ...   | ...                                      | ...   |
| $\frac{1}{2}$ plate, $4\frac{1}{8} \times 3\frac{1}{8}$ | ...                  | ...   | ...                 | ...   | ...                       | ...   | ...                                      | ...   |
| $\frac{1}{2}$ plate, $5 \times 4$                       | ...                  | ...   | ...                 | ...   | ...                       | ...   | ...                                      | ...   |
| Cabinet, $6\frac{1}{8} \times 4\frac{1}{8}$             | ...                  | ...   | ...                 | ...   | ...                       | ...   | ...                                      | ...   |
| $\frac{1}{2}$ plate, $6\frac{1}{8} \times 4\frac{1}{8}$ | ...                  | ...   | ...                 | ...   | ...                       | ...   | ...                                      | ...   |
| Stereoscopic, $7\frac{1}{8} \times 3\frac{1}{8}$        | ...                  | ...   | ...                 | ...   | ...                       | ...   | ...                                      | ...   |
| Malvern, $6\frac{1}{8} \times 3\frac{1}{8}$             | ...                  | ...   | ...                 | ...   | ...                       | ...   | ...                                      | ...   |
| Promenade, $8\frac{1}{8} \times 3\frac{1}{8}$           | ...                  | ...   | ...                 | ...   | ...                       | ...   | ...                                      | ...   |
| Boudoir, $8\frac{1}{8} \times 5$                        | ...                  | ...   | ...                 | ...   | ...                       | ...   | ...                                      | ...   |
| $\frac{1}{2}$ plate, $8\frac{1}{8} \times 6\frac{1}{8}$ | ...                  | ...   | ...                 | ...   | ...                       | ...   | ...                                      | ...   |
| Imperial, $10 \times 6\frac{1}{8}$                      | ...                  | ...   | ...                 | ...   | ...                       | ...   | ...                                      | ...   |
| $10 \times 8$                                           | ...                  | ...   | ...                 | ...   | ...                       | ...   | ...                                      | ...   |
| $12 \times 9\frac{1}{8}$                                | ...                  | ...   | ...                 | ...   | ...                       | ...   | ...                                      | ...   |
| $12 \times 9\frac{1}{2}$                                | ...                  | ...   | ...                 | ...   | ...                       | ...   | ...                                      | ...   |
| Panel, $13 \times 7\frac{1}{8}$                         | ...                  | ...   | ...                 | ...   | ...                       | ...   | ...                                      | ...   |
| Panel, $13 \times 7\frac{1}{2}$                         | ...                  | ...   | ...                 | ...   | ...                       | ...   | ...                                      | ...   |
| Panel, $13 \times 7\frac{3}{8}$                         | ...                  | ...   | ...                 | ...   | ...                       | ...   | ...                                      | ...   |
| Large Panel, $17 \times 10\frac{1}{8}$                  | ...                  | ...   | ...                 | ...   | ...                       | ...   | ...                                      | ...   |
| Large Panel, $17 \times 10\frac{1}{2}$                  | ...                  | ...   | ...                 | ...   | ...                       | ...   | ...                                      | ...   |
| Grand Panel, $23 \times 13\frac{1}{8}$                  | ...                  | ...   | ...                 | ...   | ...                       | ...   | ...                                      | ...   |
| Grand Panel, $23 \times 13\frac{1}{2}$                  | ...                  | ...   | ...                 | ...   | ...                       | ...   | ...                                      | ...   |

ALL GOODS AT LOWEST STORE PRICES.

# PRINTED MOUNTS.

No Charge for Plates.

Our printing is of the very highest possible order. We engrave copper plates for every order, and DO NOT print from wood blocks. Large variety of new and artistic designs.

Both C.-D.-V.'s and Cabinets are supplied in over 100 tints, including a variety of Duplex, both Bristol and Enamel.

All Gold Blocking, Beveling, Edging, Lithographic Printing, and General Manufacture being done upon the Premises, PROMPTNESS can be relied upon.

## C.-D.-V.'s. Printed one side.

These prices are per 1000.

|                         | 2500 | 5000 | 10,000 | 25,000 | 50,000 |
|-------------------------|------|------|--------|--------|--------|
| Bristol, 5 Sheet ... .. | 10/6 | 10/- | 9/6    | 9/-    | 8/6    |
| " 6 " ... ..            | 11/- | 10/6 | 10/-   | 9/6    | 9/-    |
| Enamel, 5 Sheet ... ..  | 11/- | 10/6 | 10/-   | 9/6    | 9/-    |
| " 6 " ... ..            | 12/- | 11/6 | 11/-   | 10/6   | 10/-   |

## C.-D.-V.'s. Printed two sides.

These prices are per 1000.

|                         | 2500 | 5000 | 10,000 | 25,000 | 50,000 |
|-------------------------|------|------|--------|--------|--------|
| Bristol, 5 Sheet ... .. | 13/6 | 11/6 | 11/-   | 10/6   | 10/-   |
| " 6 " ... ..            | 14/- | 12/- | 11/6   | 11/-   | 10/6   |
| Enamel, 5 Sheet ... ..  | 14/- | 12/- | 11/6   | 11/-   | 10/6   |
| " 6 " ... ..            | 14/6 | 12/6 | 12/-   | 11/6   | 11/-   |

No Charge for Plates or Round Corners.

If printed in gold bronze, 1/- per side extra.

Pure gold edges, 5 sheet, 4/6 per 1000; 6 sheet, 5/6; pure gold bevel edges, 10/6; coloured edges, 3/- per 1000.

## CABINETS. Printed one side.

These prices are per 1000.

|                         | 500  | 1000 | 2000 | 3000 | 5000 | 10,000 |
|-------------------------|------|------|------|------|------|--------|
| Bristol, 6 Sheet ... .. | 21/- | 31/- | 30/- | 29/- | 28/- | 26/-   |
| Enamel, 6 Sheet ... ..  | 23/- | 34/6 | 34/- | 33/- | 30/- | 28/-   |

## CABINETS. Printed two sides.

These prices are per 1000.

|                         | 500  | 1000 | 2000 | 3000 | 5000 | 10,000 |
|-------------------------|------|------|------|------|------|--------|
| Bristol, 6 Sheet ... .. | 24/- | 36/- | 34/- | 32/6 | 30/- | 27/-   |
| Enamel, 6 Sheet ... ..  | 26/- | 38/- | 38/- | 36/- | 33/- | 30/-   |

No Charge for Plates or Round Corners.

If printed in gold bronze, 2/- per side extra.

Pure gold edges, 10/6 per 1000; pure gold bevel edges, 16/-. Coloured edges, 6/- per 1000.

All the above subject to 5 per cent discount for cash with order.

ALL GOODS AT LOWEST STORE PRICES.

## CHRISTMAS AND NEW YEAR MOUNTS.

### Fig. 396a SERIES (see page 345).

This is an exceedingly pretty design in the shape of a booklet. It opens, and the photograph is inserted in the centre. Artistically bevelled and blocked in pure gold. An assortment is kept in stock in light colours with dark shields. They are all supplied with the shields upright as in above illustration, as the picture being inside it is suitable for either landscape or portrait. Kept in same wordings as Fig. 395A Series.

|                                               | Each.                            | Doz.       | 100. |
|-----------------------------------------------|----------------------------------|------------|------|
| For $4\frac{1}{2} \times 3\frac{1}{2}$ ... .. | $-\frac{1}{2}\frac{1}{2}$ ... .. | 2/- ... .. | 15/- |
| „ $6\frac{1}{2} \times 4\frac{1}{4}$ ... ..   | $-\frac{1}{3}$ ... ..            | 2/6 ... .. | 18/- |



Fig. 397A.



Fig. 398A.

These are a new and artistic Series, and are extremely effective. In delicate light tints. The Cards are duplex—that is, the outside is a different tint to the inside. Blocked and bevelled in pure gold, with above wordings.

|                             | Each.                 | Doz.       | 100. |
|-----------------------------|-----------------------|------------|------|
| $\frac{1}{4}$ -plate ... .. | $-\frac{1}{3}$ ... .. | 2/6 ... .. | 18/- |
| $\frac{1}{2}$ -plate ... .. | $-\frac{1}{4}$ ... .. | 3/6 ... .. | 25/- |

Sample packets,  $\frac{1}{4}$ -plate, 1/6;  $\frac{1}{2}$ -plate, 2/-; postage,  $-\frac{1}{3}$ .

### CARTES-DE-VISITE.

In assorted colours, 6 sheet thickness.

C.-D.-V.'s bevelled and stamped mottoes, wordings as Fig. 395 Series,  $-\frac{1}{10}$  per dozen, 6/- per 100.

ALL BLOCKED PORTRAIT WAY.

### CABINETS.

In assorted colours, 6 sheet thickness.

Cabinets, bevelled and stamped mottoes, wordings as Fig. 395 Series, 1/8 per dozen, 12/- per 100.

ALL BLOCKED PORTRAIT WAY.

ADAMS & Co

31 ALDERSGATE S. E.C.

OPACING THE STATION

26 CHARING CROSS R. W.C.

(OPPOSITE THE "AMERICO")

EMERALD CROSS LND

LONDON

ALL GOODS AT LOWEST STORE PRICES.

## NEW PLATE-SUNK INDIA-TINTED MOUNTS.

We keep two kinds in stock—a White Mount with a neutral Grey lithographed tint, and a Grey Mount with a cream tint pasted on. In our opinion the latter are the most effective. Both kinds are the same price.

|        | Size of Board. | Size of Tint. | Per doz. | Per 100. | Litho.<br>Per 100. |
|--------|----------------|---------------|----------|----------|--------------------|
| No. 1. | 8½ × 6½        | 4½ × 3½       | 10d.     | 5/9      | 4/3                |
| " 2.   | 8½ × 6½        | 5 × 4         | 10d.     | 6 -      | 4/3                |
| " 3.   | 11½ × 9½       | 7½ × 5½       | 1/2      | 8/6      | 5/9                |
| " 3A.  | 12½ × 10       | 8 × 5½        | 2/-      | 15 -     | 12/7               |
| " 4.   | 13½ × 10½      | 9 × 7         | 2/2      | 16 -     | 12/7               |
| " 5.   | 15 × 12        | 10½ × 8½      | 2/8      | 19/-     | 16/3               |
| " 6.   | 18½ × 14½      | 13 × 11       | 3/4      | 24/-     | 21/-               |
| " 7.   | 21 × 19        | 18 × 14       | 7/6      | 36 -     | 42/2               |

These are very best quality and suitable sizes.

## INDIA-TINTED MOUNTS.

White, with neutral Grey Tint.

| No.     | Size.     | Tint.            | Per doz. | Per 100. |
|---------|-----------|------------------|----------|----------|
| No. 27. | 8½ × 6½   | 4½ × 3½, 5 sheet | 9d.      | 5/6      |
| " 28.   | 8½ × 6½   | 5½ × 4½, 5 "     | 10d.     | 5/6      |
| " 29.   | 10½ × 8½  | 7 × 5½, 5 "      | 1/-      | 7/-      |
| " 30.   | 14 × 10½  | 9 × 7, 6 "       | 1/5      | 9/6      |
| " 31.   | 14½ × 12  | 10½ × 8½, 6 "    | 2/-      | 11/-     |
| " 32.   | 18 × 14   | 12½ × 10½, 8 "   | 2/8      | 2/-      |
| " 33.   | 22½ × 17½ | 15½ × 12½, 10 "  | 5/-      | 39/-     |

Any size line and any size card specially printed to order.

## BIRTHDAY AND CHRISTMAS MOUNTS.



Fig. 395A.



Fig. 396A. (See page 344.)

Fig. 395A SERIES.—These are a very handsome series of Mounts in assorted light and dark colours in enamel. They are bevelled and blocked in pure leaf gold.

|                                                 |          |           |
|-------------------------------------------------|----------|-----------|
| No. 1.—For 4½ × 3½ pictures without border line | 1/9 Doz. | 12/6 100. |
| " 2.—" " " with " " "                           | 3/6 "    | 24/- "    |
| " 3.—For 6½ × 4½ pictures without border line   | 3/6 "    | 24/- "    |
| " 4.—" " " with " " "                           | 5/- "    | 35/- "    |

State whether for Landscape or Portraits.

THEY ARE IN STOCK WITH THE FOLLOWING MOTTOES:—

Wishing you a Merry Christmas. | Wishing you a Happy New Year.

Wishing you a Merry Christmas and a Happy New Year.

Wishing you the Compliments of the Season. | Many Happy Returns of the day.

ALL GOODS AT LOWEST STORE PRICES.

## BEST QUALITY TONED BERLIN MOUNTS WITH LINE KEPT IN STOCK.

Printed in Chocolate Ink. A really handsome Mount.

Fig. 392A.

| No.  | Size.     | Line.     |         | Per doz. | Per 100. |
|------|-----------|-----------|---------|----------|----------|
| 20.  | 8½ × 6½   | 4½ × 3½   | 5 sheet | 8d.      | 4/6      |
| 21.  | 8½ × 6½   | 5½ × 4½   | 5 "     | 9d.      | 5/-      |
| 22.  | 10½ × 8½  | 7 × 5½    | 5 "     | 1/-      | 8/-      |
| 22A. | 12 × 9    | 8 × 5½    | 6 "     | 1/2      | 9/6      |
| 23.  | 14 × 10½  | 9 × 7     | 6 "     | 1/10     | 14/6     |
| 24.  | 14½ × 12  | 10½ × 8½  | 6 "     | 2/3      | 17/6     |
| 25.  | 18 × 14   | 12½ × 10½ | 8 "     | 3/2      | 24/-     |
| 26.  | 22½ × 17½ | 15½ × 12½ | 10 "    | 5/-      | 36/-     |

Name and address free on 250.

Any size line and any size card specially printed to order.

Fig. 393 A.

### OXFORD LINED MOUNTS.

In Cream Bristol. Red Oxford Lines. Kept in Stock.

*Very best London made quality.*

| No. | Size of Card. | Size of Line.  |      | Per doz. | Per 100. |
|-----|---------------|----------------|------|----------|----------|
| 3.  | 8½ × 6½       | 5 × 4, 6 sheet | 6d.  | 3/-      |          |
| 9.  | 10 × 8        | 6½ × 5, 6 "    | 8d.  | 4/-      |          |
| 11. | 12 × 9        | 8½ × 6½, 6 "   | 11d. | 6/-      |          |
| 15. | 14½ × 10½     | 10 × 8, 8 "    | 1/1  | 8/6      |          |
| 19. | 17 × 14       | 12 × 10, 8 "   | 2/2  | 15/-     |          |

Name and address 3/6 per 100. Free on 500.

### ADAMS & CO.'S 'CLUB' MOUNTS.



Fig. 394.

These Mounts can also be had handsomely bound as Albums. See page 249.

These Mounts are specially made for gelatine-chloride prints on P. O. P., Solio, and Aristotype papers, and entirely save the trouble of trimming and mounting. Prints can be removed at will and fresh ones substituted. They will be welcomed as a boon by every photographer.

#### Prices.

|                          |                         |
|--------------------------|-------------------------|
| 100 doz.                 | 100 doz.                |
| ½-plate ... 4/9 ... 8d.  | ½-plate ... 9/- ... 1/4 |
| 5×4 ... 5/- ... 9d.      | ¾ " ... 10/6 ... 1/6    |
| Cabinet ... 6/6 ... 11d. | ¾ c/m ... 4/9 ... 8d.   |
| ¾-plate ... 7/6 ... 1/1  | ¾ " ... 10/- ... 1/5    |

Not less than 50 supplied at 100 rate.

MOUNT DESIGNS.



W. & A. G. 1881

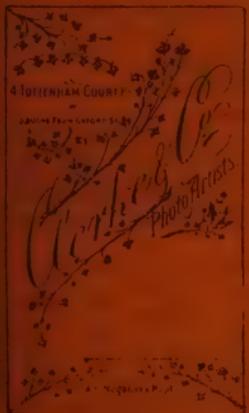
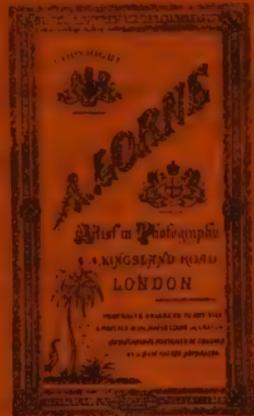


Fig. 391.

We will forward to every Professional Photographer, enclosing his trade card, our new book of 72 choice designs, printed in colours, together with a set of sample Mounts. Postage 2d.

ALL GOODS AT LOWEST STORE PRICES.

## PURE GOLD BEVELLED & BLOCKED MOUNTS.

**C.-D.-V'S.**—All prices are quoted for 6 sheet thickness and best quality waterproofed board. Dark or light colours same price.

|       | £ | s. | d. |        | £  | s. | d. |
|-------|---|----|----|--------|----|----|----|
| 500   | 1 | 2  | 0  | 5,000  | 7  | 5  | 0  |
| 1,000 | 1 | 10 | 0  | 10,000 | 11 | 10 | 0  |
| 2,500 | 3 | 15 | 0  | 20,000 | 29 | 0  | 0  |

NO CHARGE FOR DIES.

ABOVE PRICES ARE NETT.

**CABTS.**—All prices are quoted for 6 sheet thickness and best quality water-proofed board. Dark or light colours same price.

|       | £ | s. | d. |        | £  | s. | d. |
|-------|---|----|----|--------|----|----|----|
| 500   | 1 | 15 | 0  | 5,000  | 13 | 0  | 0  |
| 1,000 | 2 | 15 | 0  | 10,000 | 25 | 10 | 0  |
| 2,500 | 6 | 15 | 0  | 20,000 | 50 | 0  | 0  |

NO CHARGE FOR DIES.

ABOVE PRICES ARE NETT.

|    |        |             |            | 100  | 300  | 500   | 1,000 |
|----|--------|-------------|------------|------|------|-------|-------|
| 12 | Sheet, | Malvern     | (6½ × 3½)  | 12/9 | 34/6 | 58/6  | 107/- |
| 12 | "      | Promenade   | (8½ × 3½)  | 15/- | 40/3 | 68/-  | 126/- |
| 12 | "      | Bondoir     | (8½ × 5)   | 17/6 | 47/3 | 80/-  | 150/- |
| 12 | "      | Imperial    | (10 × 6½)  | 21/- | 69/- | 108/- | 205/- |
|    |        |             |            | 50   | 100  | 300   | 500   |
| 16 | "      | Panel       | (13 × 7½)  | 20/- | 39/- | 38/-  | 37/-  |
| 20 | "      | Panel       | (13 × 7½)  | 25/- | 49/- | 48/-  | 47/-  |
|    |        |             |            | 25   | 50   | 100   | 200   |
| 20 | "      | Large Panel | (17 × 10½) | 26/6 | 47/- | 91/-  | 89/-  |
| 30 | "      | Large Panel | (17 × 10½) | 35/- | 62/- | 120/- | 118/- |
|    |        |             |            |      |      |       | 116/- |
|    |        |             |            |      |      |       | 114/- |

THESE ARE THE FINEST QUALITY MOUNTS THE WORLD PRODUCES.

## THE NEW MOUNT.

Thoroughly artistic and neat. In 6 sheet Cream or Grey Bristol. Plain Impressed or Embossed from Dies. Most of the Leading Firms are adopting them, and they just hit the popular taste, being quite as effective as Gold Mounts, and not nearly so expensive.

### C.-D.-V.

|       | Per 1,000. |        | Per 1,000. |
|-------|------------|--------|------------|
| 1,000 | £1 1 0     | 5,000  | 0 17 0     |
| 2,500 | 0 19 6     | 10,000 | 0 16 0     |

No charge for round corners. Pure gold edges, 6 sheet, 5/6 per 1,000; pure gold bevel edges, 10/6; coloured edges, 3/- per 1,000.

### CABINETS.

|       | Per 1,000. |        | Per 1,000 |
|-------|------------|--------|-----------|
| 1,000 | 1 15 0     | 5,000  | 1 11 0    |
| 2,500 | 1 13 0     | 10,000 | 1 10 0    |

No charge for round corners. Pure gold edges, 10/6 per 1,000; pure gold bevel edges, 16/-; coloured edges, 6/- per 1,000.

No Charge for Dies, and Subject to 5 per Cent. for Cash only.

Set of samples of C.-D.-V. and Cabinet Mounts, together with handsome book, containing 72 of the newest designs printed in various colours, post free, 2 stamps.

ALL GOODS AT LOWEST STORE PRICES.

## ADAMS & CO.'S PLATE BACKING PAPERS,

which can be easily applied by simply damping them; and which can be easily stripped off by damping them a second time.

*Perfect Optical Contact.*

*Perfect Non-Activity.*

|                               |                         |
|-------------------------------|-------------------------|
| 1/4-plate packet contains 250 | 10x8 packet contains 60 |
| 1/2-plate " " 125             | 12x10 " " 30            |
| 3/4-plate " " 70              | 15x12 " " 30            |

ALL ONE PRICE, ONE SHILLING PER PACKET.

## ENAMEL WATERPROOF PAPER.

For backing all chloride of silver papers, before mounting, in order to preserve the enamelled or matted surface.

Price 1d. per sheet, 1s. 3d. per quire.

Sold in Packets of 100 sheets, as follows:—

|                       |             |                  |                     |
|-----------------------|-------------|------------------|---------------------|
| For 1/4 plate ... 7/6 | 5x4 ... 9   | 1/2-plate ... 1- | 7 1/2 x 5 ... 1 3/4 |
| .. 1/2 .. ... 1/6     | 10x8 ... 2- | 12x10 ... 2/9    |                     |

## NEGATIVE BAGS.

For preserving Negatives.

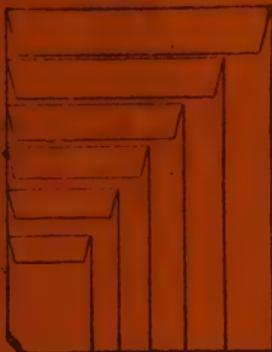


Fig. 401a.

|               |               |               |        |         |                 |
|---------------|---------------|---------------|--------|---------|-----------------|
| 4 1/2 x 3 1/2 | 6 1/2 x 4 1/2 | 8 1/2 x 6 1/2 | 10 x 8 | 12 x 10 | 15 x 12         |
| 3 8           | 5/6           | 8-            | 11-    | 16/-    | 19 - per 1,000. |
| 6d.           | 9d.           | 1/-           | 1/3    | 1,6     | 1,9 per 100.    |

BETTER QUALITY, EXTRA STRONG, WITH PRINTED SPACES FOR NUMBERING AND REGISTERING.

|          |               |       |               |           |               |        |         |
|----------|---------------|-------|---------------|-----------|---------------|--------|---------|
| Size for | 4 1/2 x 3 1/2 | 5 x 4 | 6 1/2 x 4 1/2 | 7 1/2 x 5 | 8 1/2 x 6 1/2 | 10 x 8 | 12 x 10 |
| Per 100  | 1/-           | 1/3   | 1,6           | 2-        | 2,3           | 3-     | 3/6     |

## HAND CAMERAS

Our stock and selection are immense. Of best quality goods we are far and away the Largest Manufacturers in the World.

**ADAMS & Co** 31 ALDERSGATE S. E.C. (FACING THE STATION) 28 CHARING CROSS R.W.C. (JOINING THE CAMERA CLUB) (CHARING CROSS END) **LONDON**

ALL GOODS AT LOWEST STORE PRICES.

# ADAMS & CO.'S Binocular Pantoscopes.

No. 1.  
31/6 net.  
FOR  
SLIDES  
AND  
PRINTS

No. 2.  
25/- net.  
FOR  
SLIDES  
ONLY.

Chromoscope  
Attachment  
FOR  
No. 1 Pantoscope  
10/6 net.



This *does not* require a Stereoscopic Slide, but merely the ordinary Lantern Slide. It is fitted with two very powerful Prismatic lenses, which magnify *nearly double*. Instruments with only one eyepiece become tiring if a number of slides are looked at, but this is overcome with the Binocular Pantoscope; also by looking with both eyes double the light is obtained. The Instrument can be focussed for different sights. For the easy insertion of slides, a sliding carrier is added, which also permits of the exact registering of the slides.

The No. 1 is arranged for quarter-plate prints as well as Lantern Slides, and has a raising mirror, the same as the ordinary Stereoscope. It is also so constructed as to take the *Chromoscope*.

Handsomely finished in polished mahogany, and sent out carefully packed in box complete. Both the No. 1 and No. 2 are the same design as above figure.

|                                     |              |            |      |
|-------------------------------------|--------------|------------|------|
| No. 2 Binocular Pantoscope,         | 25/- net;    | post free, | 26/- |
| No. 1       "       "               | 31/6       " | "          | 32/6 |
| No. 1 (With detachable Chromoscope) | 42/-       " | "          | 43/- |

ALL GOODS AT LOWEST STORE PRICES.

# THE CHROMOSCOPE.

**T**HIS Instrument is designed for attaching to the No. 1 Pantoscope, and we strongly recommend this addition, as the artistic and pleasing effects obtained by its use are almost incredible.

Beautifully graduated tints may be made to pass over the Slide, and the varying effects of sunrise, sunset, or evening light obtained at will.

PRICE 10/6 NET.

## PRESS NOTICES.

### PANTOSCOPES & CHROMOSCOPES.

*The British Journal of Photography*, March 25th, 1892, says:—'This system of inspecting lantern views is so good, that it is certain to be generally adopted, and a parlour table on a winter's evening will scarcely be complete without two or three of these instruments upon it.'

*The Amateur Photographer* of March 25th, 1892, says:—'In its present form it will be more than ever a welcome addition to the drawing-room or reception-room table.'

*Photography*, March, 1892, says:—'From Messrs. ADAMS & Co. comes the very latest thing in Pantoscopes, which is a vast improvement on anything yet placed on the market.'

### THE CHROMOSCOPE.

*The Photographic Review of Reviews* of April, 1892, says:—'An attachment to the Pantoscope for tinting Purposes, giving very beautiful sunrise, sunset, and night effects. It is especially suitable for marine slides, or for landscapes having a water foreground with plenty of sky room. The effects require to be seen to be believed.'

*The Photographic News* of April 29th, 1892, says:—'The effects produced are very pleasing, and the little instrument is destined to become a popular favourite.'

## ADAMS & CO.'S No. 3 "PANTOSCOPE"

(Registered Design, No. 182,910.)

FOR VIEWING LANTERN SLIDES.

To view Lantern Slides with as much pleasure as in an Optical Lantern. It is always ready, and may be used either by day-light or gas-light. It is made of polished mahogany with nickel-plated front.

To makers of lantern slides it will prove an invaluable piece of apparatus, as by its aid the density and tone of the transparencies may be reliably judged without the trouble of placing them through the lantern.



Price 15/- net, post free 15/6.

ALL GOODS AT LOWEST STORE PRICES.

# PAPERS.

ALL LEADING MAKES KEPT IN STOCK.

|                                                                                     |     | IN PACKETS CONTAINING 12 PIECES, |           |          |                                       |                                | OR ROLLS OF 6 PIECES,       |       |                               |                 |                          | 10 ft. Roll, 24 in. wide. |
|-------------------------------------------------------------------------------------|-----|----------------------------------|-----------|----------|---------------------------------------|--------------------------------|-----------------------------|-------|-------------------------------|-----------------|--------------------------|---------------------------|
|                                                                                     |     | 5x4 Cab.                         | 7 1/2 x 5 | 10x8     | 12 1/2 x 10 1/2                       | 15 1/2 x 12 1/2                | 18x15                       | 20x16 | 23x17                         | 24 1/2 x 19     |                          |                           |
| <b>Bromide Papers.</b>                                                              |     |                                  |           |          |                                       |                                |                             |       |                               |                 |                          |                           |
| C. D. V.                                                                            | 1/4 | 5/8                              | 1/3       | 1/8 1/2  | 2/5 1/2                               | 3/7                            | 4/8                         | 4/9   | 5/2                           | 6/-             | 6/9                      | 7/6                       |
| ILFORD (four kinds)                                                                 | ... | -/5 1/2                          | ...       | -/11 1/2 | ...                                   | ...                            | ...                         | ...   | ...                           | ...             | ...                      | ...                       |
| " (Alpha)                                                                           | ... | -/4 1/2                          | ...       | -/11 1/2 | ...                                   | 3/4                            | 5/3                         | ...   | 4/9                           | ...             | 6/-                      | 6/6                       |
| <b>A. &amp; Co.'s Sepiatype</b>                                                     |     | ...                              | -/7       | 1/3      | 2/6                                   | 3/4                            | 4/6                         | 6/6   | (Sample Sheet, 36 x 30, 3/-.) |                 |                          |                           |
|                                                                                     |     | NUMBER OF PIECES IN PACKET.      |           |          |                                       |                                | 1 2 6 12 24 SHEETS.         |       |                               |                 |                          |                           |
| C. D. V.                                                                            | 1/4 | 5x4 Cab.                         | 7 1/2 x 5 | 10x8     | 12 1/2 x 10 1/2                       | 15 1/2 x 12 1/2                | 18x15                       | 20x16 | 23x17                         | 24 1/2 x 19     | 10 ft. Roll, 24 in. wide |                           |
| ILFORD P.O.P. (White, Pink, and Mauve)                                              | ... | 36                               | ...       | 9        | 1/- per packet, 10/- worth post free. |                                |                             | ...   | 1/4                           | 4/-             | 7/6                      | 15/-                      |
| Sofio (White and Pink)                                                              | ... | 36                               | ...       | 9        |                                       |                                |                             | ...   | 1/4                           | 4/-             | 7/6                      | 15/-                      |
| PAGET " " "                                                                         | ... | 36                               | ...       | 9        |                                       |                                |                             | ...   | 1/4                           | 4/-             | 7/6                      | 15/-                      |
| SCHOLZIG'S P.O.P. (White and Pink)                                                  | ... | 36                               | ...       | 9        | ...                                   | 1/4                            | 4/6                         | 8/9   | 17/-                          | Post 10/- worth |                          |                           |
| Ditto, Double Albumenized (three colours) or Matt Surface, in White, in sheets only |     | 43                               | 20        | ...      | ...                                   | 9d. per packet. Postage extra. | ...                         | 1/4   | 3/6                           | 6/6             | 12/-                     | Post r.                   |
| <b>Platinotype Paper</b>                                                            |     | 2 DOZEN PIECES IN TIN CASE.      |           |          |                                       |                                | 1 DOZEN PIECES IN TIN CASE. |       |                               |                 |                          | 3 6 12 SHEETS (26 x 20)   |
| ...                                                                                 | 1/5 | 2/1 1/2                          | ...       | 3/4      | 4/3                                   | 5/9                            | 8/-                         | 6/3   | 9/-                           | 6/3             | 12/-                     | 23/-                      |

ALL GOODS AT LOWEST STORE PRICES.

COMPARE OUR VERY LOW PRICES.

**PLATE GLASS**

ANY MAKE TO ORDER. SOME OTHER KINDS ARE ALSO STOCKED IN USUAL SIZES.

| PLATES (PER DOZEN).                                    | 44x34   | 5x4  | 61x44 | 61x34 | 71x44 | 7x5 | 71x5 | 8x5 | 81x4 | 9x7  | 10x8 | 12x10 | 15x12 |
|--------------------------------------------------------|---------|------|-------|-------|-------|-----|------|-----|------|------|------|-------|-------|
| <b>ILFORD</b> —                                        |         |      |       |       |       |     |      |     |      |      |      |       |       |
| Ordinary or Iso. Med.                                  | 1 1/2   | 1 6  | 2 2   | 2 2   | 2 10  | 3 4 | 3 2  | 3 8 | 4/-  | 4 9  | 6 11 | 10/-  | 17 1  |
| Rapid Series... ..                                     | 1 2     | 1 10 | 2 9   | 2 9   | 3 8   | 4 6 | 4 3  | 4 9 | 5 3  | 6 6  | 9/-  | 12 3  | 22-   |
| Special Rapid or Iso.                                  |         |      |       |       |       |     |      |     |      |      |      |       |       |
| Instantaneous ... ..                                   | 1 5     | 2 5  | 3 3   | 3 3   | 4 6   | 5 3 | 5/-  | 6/- | 6 2  | 7 6  | 10 5 | 15 2  | 26 6  |
| <b>CADETT</b> —                                        |         |      |       |       |       |     |      |     |      |      |      |       |       |
| Ordinary ... ..                                        | 1 1 1/2 | 1 6  | 2 2   | 2 2   | 2 10  | 3 5 | 3 2  | 3 9 | 4 2  | 5 2  | 6 11 | 10 1  | 17 1  |
| Lightning ... ..                                       | 1 5     | 2 5  | 3 3   | 3 3   | 4 6   | 5 3 | 5 2  | 6 2 | 6 2  | 8 2  | 9 6  | 15 3  | 23 1  |
| Snap Shot (thin glass)                                 | 2 1 1/2 | 3 4  | 4 6   | 4 6   | 6 2   | 6 9 | 6 6  | 7 6 | 8 2  | 10 6 | 12 3 | ...   | ...   |
| <b>EDWARDS'S</b> (all kinds)                           | 1 5     | 2 5  | 3 3   | 3 3   | 4 6   | 5 3 | 5 2  | 6 2 | 6 2  | 8 2  | 9 6  | 15 3  | 23 1  |
| <b>THOMAS'S</b> —                                      |         |      |       |       |       |     |      |     |      |      |      |       |       |
| Extra Rapid... ..                                      | 1 1 1/2 | 1 6  | 2 2   | 2 2   | 2 10  | 3 5 | 3 2  | 3 9 | 4 2  | 5 2  | 6 11 | 10 1  | 17 1  |
| Thickly Coated Extra Rapid or Landscape Cyclist ... .. | 1 5     | 2 1  | 3 4   | 3 4   | 4 6   | 5 3 | 4 6  | 5 3 | 6 2  | 7 6  | 9 6  | 13 9  | 22 1  |
| <b>THOMAS'S SANDELL</b>                                |         |      |       |       |       |     |      |     |      |      |      |       |       |
| <b>PLATE</b> —                                         |         |      |       |       |       |     |      |     |      |      |      |       |       |
| General, 1/2 dozen ... ..                              | 1 2     | ...  | 2 5   | 2 5   | 2 11  | ... | 3 4  | 3 9 | 4 3  | 5 2  | 6 5  | 10 6  | 20 1  |
| Special, 1/2 " ... ..                                  | 2 1     | 3 2  | 4 6   | 4 6   | 5 6   | ... | 6 5  | 7 3 | 8 4  | 9 6  | 12 3 | 20 1  | 38 1  |
| " 1/2 " ... ..                                         | ...     | ...  | ...   | ...   | ...   | ... | 4 3  | ... | ...  | ...  | 5 3  | 7 6   | 11 30 |
| " 1/2 " ... ..                                         | 2 10    | 4 5  | ...   | ...   | ...   | ... | ...  | ... | 6 2  | 7 2  | 9 6  | 13 9  | 21 10 |

PAGEIS—Phoenix, prices as Ilford Ordinary; NXX as Ilford Rapid; and NXXX as Ilford Special Rapid.

ALL GOODS AT LOWEST STORE PRICES.

# PLATES FOR LANTERN SLIDES AND TRANSPARENCIES.

ALL LEADING MAKES KEPT.

| PRICES PER DOZEN.                                     | Lantern<br>Size.<br>3½ × 3½ | 4½ × 3½ | 5 × 4 | Stereo.<br>6½ × 3½ | Stereo.<br>6½ × 4½ | 6½ × 4½ | 7½ × 5 | 8½ × 6½ | 10 × 8 | 12 × 10 | 15 × 12 |
|-------------------------------------------------------|-----------------------------|---------|-------|--------------------|--------------------|---------|--------|---------|--------|---------|---------|
| CADETT... ..                                          | -/11½                       | 1/5     | 2/4½  | 3/1                | 3/1                | 3/6     | 5/-    | 6/3     | 9/6    | 15/-    | 22/9    |
| EDWARDS'S—                                            |                             |         |       |                    |                    |         |        |         |        |         |         |
| ‘Special Transparency’ ... ..                         | -/11½                       | 1/5½    | 2/4   | 2/7                | 3/1                | 3/6     | 5/-    | 6/3     | 9/6    | 12/4    | 22/9    |
| ‘Gelatino-Chloride’ ... ..                            | -/11½                       | 1/5½    | 2/4   | 2/7                | 3/1                | 3/6     | 5/-    | 6/3     | 9/6    | 12/4    | 22/9    |
| ILFORD—                                               |                             |         |       |                    |                    |         |        |         |        |         |         |
| Special (black tones) or Alpha<br>(warm tones) ... .. | -/11½                       | -/11½   | 1/6   | 1/10½              | 2/-                | 2/1     | 3/3    | 4/-     | 6/10   | 10/-    | 17/-    |
| THOMAS, PAGET, IMPERIAL<br>(same prices as ILFORD).   |                             |         |       |                    |                    |         |        |         |        |         |         |
| PAGET PRINTING-OUT... ..                              | 1/5                         | 1/5     | 2/5   | ...                | 3/1                | 3/6     | 4/9    | 6/2     | 9/6    | 13/9    | 26/6    |
| THOMAS'S—Coated on Ground<br>Glass... ..              | 1/5                         | 1/5     | ...   | ...                | ...                | 3/1     | 4/5    | 5/9     | 9/1    | 13/9    | 21/10   |

ALL GOODS AT LOWEST STORE PRICES.

# PRINTING FRAMES.

Second quality, but a very good frame, and far superior to the usual cheap frame.

|         |     |      |        |
|---------|-----|------|--------|
| 4½ × 3½ | ... | each | 7/4    |
| 5 × 4   | ... | ..   | 7/6    |
| 6½ × 4½ | ... | ..   | 7/8    |
| 7½ × 5  | ... | ..   | 1/-    |
| 8½ × 6½ | ... | ..   | 1/4    |
| 10 × 8  | ... | ..   | 1 1/10 |
| 12 × 10 | ... | ..   | 2/3    |

Fig. 411.



Oak, extra stout, rounded corners, and brass screws, each —

|         |     |     |         |     |     |         |     |    |         |     |     |
|---------|-----|-----|---------|-----|-----|---------|-----|----|---------|-----|-----|
| 4½ × 3½ | ... | 7/5 | 6½ × 4½ | ... | 10  | 8½ × 6½ | ... | 18 | 12 × 10 | ... | 2/6 |
| 5 × 4   | ... | 7/7 | 7½ × 5  | ... | 1/2 | 10 × 8  | ... | 21 | 15 × 12 | ... | 4/  |

Ditto, of mahogany, superior make, French polished, brass straps, per doz. —

|         |      |       |     |         |     |        |     |         |     |        |     |         |     |
|---------|------|-------|-----|---------|-----|--------|-----|---------|-----|--------|-----|---------|-----|
| 4½ × 3½ | 7/10 | 5 × 4 | 1/- | 6½ × 4½ | 1/4 | 7½ × 5 | 1/6 | 8½ × 6½ | 2/6 | 10 × 8 | 3/4 | 12 × 10 | 4/6 |
|---------|------|-------|-----|---------|-----|--------|-----|---------|-----|--------|-----|---------|-----|

# ADAMS & CO'S 'CLUB' PRINTING FRAME.

A new invention, and a very great improvement over the ordinary printing frame. Will last ten times as long. Entirely obviates the movement of paper when examining during printing. Open and closed at once. Well made in teak, with brass springs.

PRICES.

|              |        |          |        |
|--------------|--------|----------|--------|
| ½ plate.     | 5 × 4  | ½ plate. | 7½ × 5 |
| 5/4          | 7/8    | 11       | 1 1/10 |
| Whole plate. | 10 × 8 | 12 × 10  |        |
| 2/-          | 2/6    | 3/-      |        |

Fig. 412.



# LEAD-LINED SINKS.

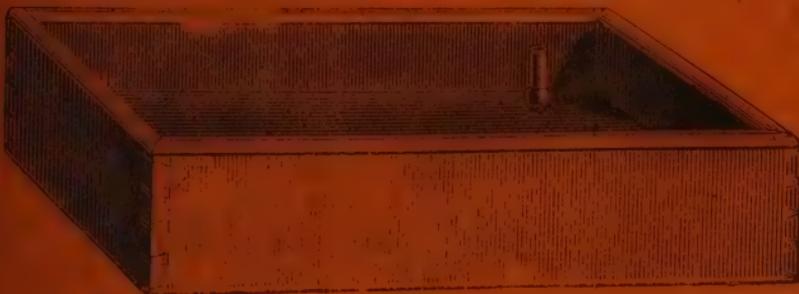


Fig. 405.

These Lead Lined Sinks are much better than stoneware, and are not affected by acids. They are lighter and do not break the Negatives.

|              |     |      |             |     |      |             |     |      |
|--------------|-----|------|-------------|-----|------|-------------|-----|------|
| 20 × 5 × 3½  | ... | 12 6 | 30 × 19 × 4 | ... | 20/- | 36 × 25 × 5 | ... | 25 - |
| 24 × 17 × 3½ | ... | 16/- | 34 × 16 × 4 | ... | 20/- | 38 × 26 × 7 | ... | 32 - |

OUTSIDE MEASUREMENTS.

ALL GOODS AT LOWEST STORE PRICES.

# ADAMS & CO.'S BEST OAK FRAMES.

| Size.      | In Oak. | Mahogany Polished. |
|------------|---------|--------------------|
| 7 × 6 each | £0 4 6  | £0 8 0             |
| 8 × 6 "    | 0 5 6   | 0 9 0              |
| 9 × 7 "    | 0 6 6   | 0 11 0             |
| 10 × 8 "   | 0 6 9   | 0 12 0             |
| 11 × 9 "   | 0 8 6   | 0 13 0             |
| 12 × 10 "  | 0 10 6  | 0 14 6             |
| 13 × 11 "  | 0 12 0  | 0 15 6             |
| 14 × 12 "  | 0 13 6  | 0 16 6             |
| 16 × 13 "  | 0 17 6  | 0 18 6             |
| 17 × 19 "  | 1 3 0   | 1 4 0              |
| 23 × 21 "  | 1 7 6   | 1 12 6             |
| 25 × 23 "  | 1 15 0  | 2 7 0              |
| 27 × 25 "  | 2 2 0   | 2 12 0             |
| 32 × 24 "  | 2 15 0  | 3 3 0              |
| 42 × 30 "  | 4 0 0   | 4 15 0             |



Fig. 414A.

Printing Frames in oak and mahogany, with British plate glass, strong springs, hinged bars and pressure-board jointed, to allow the progress of the picture to be seen without disturbing its position.

Felt Pads for Printing Frames, per doz. :-

|                 |                 |                  |                  |
|-----------------|-----------------|------------------|------------------|
| 6½ × 4½ ... 2/3 | 10 × 8 ... 4/6  | 13 × 11 ... 8/-  | 23 × 21 ... 21/- |
| 8½ × 6½ ... 3/- | 11 × 9 ... 6/-  | 16 × 13 ... 13/- | 25 × 23 ... 28/- |
| 9 × 7 ... 4/-   | 12 × 10 ... 7/- | 19 × 17 ... 20/- | 27 × 25 ... 34/- |

# ADAMS & CO.'S 'SIMPLEX' PRINTING FRAMES. (Patent.)

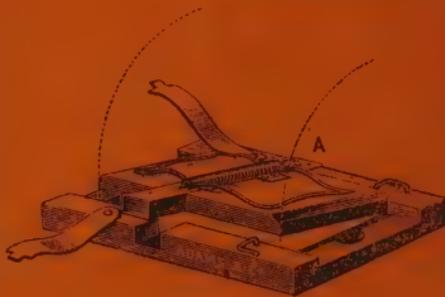


Fig. 415A.



Fig. 416A.

An extremely handy and convenient Frame is this. Prints can be quickly examined without trouble, and there is no risk whatever of them shifting during printing. The divided part of back is raised without the usual shifting of springs, these latter only being moved when paper is placed in or print taken out. During printing you ONLY raise the back, and it falls into position of its own accord. It is much appreciated in use, and is well made.

|         |     |     |     |     |           |
|---------|-----|-----|-----|-----|-----------|
| ¼-plate | ... | ... | ... | ... | 1/9 each. |
| ½-plate | ... | ... | ... | ... | 2/- "     |
| ¾-plate | ... | ... | ... | ... | 2/9 "     |

ALL GOODS AT LOWEST STORE PRICES.

## RETOUCHING DESKS.



FIG. 475A.

|                                                                                                                                     |         |
|-------------------------------------------------------------------------------------------------------------------------------------|---------|
| Pine blacked, for Plates $8\frac{1}{2} \times 6\frac{1}{2}$ ,<br>with Carriers for $\frac{1}{4}$ and $\frac{1}{2}$<br>Plates ... .. | £0 10 6 |
| Pine blacked, for Plates $12 \times 10$ ,<br>with Carriers for smaller sizes                                                        | 1 0 0   |
| Mahogany polished, with drawer,<br>  Plate ... ..                                                                                   | 0 17 6  |
| Ditto, ditto ... .. $12 \times 10$                                                                                                  | 1 15 0  |

## ADAMS & CO.'S 'CHALLENGE' RETOUCHING DESK.

White Enamelled Reflector. Dead Black Japanned Carriers.  
Hood and Wings.



FIG. 476A.

This Retouching Desk is exceedingly strong and well made. It is coated with hard baked enamel, and is so arranged as to permit of the plate being arranged at any desired angle. The side wings fold over carriers, and the hood and bottom when folded form the top and bottom of a flat box, easily packed for carriage. For hot climates and rough wear this is highly recommended.

|                                                                              |      |
|------------------------------------------------------------------------------|------|
| No. 1, with carriers for $\frac{1}{4}$ -plate ... ..                         | 6/-  |
| No. 2, ,, ,, $\frac{1}{4}$ -plate, and $\frac{1}{2}$ -plate ... ..           | 8/-  |
| No. 3, ,, ,, $\frac{1}{4}$ , $\frac{1}{2}$ , and $\frac{3}{4}$ -plate ... .. | 10/- |

ALL GOODS AT LOWEST STORE PRICES.

## ROSE AND SWING TAPS.

Suitable for High Pressure.

They are thoroughly well made and handsomely plated, and are supplied complete for fixing with arm to shut water off when moved either to the right or left. At the end is a finely perforated rose which produces a spray of water that will thoroughly wash plates in a few minutes. Nos. 2 and 3 have in addition a reversible outlet, so that it may be used as a rose or a small stream of water for filling measures and bottles.

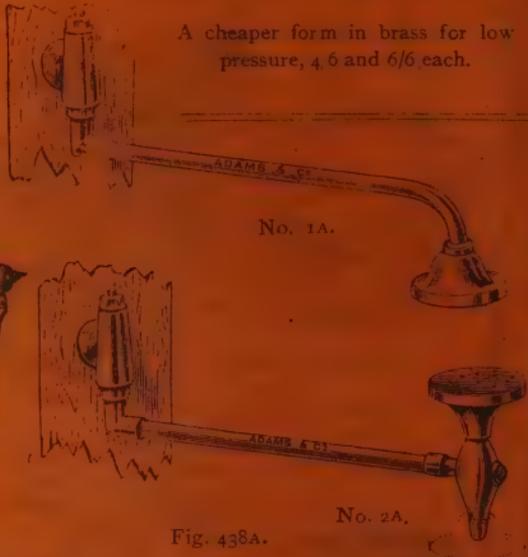
PRICE.

|                                |     |     |     |     |      |
|--------------------------------|-----|-----|-----|-----|------|
| No. 1                          | ... | ... | ... | ... | 6/0  |
| No. 2 (with reversible outlet) | ... | ... | ... | ... | 7/6  |
| No. 3                          | ... | ... | ... | ... | 10/0 |

A cheaper form in brass for low pressure, 4/6 and 6/6 each.



No. 3A.



No. 1A.

No. 2A.

Fig. 438A.



Fig. 441A. SETS OF WEIGHTS. Grains and drams, 9d.

### IMPROVED DISPENSING SCALE.

With Patent Screw Lift, Brass Beam, Pillar, and Fittings, Glass Pans; on Mahogany Box (Fig. 441A).

8 in. Beam, 10 in. Box; 26/- NETT.

Will weigh  $\frac{1}{2}$  a grain, and both hands are left free for dispensing.

VERY BEST QUALITY

ALL GOODS AT LOWEST STORE PRICES.

Fig. 440A.



Fig. 445A.

**THE ECONOMIC BALANCE.**

Special Balance, as Fig. 445A.

Weighs to 1½ ozs. Glass Pan.

Price 1/6; postage, 4d.

8-inch Beam, Glass Pans, with Pillar, &c., complete (as Fig. 440A) ... .. 6/4

**CHEAP ORDINARY SERIES.**

|                                                       |         |         |
|-------------------------------------------------------|---------|---------|
|                                                       | 6-inch. | 8-inch. |
| Scales and Weights in Oak Box, with brass pans ... .. | 2/4     | 2/11    |
| Ditto, ditto, with glass pans ... ..                  | 3/1     | 3-6     |
| Ditto, in Mahogany Box, with glass pans ... ..        | 4/6     | 5/8     |



Fig. 442A.

**ADAMS & CO.'S 'CLUB' SCALES.**

These are of the very best quality, with 6-in. Glass Pan (an extra one is also supplied) and solid marble top. Each Scale is Government stamped, and the balancing points in centre permit of the finest adjustment. Suitable for amateur and professional; also chemists and dealers generally.

Price complete, with Weights, £2 10s.

Fig. 443A.



**ADAMS & CO.'S 'Challenge' SCALES.**

A good and useful scale, will weigh up to 2 lbs. The weighing pan is detachable, and is of white enamelled iron.

Price, with weights up to ½ lb., 15/-.

**WEIGHTS.**

|                               |               |
|-------------------------------|---------------|
| Full set of Grains and Drains | -/9 complete. |
| .. to ½ lb. ... ..            | 2/-           |
| .. to 1 lb. ... ..            | 3/-           |

# ADAMS & CO.'S PATENT 'ADJUSTABLE' SHUTTER.

(MADE OF ALUMINIUM.)

FOR HAND OR FIELD CAMERAS.

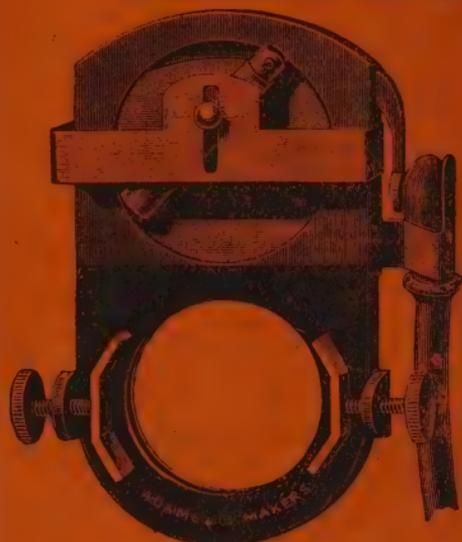


Fig. 446A.



Fig. 447A.

**T**IME and instantaneous, with pneumatic regulation. We regard this as the best and most complete all-round Shutter made. It is exceedingly light, compact, and reliable. As will be seen by Fig. 447A accurate speeds are marked upon it, and it is merely necessary to point the indicator to the speed required.

It is fitted with Hill & Adams' Pneumatic Regulation, which permits of all exposures being given with certainty. It also prevents the regulation of time being affected by climatic influences. When springs or leather brakes are used in Shutters they can never be depended upon, and they are hardly ever twice alike. Time exposures of any duration may also be given.

It will also be noticed that the tongue of the Shutter is raised and lowered by a circular movement, thus preventing the usual amount of vibration found with similar Shutters. This circular motion prevents the tongue from striking the top and then rebounding.

Fig. 446A also shows the mode of affixing to Lenses. This is done in a far simpler manner than with any other Shutter, as no special fitting is required. It will be seen that there is a good range for size of Lenses, and a  $\frac{1}{4}$ -plate Shutter will fit any  $\frac{1}{4}$ -plate Lens, and a  $\frac{1}{2}$ -plate any  $\frac{1}{2}$ -plate Lens, and so on.

Another important point for most workers is that the necessary extra amount of exposure is afforded to the foreground. It is made of aluminium, and is extremely suitable for foreign work, and is so small and light that it can be carried in the waistcoat pocket.

The outside dimensions of a  $\frac{1}{4}$ -plate Shutter are about  $3\frac{3}{8} \times 2\frac{3}{4}$ ;  $\frac{1}{2}$ -plate,  $4 \times 3\frac{1}{4}$ ; whole-plate,  $4\frac{7}{8} \times 3\frac{1}{2}$ .

Prices for the  $\frac{1}{4}$ -plate, complete, 25/-;  $\frac{1}{2}$ -plate, 27/6; whole-plate, 31/6. Postage 3%, extra on each. The above prices are strictly net.

It is a Shutter we can most strongly recommend.

ALL GOODS AT LOWEST STORE PRICES.

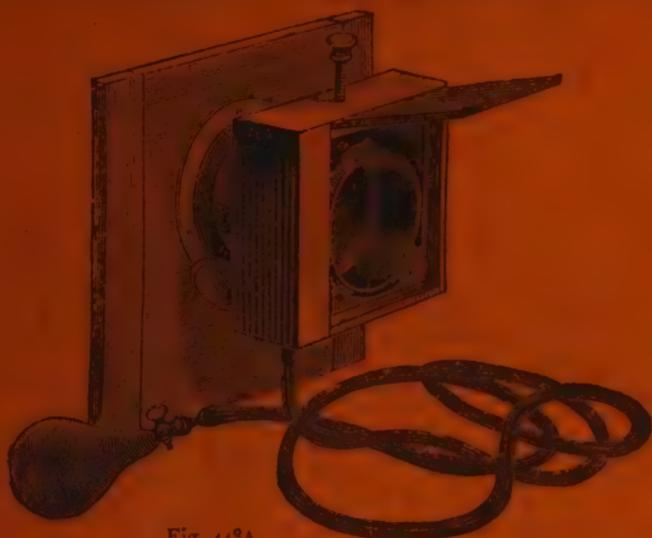


Fig. 443A

## ADAMS & CO.'S 'ALDRSGATE' PNEUMATIC FLAP SHUTTER.

For inside or outside of Camera, and studio or outdoor work. Can be used as a time shutter as well as for instantaneous work. Owing to length of tubing the operator can be at any part of the studio and yet have complete control over the shutter. There is not even the slightest vibration, and it is perfectly silent in action. For studio work it stands unrivalled, and its low price is distinctly in its favour. Strongly made, in best polished walnut.

### SINGLE FLAP SHUTTER.

With 2 Yards Rubber Tubing.

| Nos. | Largest Aperture. | Rapidity.   | Nos. | Largest Aperture. | Rapidity.   |
|------|-------------------|-------------|------|-------------------|-------------|
| 1    | 1½ inch           | 180 second. | 7    | 3½ inch.          | 180 second. |
| 2    | 2                 | 180 "       | 8    | 4                 | 180 "       |
| 3    | 2½                | 180 "       | 9    | 4½                | 180 "       |
| 4    | 2½                | 180 "       | 10   | 4½                | 180 "       |
| 5    | 3                 | 180 "       | 11   | 5½                | 180 "       |
| 6    | 3½                | 180 "       | 12   | 6½                | 180 "       |

PRICE.—Nos. 1, 2, 3, 4, 5, 6, 7, and 8, 16/6; 9, 10, 17/6; 11, 12, 20/6.

### DOUBLE FLAP SHUTTER.

With 1 Yard Rubber Tubing.

| Nos. | Largest Aperture. | Rapidity.   | Nos. | Largest Aperture. | Rapidity.   |
|------|-------------------|-------------|------|-------------------|-------------|
| 1    | 1½ inch.          | 180 second. | 6    | 2½ inch.          | 180 second. |
| 2    | 1½                | 180 "       | 7    | 3½                | 180 "       |
| 3    | 2                 | 180 "       | 8    | 3½                | 180 "       |
| 4    | 2½                | 180 "       | 9    | 4½                | 180 "       |
| 5    | 2½                | 180 "       | 10   | 4½                | 180 "       |

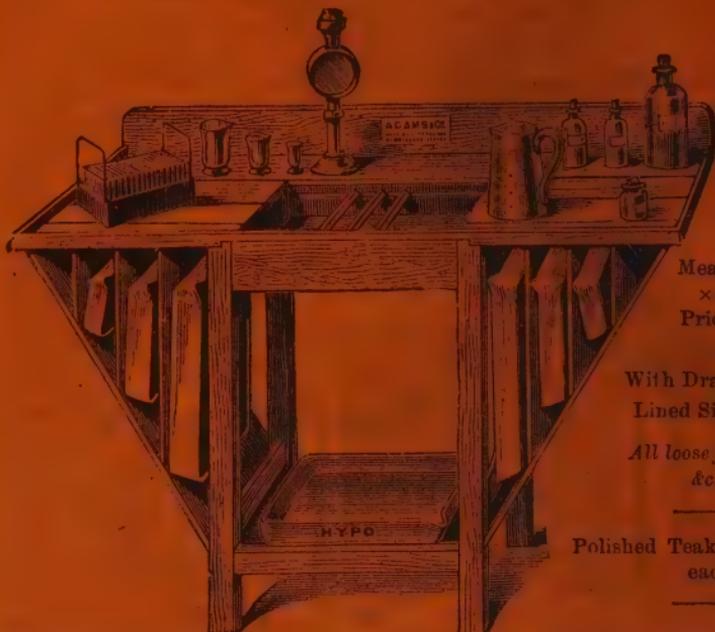
PRICE.—Nos. 1, 2, 3, 4, 5, 6, 24/6 each; 7, 8, 9, 25/- each; 10, 30/- each.

Extra large and strong ball with tap, 2/6 extra. New balls and tube, 2/6 and 4/6.

Extra lengths rubber tubing, 4d. per foot.

ALL GOODS AT LOWEST STORE PRICES.

# ADAMS & CO.'S 'CHALLENGE' DEVELOPING SINK



A thoroughly serviceable portable Developing Sink and Table of varnished pine.

Measures 4 ft. 10 in. x 22 in. x 3 ft.

Price, complete, £2 12 6

With Drawer and Lead Lined Sink, £3 3 0

All loose fittings, Dishes, &c., extra.

Polished Teak Rack, 3/- each.

For full particulars see Annual, price Sixpence; post free One Shilling.

## ADAMS & CO.'S 'CHALLENGE' LEVEL.

REGISTERED No. 138,687.

This is the most sensible level made. When an ordinary level is placed on the top of a Camera it is impossible to see it without getting a stool or ladder of some kind, it being too high. This is entirely avoided by using the 'Challenge,' as it is merely placed upon the Camera, as shown in illustration. The spirit level is seen right through, and it is placed against side of Camera also. It thus answers the purpose of level and indicator, and is complete in itself. Is very small and much lighter than brass levels, being made of best boxwood.

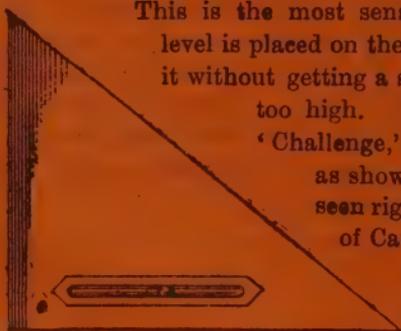


Fig. 350A.

Price 2/6 each. Postage 2d.

ALL GOODS AT LOWEST STORE PRICES.

# TISSUE COVERS.

## PRINTED TISSUES.

Assorted designs in boxes.

|            |        |          |       |
|------------|--------|----------|-------|
| C.-D.-V.'s | ... .. | per 1000 | s. d. |
| Cabinets   | ... .. | "        | 1 6   |
| C.-D.-V.'s | ... .. | per 150  | 3 6   |
| Cabinets   | ... .. | "        | 0 8   |
|            |        |          | 1 0   |

## PLAIN TISSUES.

|                  |        |          |     |
|------------------|--------|----------|-----|
| White C.-D.-V.'s | ... .. | per 1000 | 0 6 |
| " Cabinets       | ... .. | "        | 1 0 |
| Pink C.-D.-V.'s  | ... .. | "        | 0 9 |
| " Cabinets       | ... .. | "        | 1 4 |



Fig. 479A.

# SHEATHS (Patent).

They are made in two forms, one for plates and one for films at same price as Fig. 478A.



Fig. 477A.

|         |        |      |          |
|---------|--------|------|----------|
| 4½ × 3¼ | ... .. | 3-   | per doz. |
| 5 × 4   | ... .. | 4-   | "        |
| 6½ × 4½ | ... .. | 7 6  | "        |
| 7½ × 5  | ... .. | 10-  | "        |
| 8½ × 6½ | ... .. | 10/6 | "        |

All prices nett.

*In Aluminium at double above prices.*

Fig. 477A is the same sheath as is used in our 'Ideal.' It is of good quality and well finished. 4/- per dozen.



Fig. 478A.

Fig. 479A is used in our 'Adams' Camera and Changing Boxes, and permits either plate or film being up to accurate focus, independent of thickness. Being open at each end plates or films are much easier withdrawn. Those in aluminium are exceedingly light.

# VIEW FINDERS.

## ADAMS & CO.'S FINDER FOR HAND CAMERAS.



Fig. 493A.

Lens 1½ in. focus, mounted in brass tube, 1/6 each.  
Unmounted, 1/3 each. These are very best quality lenses.

Also supplied complete, ready for screwing on, both Landscape and Portrait, 5/6 per pair.

Improved Focus with spring fronts, enabling the interior to be easily got at for cleaning. 3/8 each, or 6/6 per pair net.

These are marked to scale, and the centres are also marked; thus they can be accurately fitted to any Camera.



Fig. 494A.

The Best Hand Camera Shutter is our **ADJUSTABLE.**

See page 360.





# ADAMS & CO.'S NEW VIEW METER.

MADE IN ALUMINIUM.



Fig. 498.

This View Meter is constructed to give exactly the same angle of view as the lens in use. For all classes of work it is of enormous advantage, for the exact view that would be on the plate from the position of the operator may be at once seen without the trouble or necessity of erecting the camera, and this will often lead to a better point being chosen. It also enables the operator to tell at a glance what would be the best angle lens to use in order to obtain the most artistic rendering of his subject, and also shows the exact spot where it is necessary to place the camera in order to embrace any particular subject on his plate.

**IT SAVES MUCH TIME AND TROUBLE!**

No Photographer should be without one.

Being made of aluminium, and extremely light, it is the only portable and efficient instrument made.

Price 10s. 6d. nett. Postage 3d.

## THE COMBINATION ZINC WASHING TANK.

With Siphon and Movable Drainers.

|                                                 | s. | d. |
|-------------------------------------------------|----|----|
| $4\frac{1}{2} \times 3\frac{1}{2}$ , 24 grooves | 4  | 6  |
| $5 \times 4$ .. .. .                            | 5  | 0  |
| $6\frac{1}{2} \times 4\frac{3}{4}$ .. .. .      | 6  | 0  |
| $7\frac{1}{2} \times 5$ .. .. .                 | 6  | 6  |
| $8\frac{1}{2} \times 6\frac{1}{2}$ .. .. .      | 7  | 0  |
| $10 \times 8$ .. .. .                           | 9  | 0  |
| $12 \times 10$ .. .. .                          | 10 | 6  |

All sizes also supplied in 12 grooves. 



Fig. 501A.

ALL GOODS AT LOWEST STORE PRICES.

# THE 'CHALLENGE' PRINT WASHER.

This Apparatus was shown at the Crystal Palace Exhibition, February, 1889, and has since been much admired AND IMITATED.

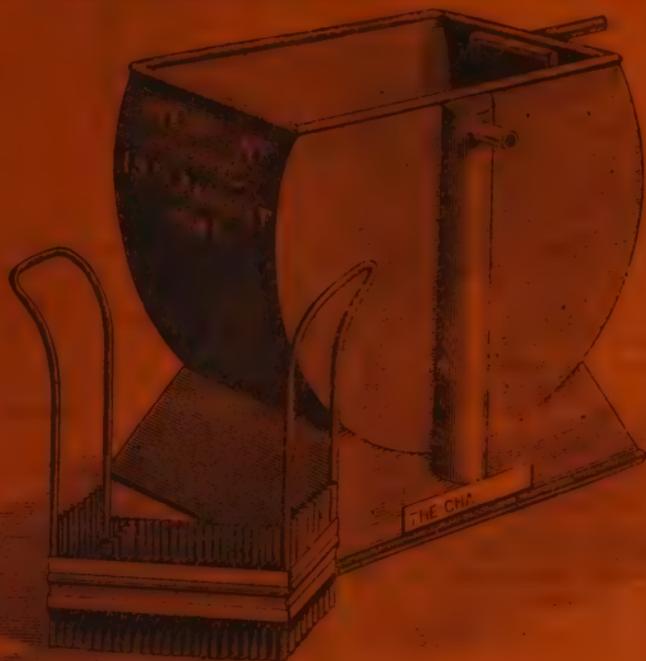


Fig. 506a.

It has been acknowledged by all to be the best in the market, and is a handsome apparatus. By dispensing with the tap and with its more elaborate finish, I can now supply a cheaper apparatus on the same lines. It has perforated bottom to carry off hypo and overflow. This overflow can be converted into syphon at will by simply attaching india rubber tube, which must fall lower than bottom of washer. *The inside is enamelled white—outside black.* Although cheap, this is strong, and will compare favourably with any of its imitators, being in all respects a Perfect Washer for plates or prints.

## PRICES, NET.

### PRINT WASHERS—ENAMELLED.

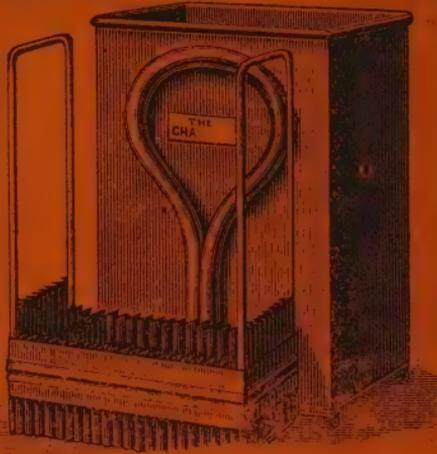
| Outside Measure.                         | Price | Capacity                              |
|------------------------------------------|-------|---------------------------------------|
| 10 $\frac{1}{2}$ X 11 $\frac{1}{2}$ X 12 | 7/0   | for any size to $\frac{1}{2}$ -plate. |
| 11 $\frac{1}{2}$ X 11 $\frac{1}{2}$ X 11 | 9/6   | " " $\frac{1}{2}$ -plate.             |
| 11 $\frac{1}{2}$ X 10 $\frac{1}{2}$ X 10 | 10/6  | " " 10 X 8.                           |
| 17 $\frac{1}{2}$ X 19 X 27 $\frac{1}{2}$ | 24/-  | " " 12 X 10.                          |
| 21 X 23 X 24                             | 32/-  | " " 15 X 12.                          |

### PLATE RACKS—PLAIN. FOR USE IN ABOVE.

| To take plates from                                                   | Price     |
|-----------------------------------------------------------------------|-----------|
| 3 $\frac{1}{2}$ X 3 $\frac{1}{2}$ to $\frac{1}{2}$ -plate             | 1/0 each. |
| 3 $\frac{1}{2}$ X 3 $\frac{1}{2}$ " 8 $\frac{1}{2}$ X 6 $\frac{1}{2}$ | 2/- "     |
| 3 $\frac{1}{2}$ X 3 $\frac{1}{2}$ " 10 X 8                            | 4/- "     |
| 3 $\frac{1}{2}$ X 3 $\frac{1}{2}$ " 12 X 10                           | 4/3 "     |
| $\frac{1}{2}$ -plate " 15 X 12                                        | 6/- "     |

ALL GOODS AT LOWEST STORE PRICES.

# WASHING AND DRYING RACKS.



## ADAMS & CO.'S 'CHALLENGE' ZINC PLATE WASHER.

This Washer is fitted with a loose rack for the plates, so that they may be lifted out after washing without touching the films. The rack can also be used as a drying rack.

**No. 1**, to take  $3\frac{1}{2} \times 3\frac{1}{2}$ ,  $4\frac{1}{2} \times 3\frac{1}{2}$ ,  $5 \times 4$ ,  $7\frac{1}{2} \times 5$ , and  $8\frac{1}{2} \times 6\frac{1}{2}$ , 5/- each.

**No. 2**, to take  $3\frac{1}{2} \times 3\frac{1}{2}$ ,  $4\frac{1}{2} \times 3\frac{1}{2}$ ,  $5 \times 4$ ,  $7\frac{1}{2} \times 5$ , and  $8\frac{1}{2} \times 6\frac{1}{2}$  up to  $12 \times 10$ , 9/- each.

The above are fitted with Siphons.

## ADAMS & CO.'S 'CHALLENGE' FOLDING RACK.

Strong, Clean, and Portable.

**No. 1**, takes  $3\frac{1}{2} \times 3\frac{1}{2}$ ,  $\frac{1}{2}$ , and  $\frac{1}{4}$  Plates.

**No. 2**, takes  $\frac{1}{2}$ ,  $\frac{1}{4}$ , and Whole Plates.

**No. 1**,  $\frac{1}{2}$  Plate, 12 Plates, 1/-;  
24 Plates, 1/4.

**No. 2**,  $\frac{1}{4}$  Plate, 24 Plates, 2/-.

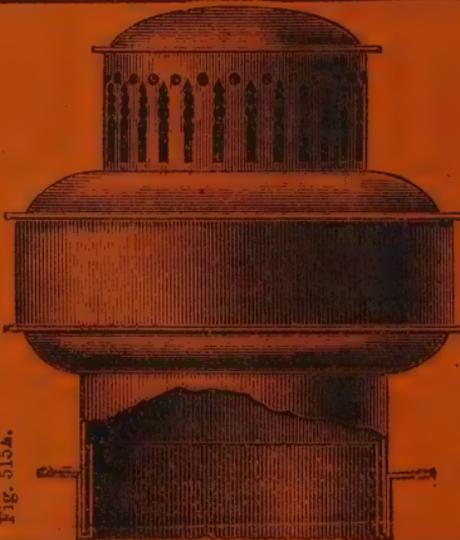


Fig. 515A.

# VENTILATORS

For

## DARK ROOMS.

PERFECTLY LIGHT-TIGHT.

Size of Hole  
at Bottom.

|        |     |     |     |     |       |
|--------|-----|-----|-----|-----|-------|
| 3-inch | ... | ... | ... | 3/6 | each. |
| 5      | "   | "   | "   | 4/6 | "     |
| 6      | "   | "   | "   | 5/6 | "     |
| 8      | "   | "   | "   | 7/6 | "     |

### ELBOWS FOR ABOVE.

|              |     |              |     |
|--------------|-----|--------------|-----|
| 3-inch each, | 1/2 | 6-inch each, | 2/- |
| 5            | "   | 8            | "   |
|              | 1/8 |              | 3/- |

### PIPING.

|                |     |                |     |
|----------------|-----|----------------|-----|
| 3-inch per ft. | 7/5 | 6-inch per ft. | 1/- |
| 5              | "   | 8              | "   |
|                | 7   |                | 1/0 |

ALL GOODS AT LOWEST STORE PRICES.

\* \* \*      I N D E X .      \* \* \*

|                          |                            |                           |
|--------------------------|----------------------------|---------------------------|
| Albums, 248-9            | Colours, 345               | Masks and Discs, 330      |
| Backgrounds, 250-7       | Cutting Glasses, 312       | Measures, 311             |
| Books, 264, 334          | Dark Slide Protectors, 315 | Mounts, 323, 342, 348     |
| Book Post Wraps, 264     | Dark Tents, 314            | Negative Bags, 349        |
| Border Negatives, 259-60 | Dish Screens, 315          | Outfits, 265, 268, 273    |
| Bottles, 258             | Dishes, 315, 317, 335      | Pantoscopes, 349          |
| Boxes, 261-2             | Exposure Meters, 320       | Papers, 347, 352          |
| Brushes, 262             | Films, 322                 | Plates, 353-4             |
| Burnishers, 263          | Supports, 321              | Printing Frames, 355-6    |
| Cameras, Enlarging, 319  | Finders, 365               | Racks, 368                |
| Field, 266-75 [332       | Focussing Cloths, 323      | Retouching Desks, 357     |
| Hand, 319-32             | Screens, 323               | Sets, 324                 |
| Reducing, 332, 335       | Frame Mounts, 323          | Rose Tops, 358            |
| Camera Bellows, 297      | Headrests, 324             | Scales and Weights, 358-9 |
| Cases, 296               | Hypo Jars, 258             | Sheaths, 365              |
| Stands, 297-303          | Lamps, 325, 327            | Shutters, 360-1           |
| Chairs, 246-7            | Lanterns, 318, 328-331     | Sinks, 355, 362-3         |
| Changing Bags, 304       | Lantern Frames, 333        | Tablets, 364              |
| Boxes, 305-7             | Masks, 332                 | Tissue Covers, 365        |
| Chemicals, 308, 309      | Screens, 334               | View Meter, 367           |
| Preparations, 310, 311   | Vices, 333                 | Washers, 367-8            |
| Cisterns, 313            | Lenses, 321, 334, 336, 339 | Ventilators, 368          |
| Cloud Negatives, 312     | Level, 362                 |                           |

\* \* \*      T E R M S .      \* \* \*

**S**TRICTLY NET CASH unless otherwise stated. Orders must be accompanied with FULL AMOUNT, as we cannot undertake the trouble of collecting small balances. It is, therefore, better to send a trifle more, as the surplus will be returned with receipt. Deposit accounts for any amount may be opened, and the holders are entitled to the best cash terms.

When goods are entered the full makers' prices will be charged. No discount whatever will be allowed. We can make no exception to this rule whatever. We do not send out goods in reply to wires unless it is a MONEY ORDER Telegram, and then it must be stated on the telegram that the money has been sent. Cheques and P.O.s cross London & County, Aldersgate Street.

Foreign Orders should be accompanied with a Draft on London at sight, or the amount will be collected by Bankers against Bill of Lading if over £15, but a draft for 15 per cent. of the amount must accompany the Indent.

All Goods packed with great care, but we are not liable for breakage.

Dangerous Goods despatched at consignee's risk.

Packing Cases charged cost price, and are not returnable.

ADAMS & CO. do not hold themselves bound for any period by the quotations in this list, the prices for chemicals and other goods being liable to the fluctuations of the various markets.

**ALL PREVIOUS LISTS AND ADVERTISEMENTS CANCELLED.**

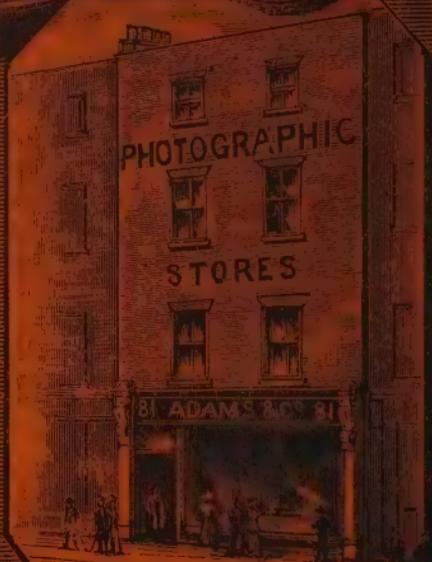
ALL GOODS AT LOWEST STORE PRICES.



**ADAMS' & CO LONDON**



2, 3 & 4 ALDERSGATE BLDGS. E.C.



81 ALDERSGATE ST. E.C.

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# HARRINGTON BROS.,

SHANDON CHEMICAL WORKS, CORK,

MANUFACTURE ALL KINDS OF

## Photographic Chemicals,

OF GUARANTEED PURITY.

(In Bulk or in neatly capped Bottles, ready for retailing, with Trader's own Labels, if desired.)

### SPECIALITIES.

Enamelling Collodion

(As used by the principal Photographers).

Platinum Chloride.

Potassium Chloro-Platinite.

Sulpho-Cyanides of Ammonia and Potash.

Soda Sulphite.

And all Salts of Cadmium, Iron, Potash, Soda, Uranium, &c.

Photographic Varnishes.

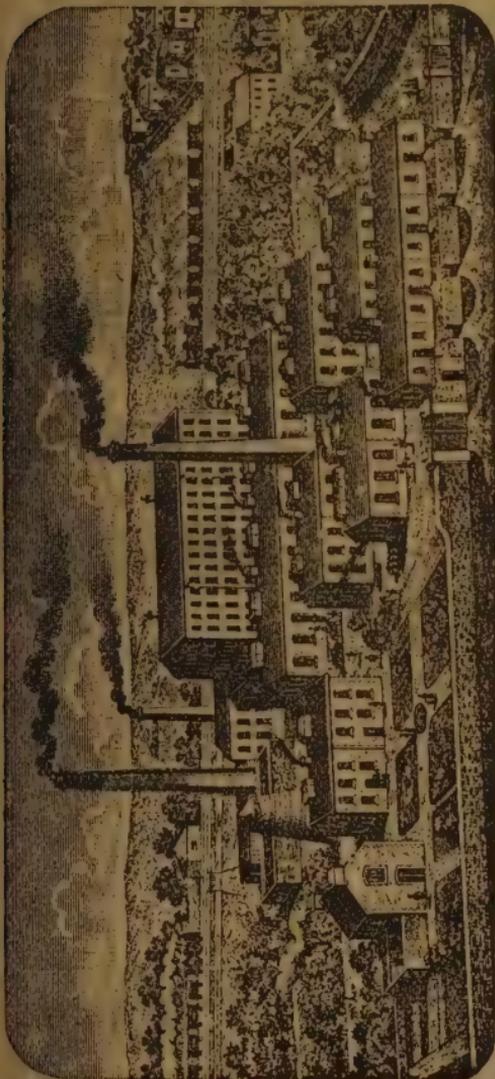
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'Queen's College, Cork, Oct. 1890.  
—It gives me great pleasure to bear testimony to the excellence of the Chemicals manufactured by Messrs. Harrington. For many years I have been supplied by them with Chemicals, and everything I got from them invariably gave me perfect satisfaction. — (Signed) MAXWELL SIMPSON, LL.D., D.Sc., M.D., F.R.S., F.R.U.I., Professor of Chemistry, Queen's College, Cork.'

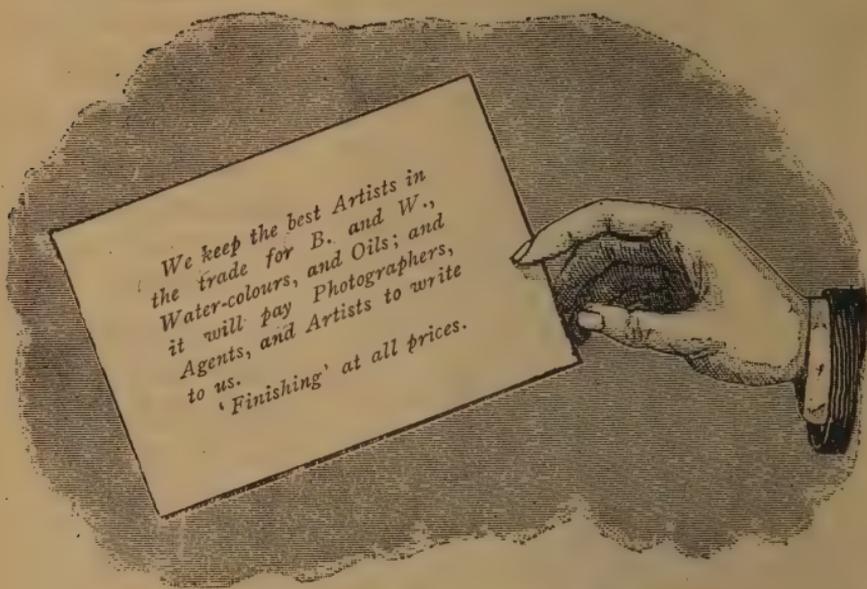
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THE TRADE ONLY SUPPLIED.

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# ILLINGWORTH'S ENLARGEMENTS



Owing to our specially adapted premises and large staff, we can offer special advantages and prices to those who can take large quantities of enlargements or of finishing work.

**WRITE TO US.**

**THOMAS ILLINGWORTH & CO.,**  
THE PHOTO WORKS,  
WILLESDEN JUNCTION, LONDON, N.W.  
[See following page.]



# ILLINGWORTH'S ENLARGEMENTS

Still continue to find increased favour with Photographers, and in the New Premises at Willesden Junction a special plant has been laid down for turning them out quickly and well. New washing rooms have been built, and a special water supply obtained, all with the idea of making Bromide and other prints as permanent as possible.



**THOMAS ILLINGWORTH & CO.,**

THE PHOTO WORKS,

WILLESDEN JUNCTION, LONDON, N.W.

Telegrams:—'SQUEEGEE, LONDON.'

SEND FOR PRICE LIST.

[See preceding page

**SPEED! SIMPLE! STEADY!****C.P.S. 'SIMPLEX' DROP SHUTTERS,****WITH OR WITHOUT REGULATORS.****No Intricate Mechanism.**

Moderate in price, yet unsurpassed for utility. Have met with unqualified approval (see numerous Testimonials). Has a specially devised catch for **RELEASE WITHOUT VIBRATION.**

The 'Regulator Simplex'—*a new and improved form*—a Slide for lengthening or shortening the aperture (see Cut with Pneumatic Release) and so regulates exposure.

**PRICES; per post, 3d. extra.**

| Size of Hood of Lens. | Simplex Shutter. | Regulator Simplex Shutter. | Size of Hood of Lens. | Simplex Shutter. | Regulator Simplex Shutter. |
|-----------------------|------------------|----------------------------|-----------------------|------------------|----------------------------|
| Up to 1½ inches       | 4/6              | ... 7/6                    | Up to 3 inches        | 6/-              | ... 10/-                   |
| " 2 "                 | 5/-              | ... 8/-                    | " 3½ "                | 7/-              | ... 11/-                   |
| " 2½ "                | 5/6              | ... 9/-                    | " 4 "                 | 7/6              | ... 12/-                   |

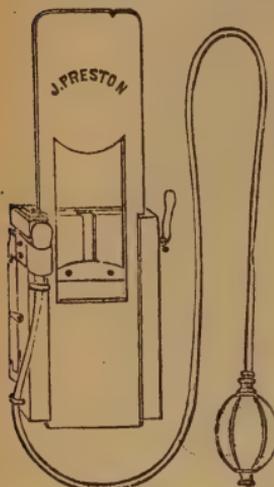
**PNEUMATIC RELEASE, 3/6 extra (Fig. 1).****N.B.**—To ensure a *Tight and correct Fit, send the Hood of the Lens.*

Fig. 1. Regulator Simplex, and Pneumatic Release.

**'C. P. S.'****SPECIAL VENTILATED DARK TENT**

Has a working space of 33 inches from right to left, when extended on a table (the rigid part is 18 inches long by 12 inches broad and 12 inches high, the remainder flexible); 48 inches from back to front. It has a special and efficient Ventilator and Sliding Window.

May be used on a Tripod Stand for outdoor work; when so required, we attach *Special Blocks for the purpose.* (Vide Woodcut, Fig. 2.)

Price **21/-**; per post, **22/-**; or with Roof Stays, Inlet and Outlet Tubes, Funnel and Stand, **31/6**; per post, **32/6**. Tripod Stand **15/-** extra.

Larger size, 24 x 18, **31/6**; or with above extras, **42/-**; postage **1/-** extra. Tripod Stand **15/-** extra.

**R. A. B. says:**—'I have found your Dark Tent of great use during a yachting cruise.'

**G. D. P. says:**—'It is quite the best kind of tent I have yet seen, and I am very much pleased with it.'



Fig. 2.

**J. PRESTON**

(Late Cubley &amp; Preston),

**CHEMIST AND PHOTOGRAPHIC DEALER,  
4 HIGH STREET, SHEFFIELD.**

CATALOGUES ON APPLICATION.

# Eastman's Solio Paper

(Gelatino-Chloride).

DETAILED PRICE LIST WILL BE SENT FREE UPON APPLICATION.

**SOLIO** at once took first rank among all printing-out papers, both for excellence of quality and ease of manipulation. An improved method of manufacture has increased its excellence of quality.

**SOLIO** has received the commendation of the leading photographers, such as Thomas Fall, of London; W. M. Warneuke, of Glasgow; A. Debenham, of Ryde; Chevalier Lafosse, of Ilfracombe; etc., etc., etc. Mr. Fall wrote, in September, 1893: "The paper is now perfection. I can get any tone I like with it."

Our own experience, gained in an extended series of experiments, not only in our own printing works, but also among the leading photographers of the day, has satisfied us that Solio paper is the best printing-out paper made.

**SOLIO** is a superior substitute for albumen paper, and is free from the defects common to albumen. It gives clear whites, exquisite tones, and high gloss; will neither curl, frill, nor blister; no special handling is necessary with it, and it can be used with ordinary negatives; for ease and rapidity of working it is beyond compare, and it gives a great variety of rich tones.

**SOLIO** is always ready for use. It combines beauty of finish, simplicity of manipulation, and permanency of image.

**SOLIO** was first introduced in June, 1892, and although of such recent date has already almost revolutionised photographic printing. The increasing demand has been unprecedented. For many weeks in 1893 we were forced to work in the Solio factory ten days a week—that is, we kept a force of men working at night as well as through the day.

Wherever Solio has been given a practical test, it has made a place for itself. The earnest photographer has seen at once that Solio is not only unequalled for clear whites, high gloss, and exquisite tones, but for ease and rapidity of working it is beyond compare. "I can get better prints mounted four hours earlier with Solio than with any other paper," a customer writes; and "Time is money."

## The Eastman Photographic Materials Co. Ltd.,

115 & 117 Oxford Street, London, W.

FRANCE { 4 Place Vendôme, Paris.  
Place Grimaldi, Nice.

ROCHESTER, N. Y., U.S.A.  
Eastman Kodak Co.

[See following pages.]

# Eastman's Bromide Paper.

“PERMANENT” and “EXTRA RAPID.”

Detailed Price List will be sent free upon application.

The beauty and durability of Eastman's Bromide Papers have already been proven, and they justly deserve the title “unrivalled.”

The output of this paper probably exceeds the output of any two combined factories. The sale of Eastman's Bromide Papers has increased to such an extent, that new factories have been finished this year to supply the increased demand, and the facilities for manufacturing this paper will soon exceed the capacity of any three other manufacturers combined.

Herbert S. Starnes, Esq., put several of the highest class of photographic papers, including platinotype, into a sealed bottle, with a sponge full of water, and sulphuretted hydrogen was passed into it for nine days. He then wrote to *The British Journal of Photography*, as follows:—

“And now, to conclude, I must say that I was thoroughly staggered with the Eastman paper prints. When we think that they had been subjected for nine days to a humid atmosphere of sulphuretted hydrogen, which practically destroyed the albumen prints, yellowed the whites of the platinum prints, and changed the bromide and others as you see, I am sure that you will agree with me that the colour of the image on the Eastman paper has actually improved, without any loss of density, and the whites have not yellowed. These two latter points are most surprising. Some of Monckhoven's ‘enamelled double transfer paper’ was tested at the same time, and had yellowed slightly.

“I feel convinced that there is some secret in the preparation of the Eastman paper that gives it a permanence which I, for one, cannot obtain with bromide of silver alone, to say nothing of the beautiful rich black image so characteristic of an untouched Eastman print. I need hardly say that I have no interest whatever in any of these processes. I simply show you these results of my experiments, and leave you to judge for yourselves.”

## The Eastman Photographic Materials Co. Ltd.,

115 & 117 Oxford Street, London, W.

FRANCE { 4 Place Vendôme, Paris.  
Place Grimaldi, Nice.

ROCHESTER, N.Y., U.S.A.  
Eastman Kodak Co.

[See preceding and following pages

# EASTMAN'S NIKKO PAPER.

Detailed Price List sent Free upon application.

---

Nikko is another step forward to keep the Eastman Company always at the front.

Nikko Paper combines the soft effect of a platinum or bromide tone with a highly enamelled surface. It has a delicate pink tint, and is especially recommended for those who desire a warmer tone than that of the ordinary bromide print.

Nikko Paper is unsurpassed by any paper for large pictures. The elaborate apparatus required for making direct negatives is no longer necessary for large work. Enlargements can be made from small negatives directly upon this paper.

Enlargements on Nikko Paper have a superior gloss; this paper gives bright clear high lights, beautiful half tones and deep rich shadows, transparent without blackness.

The Press and Dealers in photographic materials have predicted a great demand for Nikko Paper.

---

**The Eastman Photographic Materials Co. Ltd.**

115 and 117 Oxford Street, LONDON, W.

FRANCE { 4 Place Vendôme, Paris.  
Place Grimaldi, Nice.

ROCHESTER, N.Y., U.S.A.  
Eastman Kodak Company.

[See preceding and following pages.]

## Eastman's Kodaks.

These well-known instruments have a world-wide reputation. It is impossible here to fully describe the improvements made in the manufacture of Kodaks; this has already been done in a pretty illustrated Price List, which we will have pleasure in sending post free on application.

All the Kodaks now have automatic registering devices, and glass plate attachments are supplied for the "Junior" Kodaks, which are interchangeable with the roll-holder. The 4 and 5 "Folding" Kodaks are now fitted with an iris diaphragm shutter, worked either by hand or by pneumatic tube which has a range of automatic exposures from  $\frac{1}{100}$  of a second to three seconds; a double swing back, rising and sliding front and falling front board are among the improvements. These Kodaks can be focussed with the index or on ground glass. The glass plate attachment is no longer necessary when glass plate holders are used. The front of the Kodaks are so arranged that the long focus lenses can be removed and short focus wide angle lenses immediately substituted, and in the case of the 5 "Folding" Kodak the front portion containing lens and shutter can be removed and stereoscopic lenses and shutters attached in its place.

A new size of Kodak, the No. 6 "Folding," making a negative  $8\frac{1}{2} \times 6\frac{1}{2}$  inches, embodying all the improvements of the No. 5 "Folding" has been added to the list, affording, with the cheaper series called "A.B.C.," an opportunity of selection hitherto unknown in the photographic world.

---



---

## Eastman's Transparent Film.

Letter after letter has reached us this year from dealers and amateurs testifying to the improved quality of the film and the satisfaction it is giving. One of the most experienced dealers in the kingdom, Mr. John Trotter, of Glasgow, has written to us as follows: "The film has been very good indeed this year. I have had fewer complaints of it in proportion to the amount sold than any make of plate." And Eder J. Smith, Esq., of Halifax, well known in the photographic world, wrote October 2nd, 1893, as follows: "It may interest you to hear that I have a portion of one of your 48 exposure half-plate spools, four years old. I send for your inspection two negatives, one taken the same week the spool was received, the other four years later. You will see the film is in as perfect condition at the end of four years as when sent out. This film has not been kept wrapped in tin foil, or treated with any special care, but has been in the Roll-holder all the time, and has travelled some thousands of miles by sea and land."

---

### The Eastman Photographic Materials Co. Ltd.,

115 & 117 Oxford Street, London, W.

FRANCE { 4 Place Vendome, Paris.  
          { Place Grimaldi, Nice.

ROCHESTER, N.Y., U.S.A.  
Eastman Kodak Co.

[See preceding and following pages.]

# EASTMAN'S Roll Holders,

For Attachment to Ordinary Field or Hand Cameras.

**THE EASTMAN ROLL HOLDER system** is entirely dissimilar from all others, inasmuch as it first provides for the insertion of the unexposed film, already wound upon a spool or core, which fits the Roll Holder Mechanism. During the passage of the film through the instrument it is accurately marked by an automatic device designating the limits of the several exposures; an indicator shows distinctly when the film is in position for exposure, and automatically registers the number of exposures made.

One of the most important features of this Roll Holder is the **maintaining of the film under definite tension during any atmospheric changes**; this is the only instrument having such a device.

All instruments are made of best polished mahogany, and can be easily fitted to any existing camera.



No. 1.



No. 2.

No. 1 represents the complete Instrument, showing the winding key at the upper left hand, and the new automatic registering device at the upper right hand side.

No. 2 represents the Instrument divided into three parts, the upper portion being the back removed from the central portion or case, in which is seen the rolls or spools of film in position. The lower part is the front, which is left larger in all directions, to permit of fitting to the camera back. This work can be easily done by any intelligent camera maker; but when it is possible we prefer to do it ourselves, for which we charge cost price only, in which case we always require the reversing frame or camera itself.

| SIZE.                     | PRICE. | SIZE.             | PRICE.  | SIZE.          | PRICE. |
|---------------------------|--------|-------------------|---------|----------------|--------|
| 3½ × 4½ ins. ...          | £2 5 0 | 6½ × 4½ ins. ...  | £2 17 6 | 8 × 5 ins. ... | £3 0 0 |
| 4 × 5 " ...               | 2 10 0 | 7 × 5 " ...       | 3 0 0   | 8½ × 6½ " ...  | 3 15 0 |
| 6½ × 4½ " ...             | 2 15 0 | 7½ × 5 " ...      | 3 0 0   | 10 × 8 " ...   | 4 10 0 |
| <b>CONTINENTAL SIZES.</b> |        |                   |         |                |        |
| 9 × 12 cent. ...          | £2 5 0 | 18 × 24 cent. ... | £3 15 0 |                |        |
| 13 × 18 " ...             | 3 0 0  | 21 × 27 " ...     | 4 15 0  |                |        |

*NOTE that these Roll Holders are so constructed that they may be fitted to ordinary Field or Hand Cameras.*

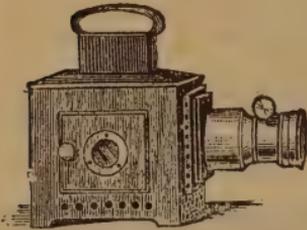
**The EASTMAN Photographic Materials Co. Limited,**  
 115-117 OXFORD STREET, LONDON, W.  
 PARIS—4 Place Vendôme. NICE—Place Grimaldi.  
 Rochester, New York, U.S.A.—Eastman Kodak Co.

[See preceding pages.]

# CHATHAM PEXTON,

Dissolving View Artist & Manufacturer,

**OPTICAL LANTERNS, APPARATUS, & SLIDES.**



IMPORTANT ANNOUNCEMENT.

## OPTICAL LANTERN SLIDES.

SEASON 1893-4.

By special arrangement with the Publishers, Messrs. **W. B. HORNER & SON**, of London and Dublin, **SIX** of their far-famed and wonderfully popular series, known as

### HORNER'S PENNY STORIES FOR THE PEOPLE

have been illustrated. The following are the titles and subjects :—

- No. 1.—‘**NAN.**’ A Temperance Story. By H. FITZGERALD.  
 ,, 2.—‘**FLOSSIE'S LITTLE SHOES.**’ A Temperance Story. By M. E. L.  
 ,, 3.—‘**FATHER, COME HOME.**’ A Temperance Story.  
 By FANNIE EDEN.  
 ,, 4.—‘**WOPS, THE WAIF.**’ By SYDNEY WATSON. A Story illustrating London Arab Life.  
 ,, 5.—‘**PLAYED OUT.**’ A Gambling Story. By SYDNEY WATSON.  
 ,, 6.—‘**LEFT ALONE; OR THE ORPHANS OF PINWOOD COTTAGE.**’ A Touching Story. By FANNIE EDEN.

#### ALL FROM LIFE MODELS.

One of the leading features of these Series is that **every Set has different people to illustrate the characters**, thus avoiding all similarity in the Sets. This is a great advance on many of the published Life Model Slides.

**SINGLE, BI-UNIAL, & TRIPLE LANTERNS** in great variety at all prices.  
**100,000 SLIDES** in stock to select from.

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*Slides produced from Negatives and Painted in three different styles if desired.*

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CHATHAM PEXTON, Dissolving View Artist,  
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(PATENT).

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FOR Washing Photographic Prints **PERFECTLY** with one-eighth the quantity of water used by any other washer, and in half the time.



**THE ONLY SELF-ACTING  
ROCKING TRAY.**

Only the contaminated water discharged periodically so often as desired; never leaves prints out of water; no adjustments required. Will work and 'ROCK' equally well with ONE

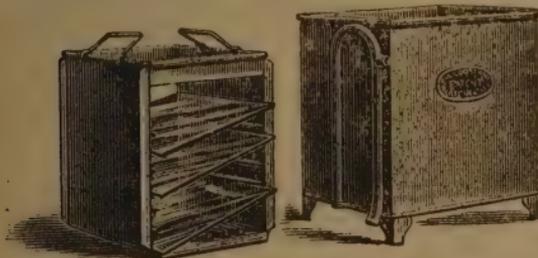
DROP per second or thirty gallons per hour. Action continues as long as water is supplied.

Action continues as long as

## THE GODSTONE PLATE WASHER

(PATENT)

WILL take all one, or two, or three different sizes at the same time, **face downwards.** Discharges a portion of the water from the bottom at intervals, according to supply. The Plates are **Never Out of Water**, thus washing them in one-third the usual time and water. Washes equally well **WITHOUT** continuous supply. No taps, no mechanism to get out of order.



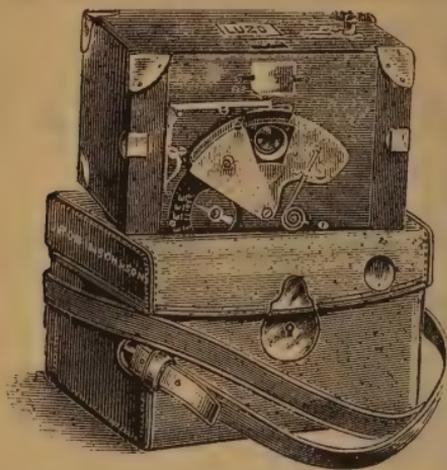
These Print and Plate Washers bear a Label with number and "GODSTONE" stamped on them.

**THOUSANDS HAVE BEEN SOLD.**

DESCRIPTIVE PRICED CIRCULAR ON APPLICATION.

To be obtained from the principal Photo Material Dealers in the United Kingdom and Colonies, and Wholesale only from

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47 TO 51 FEATHERSTONE ST., FINSBURY, E.C., LONDON.



# THE LUZO!!

**A**BSOLUTELY the lightest, most compact, simplest, and **BEST HAND CAMERA IN THE WORLD**, and the only one which is really suitable for extreme climates. Photos taken with the 'Luzo' are sharp to the corners, avoiding the necessity of circular prints. Six sizes now ready.

The 'LUZO' is made of the best seasoned Spanish Mahogany, has best rapid rectilinear lens, the improved 'Luzo' finder, time and instantaneous shutter (speed variable at will) solid leather case, the whole, including

lens, of best London make and finish. The new Transparent Film yields very beautiful results, and is as easily developed as glass plates.

CALL AND SEE IT



CALL AND SEE IT.

Reduced from a Photo taken with the 'Luzo.'

FULL PARTICULARS (ILLUSTRATED) WITH PRICES, TOGETHER WITH SPECIMEN PHOTO, POST FREE ON APPLICATION.

ONLY TO BE OBTAINED FROM THE MANUFACTURERS—

**J. ROBINSON & SONS,** Opticians & Manufacturers  
of all kinds of  
Photographic Apparatus.

ONLY ADDRESS—172 REGENT ST., LONDON, W.

[See following pages.]

# WHY CARRY UNNECESSARY WEIGHT?

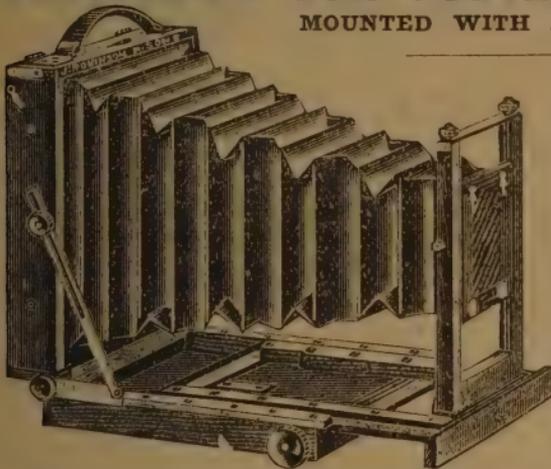
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 A FACT WORTH KNOWING.

MESSRS. J. ROBINSON & SONS are now supplying their Improved Cameras with Aluminium Fittings at prices usually charged for those mounted with Brass.

**THE** APPEARANCE **IS** IMPROVED.  
 WEIGHT REDUCED.  
 STRENGTH MAINTAINED.

FOR EXAMPLE, SEE THE FOLLOWING :

## ROBINSON'S NEW PORTABLE CAMERAS MOUNTED WITH ALUMINIUM.



No. 4A. CONICAL PATTERN (DOUBLE EXTENSION).

THESE Cameras are exceptionally well made of good seasoned mahogany; they are strong, portable, rigid, and easily worked; they are furnished with every movement, rack and pinion or winch screw focussing arrangement, swing back, reversing focussing screen, sliding fronts. The back slides forward for wide-angle work.

PRICES, including three Double Dark Slides:—

|                                                                 |     |     |         |
|-----------------------------------------------------------------|-----|-----|---------|
| For Pictures, HALF-PLATE ( $6\frac{1}{2} \times 4\frac{3}{4}$ ) | ... | ... | £6 10 0 |
| „ WHOLE-PLATE ( $8\frac{1}{2} \times 6\frac{1}{2}$ )            | ... | ... | £9 0 0  |
| For other sizes see List.                                       |     |     |         |

.....  
 Write at once for NEW ILLUSTRATED CATALOGUE, containing a description of every Requisite for Photography, together with many NOVELTIES and Complete Instructions in the Art. Post free to any part of the World.

SOLE Address—

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[See preceding and following pages.]

# THE PHOTOGRAPHIC STORES, 172 REGENT ST.

The **CHEAPEST & BEST HOUSE** for High-class Goods.

NOVELTIES FOR 1894.



Fig. 1.

## 'THE LUZO' PATENT VIEW FINDER.

The best of all Finders; requires no shading, shows the image very bright and well defined in any light, requires no focussing, fitted to any camera in a moment, Fig. 1, with a neat leather case.

No. 1, small size,  
**10/6.**

No. 2, large size,  
**13/6.**

## NEW HAND CAMERAS.

The Guinea  
The Two Guinea  
The Three Guinea

For prices, &c., see New  
Illustrated Catalogue,  
post free.

- ROBINSON'S Aluminium Mounted Cameras.
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- ROBINSON'S New Pattern Portable Cameras, in all sizes.
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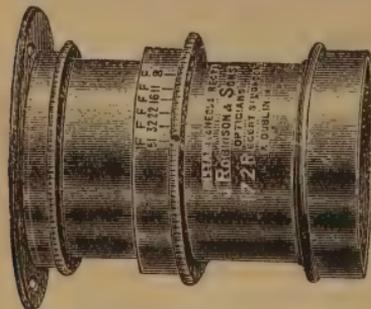
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## ROBINSON'S HIGH-CLASS LENSES are second to none.

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THE NEW ALUMINIUM MOUNTS.  
For Prices see Catalogue.



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The **CHEAPEST & BEST HOUSE** for High-class Goods.

**Complete Outfits for Beginners.**



**M**ESSRS. J. ROBINSON & SONS direct Special attention to their Complete Sets, comprising Portable Mahogany Camera, with 3 Double Dark Slides, First-class Lens, Folding Stand, Dry Plates, Chemicals; Instructions, and every requisite for taking Photographs. Neatly fitted in polished pine travelling cases.

For Pictures,  $3\frac{1}{2} \times 4\frac{1}{2}$ , 42/-;  
 $6\frac{1}{2} \times 4\frac{1}{2}$ , £5;  $8\frac{1}{2} \times 6\frac{1}{2}$ , £7 10/-  
 Superior Sets from £5 upwards.

Robinson's Cameras are unsurpassed for Quality and Finish.

A Complete Course of **FREE LESSONS** to all Purchasers.  
 Special Outfits for **INDIA** and the Colonies.

Important to all who practise Photography.

MESSRS. J. ROBINSON and Sons beg to draw special attention to the fact that they have increased their efficient staff of artists who are retained specially for Amateur Work. They have, therefore, every facility for executing, with the greatest promptitude, work in all branches of Photography, including

**DEVELOPING** all kinds of Plates and Films.

**PRINTING** in Silver, Platinotype, Bromide, Carbon, Aristotype, Chloride Printing Out, and all other Processes.

**ENLARGING**, Mounting, and Finishing.

**RETOUCHING**, Negative and Positive.

**TRANSPARENCIES** and Lantern Slides.

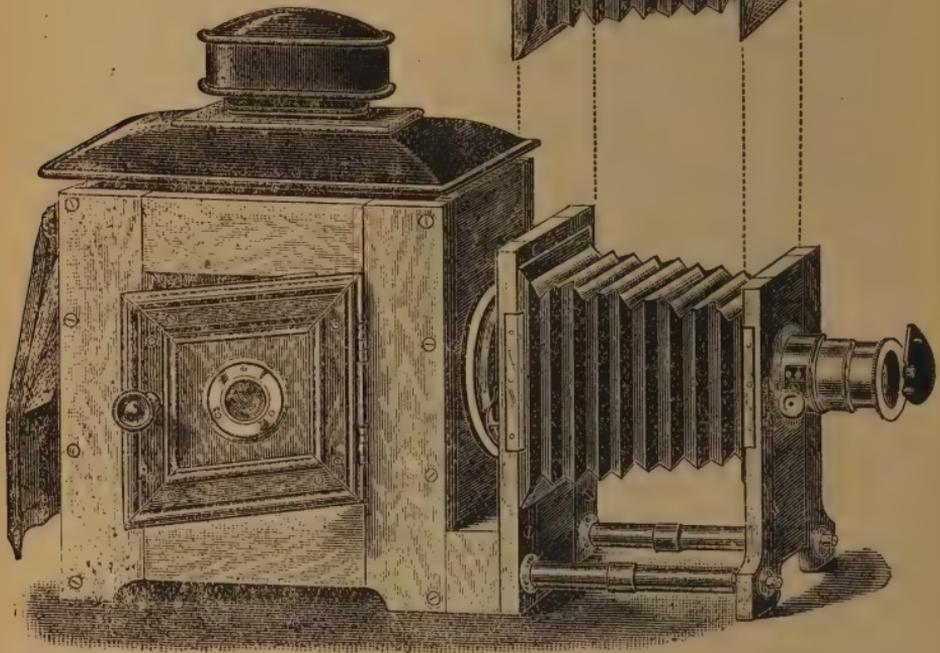
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[See preceding pages.]



# The "LOTHIAN" OPTICAL LANTERN.



## THE 'LOTHIAN' OPTICAL LANTERN, FOR OIL OR LIME LIGHT,

Is specially designed for Lecturers, Teachers and Lanternists generally who require an Instrument capable of yielding the best possible results at a public or private lecture.

The Optics are of selected quality, yielding brilliant results. The Objective is mounted in a Special Jacket Fitting, so that another lens of different focus can be inserted without any unscrewing.

The Special Bellows Front has a draw of from 5 to 14 inches. This varying length admits of the use of an Objective of any focal length. The Bellows can be taken out (see Woodcut), thus enabling the lecturer to demonstrate in the lantern many experiments in Physics, which cannot well be seen under ordinary conditions by a large audience.

*Price of Lantern as figured, £6 10s. Extra Lenses to slip into Jacket Fitting, from 16s. each. For other parts of Lantern see List.*

**Table for supporting Apparatus during Physical Experiments in the Lantern.**

This Table fits on the Telescope Tubes; it is adjustable to height, and can be moved towards or away from the Condenser. Size of Table 6 by 4 ins. Price 6s. each.



**ANDREW H. BAIRD,**  
Scientific Instrument Maker,  
15 LOTHIAN STREET, EDINBURGH.

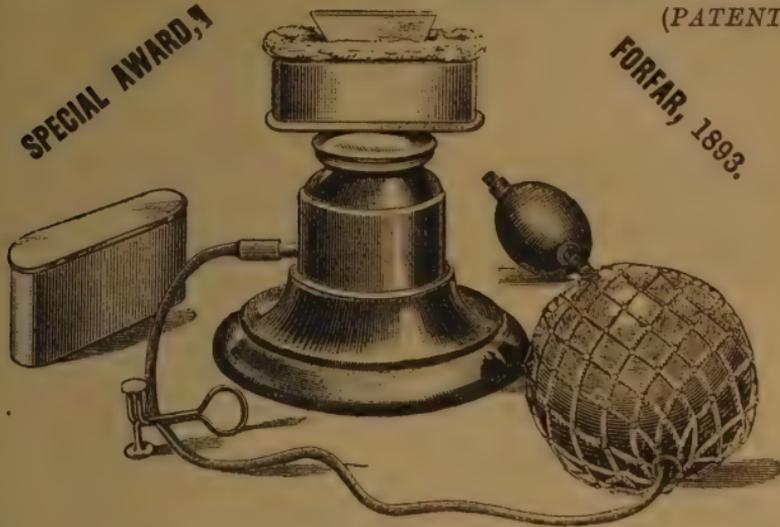
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THE 'TODD - FORRET' MAGNESIUM FLASH LAMP

(PATENT)

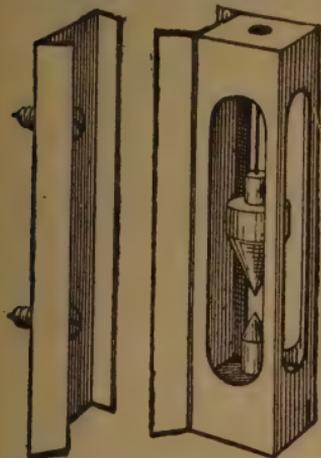
SPECIAL AWARD, 1

FORFAR, 1893.



The most powerful Lamp in the Market. Splendid for Portraiture. Unexcelled for Interiors. This Lamp was Awarded a Special Bronze Medal, the only award given in the Apparatus Section at the International Photographic Exhibition, Forfar. Price, 12/6; Post Free, 13/-

The 'Lothian' Universal  
CAMERA PLUMMET



Seen at Any Altitude.  
Price, with Screws, in Box, 2/-  
Post Free, 2/2

The 'Lothian' Rapid Solution Jar.  
Simple, Efficient, Clean.



|            |       |        |           |
|------------|-------|--------|-----------|
| To contain | 1 lb. | 2 lbs. | 6 lbs.    |
| Price ...  | 9d.   | 1/-    | 1/9 each. |
| Post Free  | 1/-   | 1/3    | 2/2       |

LIBERAL TERMS TO THE TRADE.

A. H. BAIRD, Scientific Instrument Maker, 15 Lothian St., EDINBURGH.

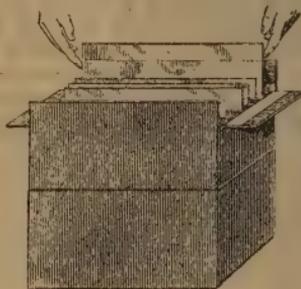
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**LIGHT-TIGHT BOXES FOR DRY PLATES,  
 LANTERN SLIDES, &c.**

**PRIZE MEDAL 1887.**

Fitted with Paper-covered Metallic Groovings, occupy little room, also serviceable for keeping Negatives in, &c. Plates can be stored close together, and yet with sufficient space to avoid contact. After removing lid, bend back ends of box, which, being hinged, will readily fall down. The Plate can then be easily withdrawn or replaced.



**PARCELS-POST BOXES FOR ONE OR MORE BOTTLES,  
 READY FOR ADDRESSING.**

These Cases are perfectly secure, the bottles being protected by an inner wrapping of Patent Corrugated Cardboard. The adhesive flap forms a dust-proof package. Made also in a stronger form, with shoulders and deep lift-off lid.

ANY SIZES OR SHAPES MADE TO ORDER.

**ALL DESCRIPTIONS OF BOXES FOR THE PHOTOGRAPHIC TRADE.  
 Folding Boxes for various purposes.**

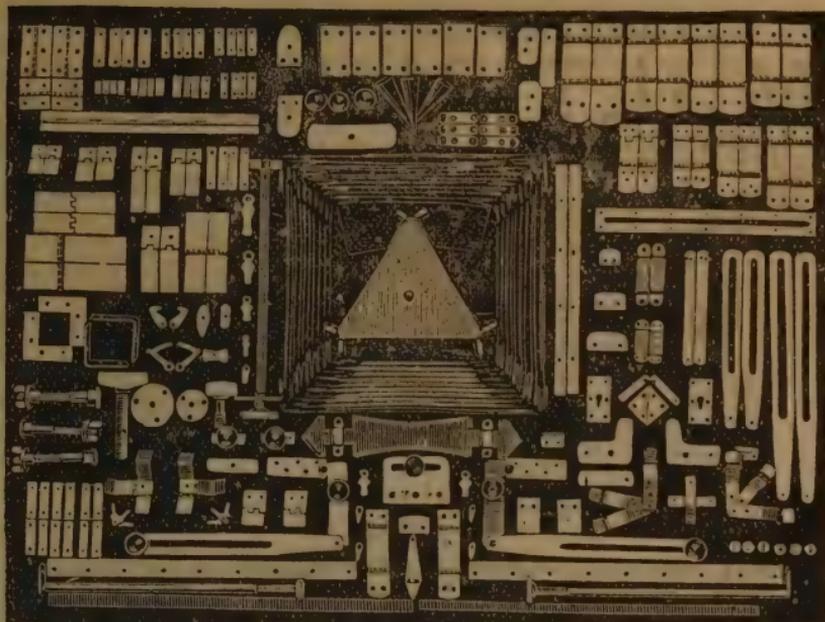
To be obtained from all Dealers. Price List on application.

Telephone No. 220.

Telegraphic Address: 'Archway, London.'

RACK & PINIONS SETS FROM 2/10

RACK FROM 10 PER IN. PINION WIRE FROM 10 PER IN



THE LARGEST MAKERS OF PHOTOGRAPHIC RACKS SETS FROM 2/10 PER IN. PINION WIRE FROM 10 PER IN

THE LARGEST MAKERS OF PHOTOGRAPHIC RACKS SETS FROM 2/10 PER IN. PINION WIRE FROM 10 PER IN

# TO THE TRADE

**THE** above is a representation of a Show Case which we are sending out in conjunction with our **PRICE LIST AND CYCLOPEDIA OF PHOTO-BRASSWORK.**

This branch is frequently neglected by many dealers on account of the liability to mistake, owing to imperfect description and method of ordering. This liability is entirely obviated by the use of the above Case and our Catalogue, which contains full sized illustrations of every description of Camera fittings, each distinctly numbered, with the price, description, and number opposite the illustration.

The fittings are securely and tastefully arranged in a velvet-lined glass case, ebonised, measuring  $24 \times 19 \times 2\frac{1}{2}$ , suitable for wall or counter, and additionally valuable for exhibition purposes. It is sent out to the Trade with a number of copies of the Cyclopaedia and Price List at a nominal charge, and has already proved conducive to increased business in this branch. Particulars obtained by return post from—

## LONSDALE BROS.,

Camera-Makers' Sundry-men, Photographic Engineers & Manufacturers of Photographic & Scientific Apparatus.

LICENSEES FOR THE MANUFACTURE OF MCKELLEN'S PATENT TURNTABLES.

NEW BRIGGATE, LEEDS, and at CHRISTCHURCH, NEW ZEALAND.

RACK & PINIONS SETS FROM 2/10

RACK FROM 10 PER IN. PINION WIRE FROM 10 PER IN

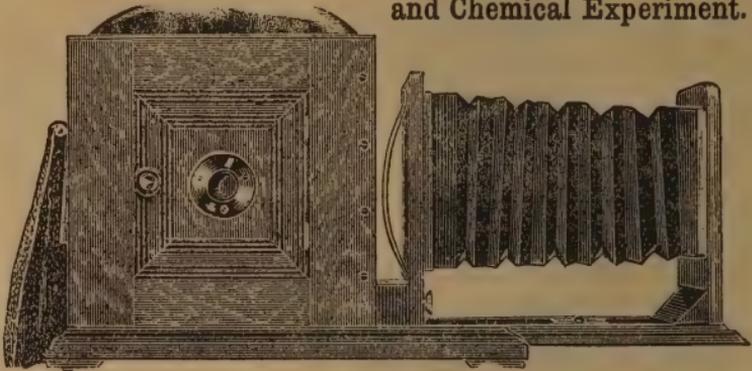
THE LARGEST MAKERS OF PHOTOGRAPHIC RACKS SETS FROM 2/10 PER IN. PINION WIRE FROM 10 PER IN

THE LARGEST MAKERS OF PHOTOGRAPHIC RACKS SETS FROM 2/10 PER IN. PINION WIRE FROM 10 PER IN

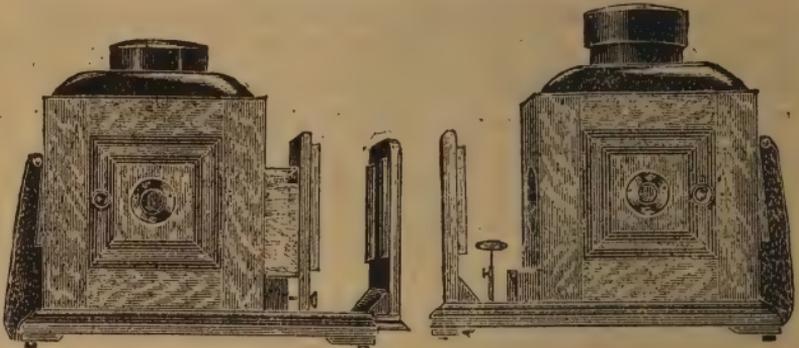
THE "SUN" CAMERA CO LTD LEEDS

THE 'PROFESSOR ARTHUR'  
MULTIPANOPTIC

For Enlarging, Lantern Slide Projection, Microscopic and Chemical Experiment.



**SPECIAL FEATURES.**—Removable Bellows.—Removable Spring-Board.—Adjustable Spring-Board for Tank.—Extending Base-Board for Lenses up to 12-in. focus.—Sliding Base for Table Attachment.



FOR USE WITH PURCHASER'S OWN LENS.

**PRICE** ... .. £4 10 0.

Including 4-in. Condenser, short Chimney and Tray and travelling case with lock and key. The front can be altered at slight expense to take any size condenser up to 5 inches. The apparatus is of high-class workmanship and finish, the body being of sound Honduras Mahogany, well seasoned and polished, with two moulded doors having brass bound sight holes. The linings are of japanned iron with Russian iron top.

**EXTRAS.**

|                                                     |     |     |     |      |
|-----------------------------------------------------|-----|-----|-----|------|
| If fitted with Rack and Pinion Achromatic Objective | ... | ... | ... | 20/- |
| If fitted with 4½-in. Condenser                     | ... | ... | ... | 7/6  |
| If fitted with 5-in. Condenser                      | ... | ... | ... | 17/6 |
| If fitted with Rack and Pinion to Extending Frame   | ... | ... | ... | 7/6  |
| If fitted with Table Attachment                     | ... | ... | ... | 2/6  |

THE "SUN" CAMERA CO LTD LEEDS

MANUFACTURERS & EXPORTERS OF PHOTOGRAPHIC APPARATUS & C.

MANUFACTURERS & EXPORTERS OF PHOTOGRAPHIC APPARATUS & C.

THE "SUN" CAMERA CO LTD LEEDS.

THE 'MODERN' OUTFIT.

**FALSE  
ECONOMY.**

To buy cheap Apparatus that spoils your material, and thus constantly adds to its cost.

**TRUE  
ECONOMY.**

To give a fair price for well-made Apparatus. Good articles always maintain their value, and cost no more to use.



COMPLETE OUTFITS.

EXTRA SLIDES.

CAMERA AND 3 SLIDES ONLY.

|           |     |     |        |     |     |         |     |     |         |
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| 1/4-plate | ... | ... | £4 7 6 | ... | ... | £0 10 0 | ... | ... | £3 15 0 |
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We guarantee the efficiency of each Piece, and will exchange or return the money promptly if not in accordance with this guarantee.

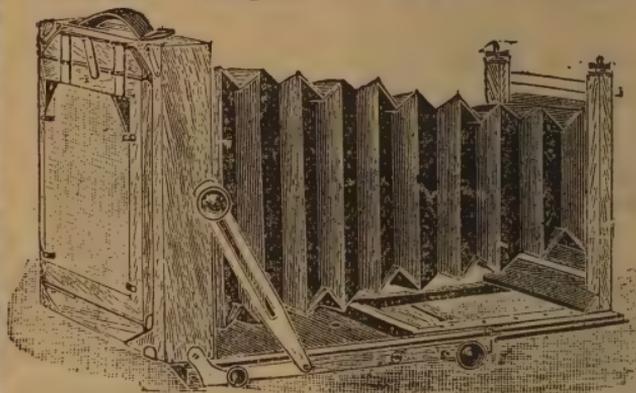
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THE NORTHERN CAMERA finished.



THE NORTHERN CAMERA IN PARTS (unfinished).

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The woodwork is just sufficiently advanced for the amateur to finish with the usual hand tools, the operations best performed with more elaborate machinery and steam power being already done, i.e., the base board clamped and ploughed for racks and pinion; the body dovetailed; the bellows frame, focus screen frame, extending frame and reversing back mitred, keyed and glued up; the front turned out for circular disc, and the slide shutters rabbeted, clamped and hinged.

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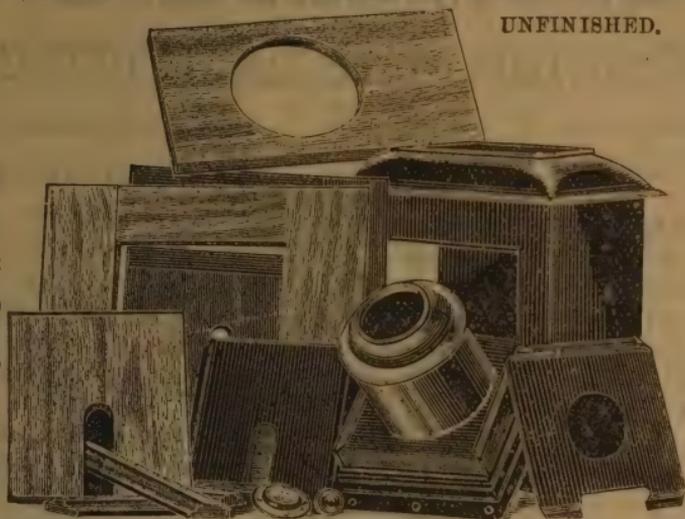
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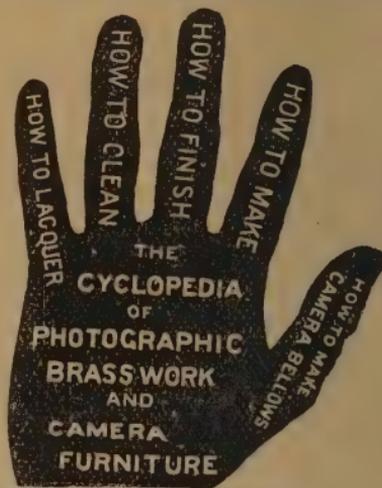
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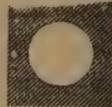


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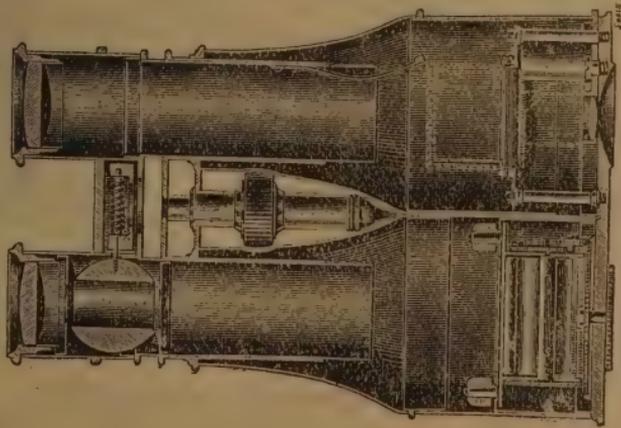
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GERMANY, April 3, 1890, Sept. 17, 1891; U.S. AMERICA, Aug. 12, 1890, Dec. 27, 1892.

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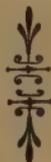
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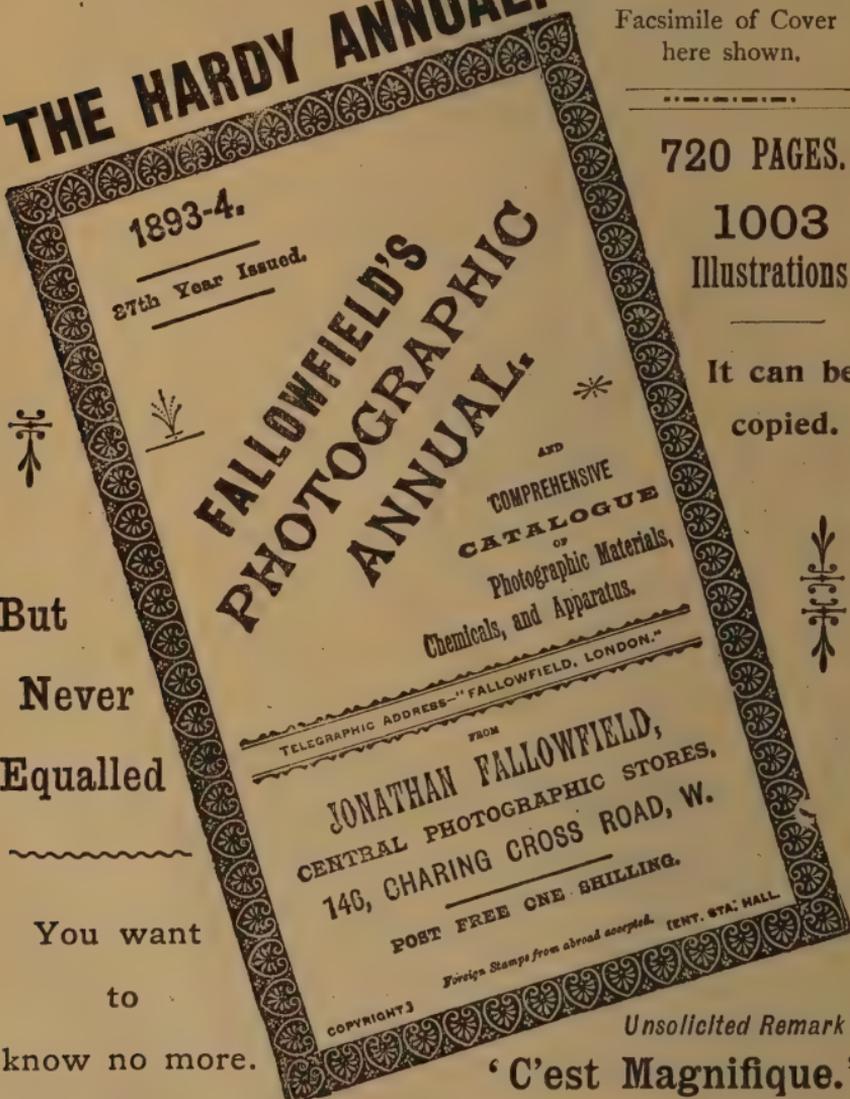


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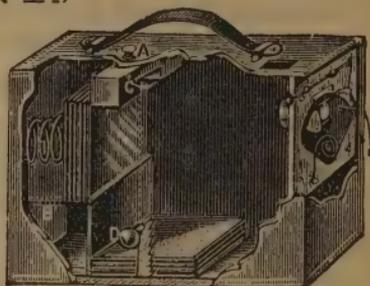
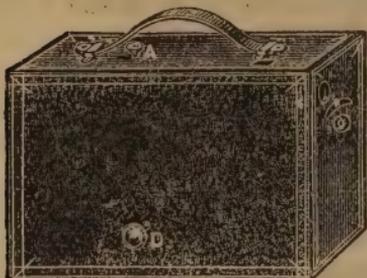
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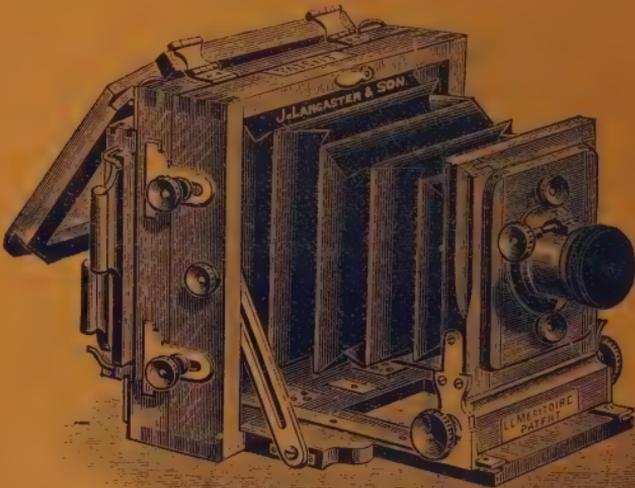
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THE 1894

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| 310                              | ... | "Le Meritoire" | for $\frac{1}{4}$ plates | ... | ... | ... | ... | ... | ... | £1 11 6         |
| 312                              | ... | "              | "                        | ... | ... | ... | ... | ... | ... | 3 3 0           |
| 314                              | ... | "              | "                        | ... | ... | ... | ... | ... | ... | 4 10 0          |
| 315                              | ... | "              | 10 x 8 plates            | ... | ... | ... | ... | ... | ... | 6 0 0           |
| 316                              | ... | "              | 12 x 10 "                | ... | ... | ... | ... | ... | ... | 7 10 0          |
| 317                              | ... | "              | 15 x 12 "                | ... | ... | ... | ... | ... | ... | 8 10 0          |
| Camera and Double Dry Slide only | ... | ...            | ...                      | ... | ... | ... | ... | ... | ... | 21/-            |
| Stand only                       | ... | ...            | ...                      | ... | ... | ... | ... | ... | ... | 5/-             |
| Double Dry Slides                | ... | ...            | ...                      | ... | ... | ... | ... | ... | ... | 5/6             |
| Carriers                         | ... | ...            | ...                      | ... | ... | ... | ... | ... | ... | 1/6             |
|                                  |     |                |                          |     |     |     |     |     |     | $\frac{1}{2}$   |
|                                  |     |                |                          |     |     |     |     |     |     | $\frac{1}{4}$   |
|                                  |     |                |                          |     |     |     |     |     |     | $\frac{1}{2}$   |
|                                  |     |                |                          |     |     |     |     |     |     | $\frac{10}{8}$  |
|                                  |     |                |                          |     |     |     |     |     |     | $\frac{12}{10}$ |
|                                  |     |                |                          |     |     |     |     |     |     | $\frac{15}{12}$ |
|                                  |     |                |                          |     |     |     |     |     |     | 42/-            |
|                                  |     |                |                          |     |     |     |     |     |     | 7 6             |
|                                  |     |                |                          |     |     |     |     |     |     | 10/6            |
|                                  |     |                |                          |     |     |     |     |     |     | 12 6            |
|                                  |     |                |                          |     |     |     |     |     |     | 18/-            |
|                                  |     |                |                          |     |     |     |     |     |     | 25/-            |
|                                  |     |                |                          |     |     |     |     |     |     | 3/-             |
|                                  |     |                |                          |     |     |     |     |     |     | 3/6             |
|                                  |     |                |                          |     |     |     |     |     |     | 4/-             |

COLMORE ROW, BIRMINGHAM.

J. LANCASTER & SON, Opticians.

THE 1894

# "Le Meritoire" Sets.

(PATENT.)

## COMPLETE SETS

FOR TAKING NEGATIVES.

Each Set consists of Camera with Double Swing Back, Universal Moving Front, Double Dry Slide, Achromatic Lens in Rack Mount, Folding Stand with Brass Top, one dozen Dry Plates, Developing and Fixing Solutions, Dishes, Ruby Lamp, and Book of Instructions.

|      |                |                               |     |     |     |         |
|------|----------------|-------------------------------|-----|-----|-----|---------|
| 310a | "Le Meritoire" | 310 and Plates, &c., as above | ... | ... | ... | £1 17 6 |
| 312a | "              | 312                           | "   | "   | "   | 3 15 0  |
| 314a | "              | 314                           | "   | "   | "   | 5 10 0  |
| 315a | "              | 315                           | "   | "   | "   | 7 0 0   |
| 316a | "              | 316                           | "   | "   | "   | 9 0 0   |
| 317a | "              | 317                           | "   | "   | "   | 11 11 0 |

## COMPLETE SETS

FOR NEGATIVES AND PRINTS.

These Sets, in addition to the above, contain every requisite for Paper Printing, including Sensitized Paper, Toning and Fixing Solutions, Toning and Fixing Dishes, Printing Frame, Cards, Cutting Shape, and Book of Instructions.

|      |                |                     |     |     |     |        |
|------|----------------|---------------------|-----|-----|-----|--------|
| 310b | "Le Meritoire" | 310a and Paper, &c. | ... | ... | ... | £2 2 0 |
| 312b | "              | 312a                | "   | "   | "   | 4 5 6  |
| 314b | "              | 314a                | "   | "   | "   | 6 5 0  |
| 315b | "              | 315a                | "   | "   | "   | 8 1 0  |
| 316b | "              | 316a                | "   | "   | "   | 10 5 0 |

Quotations may be had for Sets 311a or b and 313a or b, also special Sets of Chemicals in chests of any size.

## COMPLETE OUTFITS

FOR TAKING NEGATIVES, PRINTS, &c.

These Sets contain the whole of A and B above, also extra Chemicals, Cutting Shapes, Vignette Glass, Cutting Knife, Mounting Cards, &c., all in Polished Cabinet, with lock and key.

|      |                 |     |     |     |     |         |
|------|-----------------|-----|-----|-----|-----|---------|
| 310c | Complete Outfit | ... | ... | ... | ... | £2 12 6 |
| 312c | "               | ... | ... | ... | ... | 5 0 0   |
| 314c | "               | ... | ... | ... | ... | 7 5 0   |

COLMORE ROW, BIRMINGHAM.

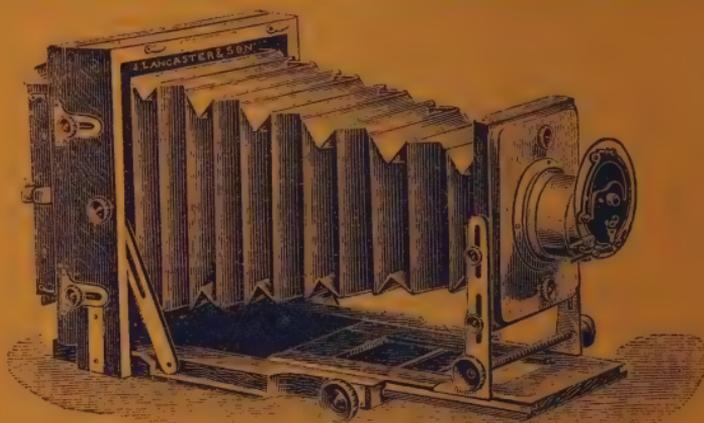
J. LANCASTER &amp; SON, Opticians.

# The 1894 "Instantograph."

(PATENT.)

THIS Apparatus is useful for all kinds of work, Instantaneous Pictures, Portraits, Groups, Landscapes, Architectural and Engineering Subjects, etc., etc. The Lens is of a most rapid type, and has a Patent Instantaneous Shutter working with the greatest rapidity, also our Patent Adjustable Diaphragms, showing at a glance the precise aperture by a divided scale, and the relative times of exposure with different apertures.

Universal Opinion:  
"Everything an Amateur can desire."



Will take Vertical or Horizontal  
Photos.

The Camera is beautifully made and folds up into the smallest possible compass. The Tail Board opens out of Camera, and the Lens Front slides out and clamps. Fine adjustment is obtained by Rackwork. The Bellows in the INSTANTOGRAPH are made of Leather, and the apparatus of which, by the way, over 40,000 have been sold, is pronounced the *sine qua non* of the Amateur Photographer. The Stand is of polished mahogany, with a brass top.

Each Set consists of Camera, Slide, Lens and Stand.

|     |                    |                      |              |     |     |     |     |     |    |    |   |
|-----|--------------------|----------------------|--------------|-----|-----|-----|-----|-----|----|----|---|
| 320 | Price complete for | $\frac{1}{4}$ -plate | ...          | ... | ... | ... | ... | ... | £2 | 2  | 0 |
| 322 | "                  | "                    | ...          | ... | ... | ... | ... | ... | 4  | 4  | 0 |
| 324 | "                  | "                    | ...          | ... | ... | ... | ... | ... | 6  | 6  | 0 |
| 325 | "                  | "                    | 10 x 8 plate | ... | ... | ... | ... | ... | 8  | 8  | 0 |
| 326 | "                  | "                    | 12 x 10 "    | ... | ... | ... | ... | ... | 10 | 10 | 0 |
| 327 | "                  | "                    | 15 x 12 "    | ... | ... | ... | ... | ... | 12 | 12 | 0 |

## EXTRA SLIDES.

|     |     |                   |     |               |     |               |     |               |     |        |     |         |     |         |
|-----|-----|-------------------|-----|---------------|-----|---------------|-----|---------------|-----|--------|-----|---------|-----|---------|
| 328 | ... | Double Dry Slides | ... | $\frac{1}{4}$ | ... | $\frac{1}{2}$ | ... | $\frac{1}{2}$ | ... | 10 x 8 | ... | 12 x 10 | ... | 15 x 12 |
| 329 | ... | Wet Plate Slides  | ... | 7/6           | ... | 12/6          | ... | 20/-          | ... | 28/-   | ... | 40/-    | ... | 45/-    |
|     | ... | Carriers          | ... | 6/-           | ... | 11/-          | ... | 17/6          | ... | 24/-   | ... | 34/-    | ... | 38/-    |
|     | ... |                   | ... | —             | ... | 1/6           | ... | 2/6           | ... | 3/-    | ... | 3/6     | ... | 4/-     |

The Carriers hold two plates, thus the  $\frac{1}{4}$ -plate carrier at 1/6 holds two  $\frac{1}{4}$ -plates, the  $\frac{1}{2}$ -plate holds two  $\frac{1}{2}$ -plates, and so on, but Carriers may be had for any of the smaller sized plates at the above prices.

COLMORE ROW, BIRMINGHAM.

J. LANCASTER &amp; SON, Opticians.

THE 1894

## "INSTANTOGRAPH" SETS.

(PATENT.)

## COMPLETE SETS FOR TAKING NEGATIVES. (A)

Each Set consists of Camera, with Leather Bellows, Universal Front, Double Swing Back, Rising Front, Best Instantaneous Lens with Patent Shutter, Mahogany Camera Stand, one dozen Instantaneous Plates, Developing and Fixing Solutions, Developing and Fixing Dishes, Ruby Lamp, and Book of Instructions.

|      |                                        |     |     |     |     |    |    |   |
|------|----------------------------------------|-----|-----|-----|-----|----|----|---|
| 320A | No. 320, with Chemicals, &c., as above | ... | ... | ... | ... | £2 | 8  | 6 |
| 322A | " 322, " " " " " " " " " " " "         | ... | ... | ... | ... | 4  | 16 | 6 |
| 324A | " 324, " " " " " " " " " " " "         | ... | ... | ... | ... | 7  | 6  | 0 |
| 325A | " 325, " " " " " " " " " " " "         | ... | ... | ... | ... | 9  | 15 | 0 |
| 326A | " 326, " " " " " " " " " " " "         | ... | ... | ... | ... | 12 | 0  | 0 |

## COMPLETE SETS FOR NEGATIVES AND PRINTS. (B)

These Sets in addition to above, contain every requisite for Paper Printing, including Sensitised Paper, Toning and Fixing Solutions, Toning and Fixing Dishes, Printing Frame, Cards, Cutting Shape, and Book of Instructions.

|      |                                       |     |     |     |     |    |    |   |
|------|---------------------------------------|-----|-----|-----|-----|----|----|---|
| 320B | No. 320, and Chemicals, &c., as above | ... | ... | ... | ... | £2 | 13 | 6 |
| 322B | " 322, " " " " " " " " " " " "        | ... | ... | ... | ... | 5  | 7  | 0 |
| 324B | " 324, " " " " " " " " " " " "        | ... | ... | ... | ... | 8  | 1  | 0 |
| 325B | " 325, " " " " " " " " " " " "        | ... | ... | ... | ... | 10 | 16 | 0 |
| 326B | " 326, " " " " " " " " " " " "        | ... | ... | ... | ... | 13 | 5  | 0 |

## COMPLETE OUTFITS FOR NEGATIVES, PRINTS, &amp;c. (C)

These Sets consist of the Camera, Lens, Stand, three Double Dry Slides, two dozen Plates, Ruby Lamp, six Dishes, Printing Frames, Scales and Weights, Sensitised Paper, large stock of Chemicals, Vignette and Cutting Glasses, Measures, Plate Box, Compound Focuser, &c., in Polished Cabinets.

|      |                                       |     |     |     |     |    |    |   |
|------|---------------------------------------|-----|-----|-----|-----|----|----|---|
| 320C | Complete Outfit, $\frac{1}{2}$ plate, | ... | ... | ... | ... | £4 | 4  | 0 |
| 322C | " " " " " " " " " " " "               | ... | ... | ... | ... | 7  | 7  | 0 |
| 324C | " " " " " " " " " " " "               | ... | ... | ... | ... | 10 | 10 | 0 |
| 325C | " " " " " " " " " " " "               | ... | ... | ... | ... | 14 | 14 | 0 |
| 326C | " " " " " " " " " " " "               | ... | ... | ... | ... | 20 | 0  | 0 |

If with Rectigraph Lens and Shutter in place of Instantaneous Lens and Shutter—Extra Cost.

|               |               |               |         |         |         |
|---------------|---------------|---------------|---------|---------|---------|
| $\frac{1}{2}$ | $\frac{3}{4}$ | $\frac{1}{1}$ | 10 × 8  | 12 × 10 | 15 × 12 |
| £1 2 6        | £1 17 6       | £2 7 6        | £2 17 6 | £3 15 0 | £4 10 0 |

COLMORE ROW, BIRMINGHAM.

J. LANCASTER &amp; SON, Opticians.

# 'Instantograph' Complete Outfit



## COMPLETE OUTFITS. FOR NEGATIVES, PRINTS, &c. (C)

THESE Sets consist of the Camera, Lens, Stand, three Double Dry Slides, two dozen Plates, Ruby Lamp, six Dishes, Printing Frames, Scales, and Weights, Sensitised Paper, large stock of Chemicals, Vignette and Cutting Glasses, Measures, Plate Box, Compound Focuser, &c., in Polished Cabinets.

|      |    |                                      |    |         |
|------|----|--------------------------------------|----|---------|
| 320c | .. | Complete Outfit, $\frac{1}{4}$ plate | .. | £4 4 0  |
| 322c | .. | " "                                  | .. | 7 7 0   |
| 324c | .. | " "                                  | .. | 10 10 0 |
| 325c | .. | " 10 x 8 plate                       | .. | 14 14 0 |
| 326c | .. | " 12 x 10 "                          | .. | 20 0 0  |

If with Rectigraph Lens and Shutter, in place of Instantaneous Lens and Shutter—Extra Cost.

|               |               |               |         |
|---------------|---------------|---------------|---------|
| $\frac{1}{4}$ | $\frac{1}{2}$ | $\frac{1}{1}$ | 10 x 8  |
| £1 2 6        | £1 17 6       | £2 7 6        | £2 17 6 |
|               | 12 x 10       | 15 x 12       |         |
|               | £3 15 0       | £4 10 0       |         |

COLMORE ROW, BIRMINGHAM.

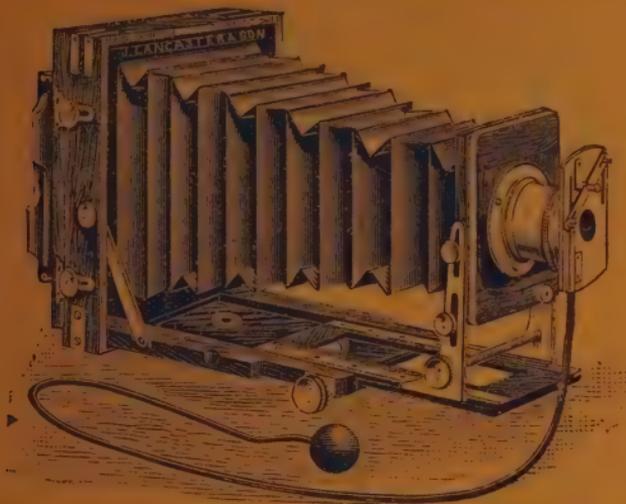
J. LANCASTER & SON, Opticians.

**THE 1894  
Aluminium Mounted Instantograph.**



This Apparatus is about as perfect, portable, and light as it is possible to make one.

THE AMATEUR'S DELIGHT



AND CONSTANT COMPANION.

THE Camera is made out of selected Mahogany, of the smallest possible size, with a due regard to strength. It has Aluminium Binding, Aluminium Front Stage, Plates, Screws, &c., so that the Camera is the Lightest ever made. It has Rising Front, Double Swing Back, Long Extension, Reversing Back, and all recent improvements.

The Lens is a specially selected one, mounted in Aluminium, and has our Patent Aluminium See-saw Shutter.

The Stand has an Aluminium Top, and the whole apparatus is perfect and complete.

|                                                 |         |         |         |
|-------------------------------------------------|---------|---------|---------|
| Camera, Slide, Lens, and Stand                  | £3 3 0  | £5 10 0 | £8 0 0  |
| Extra Slides, Aluminium Bound                   | £0 10 0 | £0 15 0 | £1 5 0  |
| Sets of Chemicals for Negatives and Prints, &c. | £0 12 6 | £1 5 0  | £1 15 0 |

If with Aluminium Rectigraph and Aluminium Shutter, in place of Instantograph Lens, &c.

|         |         |         |
|---------|---------|---------|
| £1 10 0 | £2 10 0 | £3 10 0 |
|---------|---------|---------|

**COLMORE ROW, BIRMINGHAM.**



J. LANCASTER &amp; SON, Opticians.

THE 1894

# Special Brass Bound "Instantograph" Sets.

(PATENT.)

## Complete Sets for taking Negatives. (A)

EACH SET consists of Camera, with Leather Bellows, Double Swing Back, best Instantaneous Lens, with Patent See-saw Shutter, Mahogany Camera Stand, one dozen Instantaneous Plates, Developing and Fixing Solutions, Developing and Fixing Dishes, Ruby Lamp, and Book of Instructions.

|        |            |                               |     |     |     |     |     |         |
|--------|------------|-------------------------------|-----|-----|-----|-----|-----|---------|
| 320 sa | No. s 320, | with Chemicals, &c., as above | ... | ... | ... | ... | ... | £2 16 6 |
| 322 sa | " s 322,   | " " " " " " " " " " " "       | ... | ... | ... | ... | ... | 5 12 6  |
| 324 sa | " s 324,   | " " " " " " " " " " " "       | ... | ... | ... | ... | ... | 8 8 0   |
| 325 sa | " s 325,   | " " " " " " " " " " " "       | ... | ... | ... | ... | ... | 10 16 0 |
| 326 sa | " s 326,   | " " " " " " " " " " " "       | ... | ... | ... | ... | ... | 13 1 0  |

## Complete Sets for Negatives and Prints. (B)

THESE SETS, in addition to above, contain every requisite for Paper Printing, including Sensitised Paper, Toning and Fixing Solutions, Toning and Fixing Dishes, Printing Frame, Cards, Cutting Shape, and Book of Instructions.

|        |            |                              |     |     |     |     |     |         |
|--------|------------|------------------------------|-----|-----|-----|-----|-----|---------|
| 320 sb | No. s 320, | and Chemicals, &c., as above | ... | ... | ... | ... | ... | £3 1 6  |
| 322 sb | " s 322,   | " " " " " " " " " " " "      | ... | ... | ... | ... | ... | 6 3 0   |
| 324 sb | " s 324,   | " " " " " " " " " " " "      | ... | ... | ... | ... | ... | 9 2 0   |
| 325 sb | " s 325,   | " " " " " " " " " " " "      | ... | ... | ... | ... | ... | 11 17 0 |
| 326 sb | " s 326,   | " " " " " " " " " " " "      | ... | ... | ... | ... | ... | 14 6 0  |

## Complete Outfits for Negatives, Prints, &c. (C)

THESE SETS consist of the Camera, Lens, Stand, three Double Dry Slides, two dozen Plates, Ruby Lamp, six Dishes, Printing Frames Scales and Weights, Sensitised Paper, large stock of Chemicals, Vignette and Cutting Glasses, Measures, Plate Box, Compound Focuser, &c., in Polished Cabinet.

|        |                  |                     |     |     |     |     |     |         |
|--------|------------------|---------------------|-----|-----|-----|-----|-----|---------|
| 320 sc | Complete Outfit, | $\frac{1}{2}$ plate | ... | ... | ... | ... | ... | £4 12 0 |
| 322 sc | " "              | $\frac{2}{3}$ " "   | ... | ... | ... | ... | ... | 8 5 0   |
| 324 sc | " "              | $\frac{1}{1}$ " "   | ... | ... | ... | ... | ... | 11 11 0 |
| 325 sc | " "              | 10 x 8 plates       | ... | ... | ... | ... | ... | 15 15 0 |
| 326 sc | " "              | 12 x 10 " "         | ... | ... | ... | ... | ... | 21 0 0  |

If with Rectigraph Lens and Shutter, in  
Place of Instantaneous Lens and Shutter—EXTRA COST.

|               |     |               |     |               |     |         |     |         |
|---------------|-----|---------------|-----|---------------|-----|---------|-----|---------|
| $\frac{1}{2}$ | ... | $\frac{2}{3}$ | ... | $\frac{1}{1}$ | ... | 10 x 8  | ... | 12 x 10 |
| £1 2 6        | ... | £1 17 6       | ... | £2 7 6        | ... | £2 17 6 | ... | £3 15 0 |

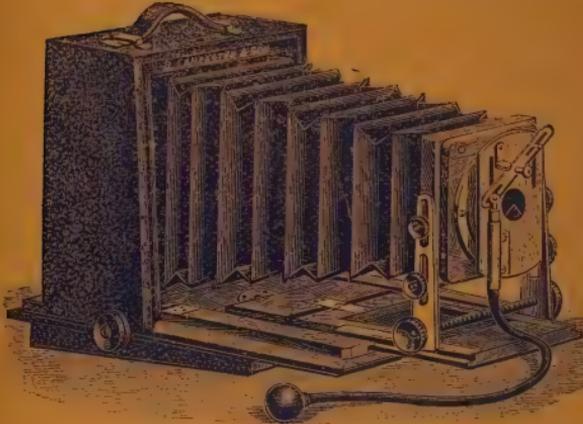
COLMORE ROW, BIRMINGHAM.

J. LANCASTER & SON, Opticians.

THE 1894

# Portable Instantograph.

(PATENT.)



OPEN.



CLOSED.

THIS Camera has been made to satisfy a widely expressed desire for a compact Folding Camera, free from any complications.

Messrs. J. L. & S. believe that it will give great satisfaction to all who require a good Camera in the smallest possible compass. The Camera is made of Mahogany, covered with Leather. The Lens is a very rapid one, with Patent See-saw Shutter, and the Stand is a special light and portable one.

## COMPLETE SETS, CAMERA, LENS, AND STAND.

$\frac{1}{2}$ , £2 2s.

$\frac{3}{4}$ , £4 4s.

1, £6 6s.

### EXTRA SLIDES.

$\frac{1}{2}$ , 7/6.

$\frac{3}{4}$ , 12/6.

1, £1.

## COMPLETE SETS FOR NEGATIVES AND PRINTS.

Sets, including Camera, Lens, and Stand, and a good supply of Chemicals, Plates, Sensitized Paper, Printing Frame, &c., &c.

$\frac{1}{2}$ , £2 13s. 6d.

$\frac{3}{4}$ , £5 7s.

1, £8 1s.

If with Rectigraph Lens and Shutter, in place of Instantaneous Lens and Shutter—Extra.

$\frac{1}{2}$ , £1 2s. 6d.

$\frac{3}{4}$ , £1 17s. 6d.

1, £2 7s. 6d.

COLMORE ROW, BIRMINGHAM.

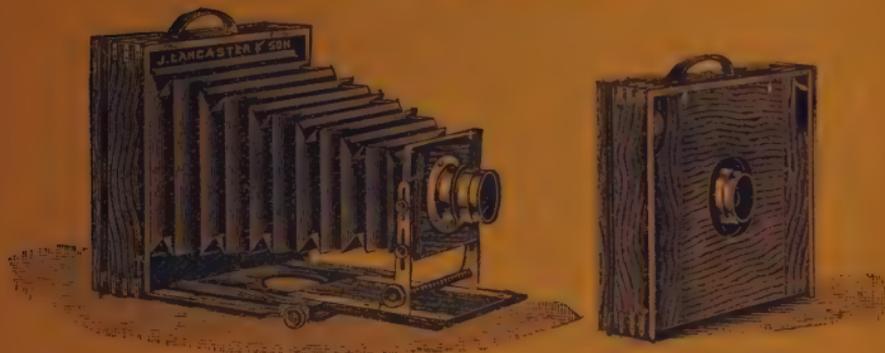
J. LANCASTER &amp; SON, Opticians.

THE 1894

## "Pocket Instantograph."

(PATENT.)

MOUNTED IN ALUMINIUM.



This is a portable form of Instantograph, excessively light, weighing only a few ounces but at the same time very firm; it has Aluminium Binding, Runners, Front Stage, &c.

The Lens is very rapid and is mounted in Aluminium, and has a patent Aluminium Shutter working at any speed.

The Stand is a new pattern, with Aluminium top and fittings, and is the lightest and most portable stand made.

The Camera, Lens, Shutter and three Double Dry Slides are carried in a Leather Case, with lock and key, and form altogether a most beautiful set.

The Double Slides,  $\frac{1}{2}$ -plate, weigh two ounces each, and three are included in each set.

Pocket Instantograph, including  
 Camera, Lens, Shutter, Three  
 Aluminium Bound Slides,  
 Leather Case, and Aluminium  $\frac{1}{2}$   $\frac{3}{4}$   $1$   
 Mounted Stand ... .. 84/- 147/- 200/-  
 Ditto, ditto, with Rectigraph  
 Lens, mounted in Aluminium 110/- 200/- 270/-



COLMORE ROW, BIRMINGHAM.

J. LANCASTER & SON, Opticians.

# THE 1894 "IMPERIAL INSTANTOGRAPH"

(PATENT).

THIS is a new Camera of great strength, portability, and lightness. It unfolds and folds with the utmost rapidity, and has Double Swing Back, Rising and Cross Fronts, Long Extension Camera, with one Double Slide.



**PRICES.**

OPEN

|         |         |        |        |         |         |
|---------|---------|--------|--------|---------|---------|
|         |         |        | 10 x 8 | 12 x 10 | 15 x 12 |
| £1 17 6 | £3 10 0 | £5 0 0 | £6 0 0 | £7 0 0  | £8 0 0  |



**SETS,**

consisting of Camera, Instantaneous Lens, Shutter, and Stand.

|               |               |               |
|---------------|---------------|---------------|
| $\frac{1}{2}$ | $\frac{1}{2}$ | $\frac{1}{2}$ |
| £3 3 0        | £6 0 0        | £7 10 0       |
| 10 x 8        | 12 x 10       | 15 x 12       |
| £9 9 0        | £12 0 0       | £14 14 0      |

**EXTRA SLIDES.**

|               |               |               |
|---------------|---------------|---------------|
| $\frac{1}{2}$ | $\frac{1}{2}$ | $\frac{1}{2}$ |
| 9 6           | 14 6          | £1 3 0        |

WITH RECTIGRAPH LENS AND SEE-SAW SHUTTER,  
In place of Instantograph Lens and Shutter.

|               |               |               |         |         |         |
|---------------|---------------|---------------|---------|---------|---------|
| $\frac{1}{2}$ | $\frac{1}{2}$ | $\frac{1}{2}$ | 10 x 8  | 12 x 10 | 15 x 12 |
| £4 5 6        | £7 17 6       | £9 17 6       | £12 6 6 | £15 6 0 | £18 8 0 |

COLMORE ROW, BIRMINGHAM.

J. LANCASTER & SON, Opticians.

# THE "LADIES'" CAMERA.

(PATENT.)

"1894" MODEL.

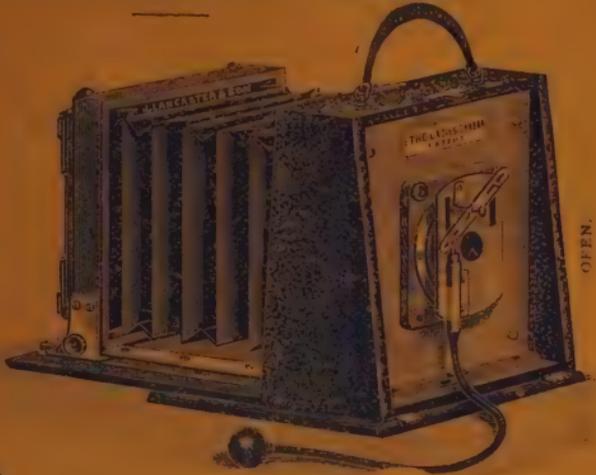
## LANCASTER'S "LADIES'" CAMERA

(PATENT.)

$\frac{1}{2}$ -plate, 42/-  $\frac{3}{4}$ -plate, 84/-  
 $\frac{1}{2}$ -plate, 126/-

Folding up like a  
RETICULE

Consists of Camera,  
Double Dry Slide,  
Lens, Shutter, and  
Stand.



THIS APPARATUS has been especially designed for Ladies. It is entirely free from complications, and, although strong, yet it is extremely light and portable.

The Apparatus consists of an excellent Portable Camera with Folding Tailboard, Patent Reversible Back, changing from vertical to horizontal in an instant, thus enabling a vertical or a horizontal photo to be taken at will without moving the Camera, Rising Front, &c., excellent Achromatic Lens for Portraits, Groups, and Views, Triple Folding Standard, &c., &c., making the most portable and complete Apparatus a lady can possibly have.

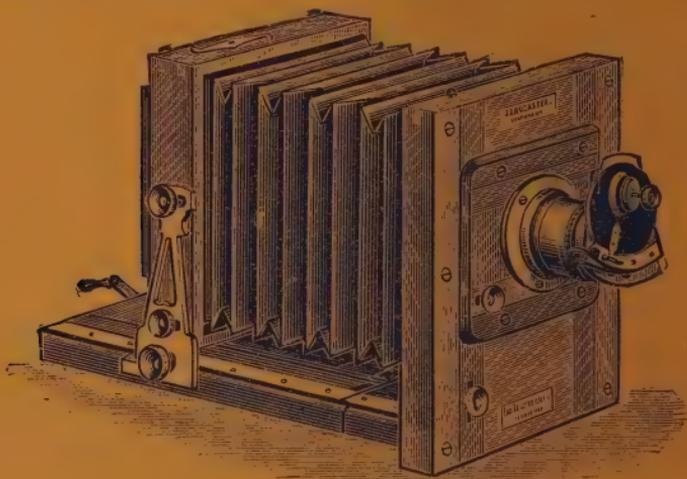
There are no loose parts, and the whole Apparatus is most easily opened and used. For Ladies it is an admirable Apparatus,

COLMORE ROW, BIRMINGHAM.

J. LANCASTER & SON, Opticians.

## The 1894 "International" Patent.

THIS is an excellent Apparatus, very compact, closing into about two inches, and opening out to nearly three times the greatest length of Plate. It has a Folding Tail-board, Patent Reversing Frame and Slide Holder, Double Swing, Rising and Cross Fronts, &c., &c. The Lens is an instantaneous one, with Patent Shutter and Patent Diaphragms, giving any aperture that may be required, and showing at a glance the diameter of Stop, ratio of aperture to focus, and speed of same. Mahogany Stand with Brass Top.



The 1894 INTERNATIONAL is a Camera which has given great satisfaction; it is strongly built, well put together, and in every way is a perfect Apparatus.

|       |     |                                                     |     |                                                                                                  |                                                      |         |
|-------|-----|-----------------------------------------------------|-----|--------------------------------------------------------------------------------------------------|------------------------------------------------------|---------|
| 330   | ... | Price complete                                      | ... | $\frac{1}{4}$ ( $4\frac{1}{2} \times 3\frac{1}{2}$ )                                             | ...                                                  | £2 10 0 |
| 331   | ... | "                                                   | "   | $5 \times 4$                                                                                     | ...                                                  | 4 0 0   |
| 332   | ... | "                                                   | "   | $\frac{1}{2}$ ( $6\frac{1}{2} \times 4\frac{1}{2}$ )                                             | ...                                                  | 5 0 0   |
| 333   | ... | "                                                   | "   | $7\frac{1}{2} \times 5$                                                                          | ...                                                  | 6 6 0   |
| 334   | ... | "                                                   | "   | $\frac{1}{2}$ ( $8\frac{1}{2} \times 6\frac{1}{2}$ )                                             | ...                                                  | 7 10 0  |
| 335   | ... | "                                                   | "   | $10 \times 8$                                                                                    | ...                                                  | 9 9 0   |
| 336   | ... | "                                                   | "   | $12 \times 10$                                                                                   | ...                                                  | 11 11 0 |
| 337   | ... | "                                                   | "   | $15 \times 12$                                                                                   | ...                                                  | 13 13 0 |
| 330 a | ... | Fitted with Rectigraph Lens and New Patent Shutter, | ... | in place of Instantaneous Lens and Shutter, $\frac{1}{4}$ ( $4\frac{1}{2} \times 3\frac{1}{2}$ ) | ...                                                  | £3 12 6 |
| 331 a | ... | Ditto                                               | do. | do.                                                                                              | $5 \times 4$                                         | 5 10 0  |
| 332 a | ... | Ditto                                               | do. | do.                                                                                              | $\frac{1}{2}$ ( $6\frac{1}{2} \times 4\frac{1}{2}$ ) | 6 17 6  |
| 333 a | ... | Ditto                                               | do. | do.                                                                                              | $7 \times 5$                                         | 8 8 0   |
| 334 a | ... | Ditto                                               | do. | do.                                                                                              | $\frac{1}{2}$ ( $8\frac{1}{2} \times 6\frac{1}{2}$ ) | 9 17 6  |
| 335 a | ... | Ditto                                               | do. | do.                                                                                              | $10 \times 8$                                        | 12 5 0  |
| 336 a | ... | Ditto                                               | do. | do.                                                                                              | $12 \times 10$                                       | 15 0 0  |
| 337 a | ... | Ditto                                               | do. | do.                                                                                              | $15 \times 12$                                       | 17 10 0 |

COLMORE ROW, BIRMINGHAM.

J. LANCASTER & SON, Opticians.

# “International” Sets.

Complete Sets for taking Negatives and Prints.



EACH Set consists of Camera, Double Slide, Lens and Stand, Dry Plates, Developing and Fixing Solutions, Developing and Fixing Dishes, Ruby Lamp, Sensitised Paper, Printing Frame, Cards, Cutting Shape, Toning and Fixing Solutions, Developing and Porcelain Dishes, and Book of Instructions.

|      | COMPLETE SETS —CAMERA, LENS, STAND, CHEMICALS, PLATES, DISHES, PRINTING FRAME, SENSITISED PAPER, RUBY LAMP, &c. | £  | s. | d. |
|------|-----------------------------------------------------------------------------------------------------------------|----|----|----|
| 330c | $\frac{1}{2}$ ( $4\frac{1}{2} \times 3\frac{1}{2}$ )                                                            | 8  | 1  | 6  |
| 332c | Ditto do. do. $\frac{1}{2}$ ( $6\frac{1}{2} \times 4\frac{1}{2}$ )                                              | 6  | 8  | 0  |
| 334c | Ditto do. do. $\frac{1}{2}$ ( $8\frac{1}{2} \times 6\frac{1}{2}$ )                                              | 9  | 5  | 0  |
| 335c | Ditto do. do. 10 x 8                                                                                            | 11 | 17 | 0  |
| 336c | Ditto do. do. 12 x 10                                                                                           | 14 | 11 | 0  |
| 337c | Ditto do. do. 15 x 12                                                                                           | 17 | 8  | 0  |

Complete Sets as above, with Rectigraph Lens and Patent See-saw Shutter.

|    |               |    |               |     |               |        |         |         |
|----|---------------|----|---------------|-----|---------------|--------|---------|---------|
| £4 | $\frac{1}{2}$ | £8 | $\frac{1}{2}$ | £11 | $\frac{1}{2}$ | 10 x 8 | 12 x 10 | 15 x 12 |
| 4  | 0             | 0  | 0             | 11  | 0             | 14     | 5       | 22      |
| 0  | 0             | 0  | 0             | 0   | 0             | 0      | 0       | 0       |

THE INTERNATIONAL CAMERA has every motion, LANCASTER'S PATENT REVERSING BACK, EXTENSION BELLOWS, FOLDING TAIL-BOARD of excellent design. The whole unpacks and repacks in an instant.



— EXTRA SLIDES. —

|                     |       |   |   |       |    |   |       |    |   |       |    |   |       |    |   |       |    |   |   |
|---------------------|-------|---|---|-------|----|---|-------|----|---|-------|----|---|-------|----|---|-------|----|---|---|
| Double Dry Carriers | ..... | 7 | 6 | ..... | 12 | 6 | ..... | 20 | 0 | ..... | 28 | 0 | ..... | 40 | 0 | ..... | 45 | 0 |   |
|                     | ..... |   |   | ..... | 1  | 6 | ..... | 2  | 6 | ..... | 3  | 0 | ..... | 3  | 6 | ..... |    | 4 | 0 |

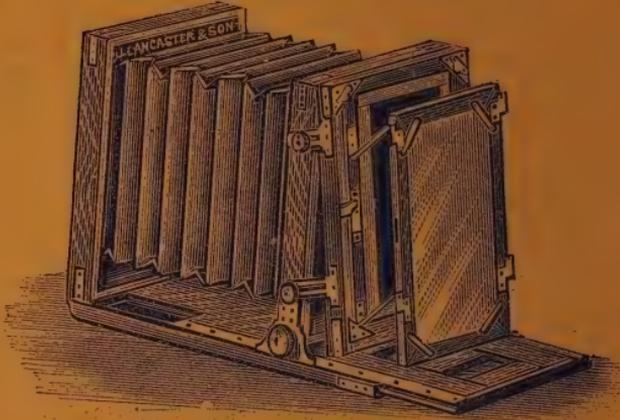
COLMORE ROW, BIRMINGHAM.

J. LANCASTER &amp; SON, Opticians.

LANCASTER'S

**"Improved Special '86" Camera**

(PATENT).

Reversing Back. Every Recent  
Improvement.Rack Adjustment. Sliding  
Adjustment.

**B**EST Quality Brass-bound Folding Camera, extending to twice the ordinary length, with Rackwork Adjustment, best Leather Bellows, Reversing Frame, Rising Fronts. The Focussing Slide moves in a Lateral direction, and the Dark Slide, instead of sliding in the usual way, is simply grooved to go on to a brass plate, and a movable plate in back of Camera fixes the Dark Slide in an instant.

Each Camera has Double Swing.

Camera and One Brass-bound Slide.

| 338           | 339           | 340           | 341    | 342     | 343     |
|---------------|---------------|---------------|--------|---------|---------|
| $\frac{1}{4}$ | $\frac{1}{2}$ | $\frac{1}{1}$ | 10 x 8 | 12 x 10 | 15 x 12 |
| £2 10 0       | £4 0 0        | £5 0 0        | £6 0 0 | £7 0 0  | £8 0 0  |

Extra Dark Slides.

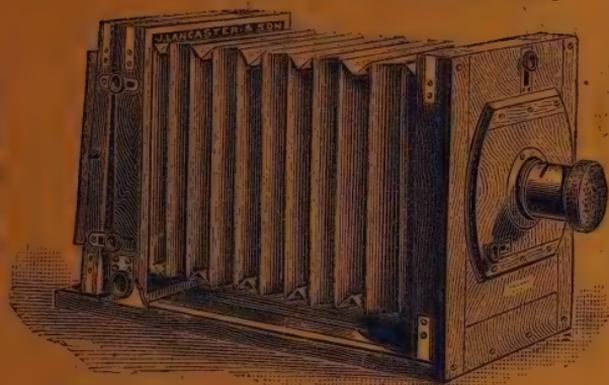
|                  | $\frac{1}{4}$ | $\frac{1}{2}$ | $\frac{1}{1}$ | 10 x 8 | 12 x 10 | 15 x 12 |
|------------------|---------------|---------------|---------------|--------|---------|---------|
| Double Dry .. .. | 12/6          | 17/6          | 25/-          | 30/-   | 42/-    | 50/-    |
| Wet .. ..        | 10/-          | 15/-          | 21/-          | 25/-   | 40/-    | 45/-    |
| Carriers .. ..   |               | 1/6           | 2/6           | 3/-    | 3/6     | 4/-     |

COLMORE ROW, BIRMINGHAM.

J. LANCASTER & SON, Opticians.

# LANCASTER'S "IMPROVED SPECIAL '86" SETS

Rapid Rectigraph Lens,  
in  
B and C Sets.



Very Light, Strong  
and  
Portable.

## First Quality Sets.

LANCASTER'S SPECIAL '86 CAMERA, Brass-bound, Double Dry Slide, Instantaneous Lens with Patent Adjustable Diaphragms, Instantaneous Shutter, and best Mahogany Folding Stand, &c.

|                                     |                                     |                                     |                |                 |
|-------------------------------------|-------------------------------------|-------------------------------------|----------------|-----------------|
| <sup>1</sup> / <sub>3</sub><br>338a | <sup>1</sup> / <sub>3</sub><br>339a | <sup>1</sup> / <sub>3</sub><br>340a | 10 x 8<br>341a | 12 x 10<br>342a |
| £4 0 0                              | £6 0 0                              | £8 0 0                              | £10 0 0        | £12 12 0        |

LANCASTER'S PATENT CAMERA, &c., &c., as above, but having Rectigraph Lens, and Lancaster's Patent "See-saw" Shutter in place of Instantaneous Lens and Shutter. This is a perfect Camera and Lens.

|                                     |                                     |                                     |                |                 |
|-------------------------------------|-------------------------------------|-------------------------------------|----------------|-----------------|
| <sup>1</sup> / <sub>3</sub><br>338b | <sup>1</sup> / <sub>3</sub><br>339b | <sup>1</sup> / <sub>3</sub><br>340b | 10 x 8<br>341b | 12 x 10<br>342b |
| £5 0 0                              | £7 10 0                             | £10 0 0                             | £12 12 0       | £15 0 0         |

## First Quality Complete Sets,

— INCLUDING —

LANCASTER'S PATENT CAMERA, Double Swing, &c., &c., three Brass-bound Double Dry Slides, best Camera Stand, Rectigraph Lens, best Leather Case for Camera, Lens, Instantaneous Shutter, and Three Slides, Lancaster's Patent Ruby Lamp, three Ebonite Discs, Plates, Scales and Weights, Vignette Glass, Printing Frame, Cutting Shapes, Light-tight Plate Box, Compound Focuser, Sensitised Paper, and large Stock of Chemicals in Stoppered Bottles, &c.

|                                     |                                     |                                     |                |                 |
|-------------------------------------|-------------------------------------|-------------------------------------|----------------|-----------------|
| <sup>1</sup> / <sub>3</sub><br>338c | <sup>1</sup> / <sub>3</sub><br>339c | <sup>1</sup> / <sub>3</sub><br>340c | 10 x 8<br>341c | 12 x 10<br>342c |
| £8 8 0                              | £12 12 0                            | £16 16 0                            | £21 0 0        | £25 0 0         |

COLMORE ROW, BIRMINGHAM.

J. LANCASTER & SON, Opticians.

# The 'SPECIAL' 1894 PATENT CAMERA



THIS Camera is of the best quality, Brass-bound, Leather Bellows, Fine Rack Adjustment to front Carrier, with every possible Motion, Rising Front Angular Motions, both Vertical and Horizontal, Double Swing Back, Reversing Frame with Lateral Hinges, the whole folding up without removal of a single part, and forming the most portable and compact Camera in the market.

Vertical Swing,  
Horizontal Swing  
to  
Front and Back.



Rising and Cross  
Fronts, Fine  
Rack Adjustment.

|     |     |     |                          |                     |     |     |    |    |   |
|-----|-----|-----|--------------------------|---------------------|-----|-----|----|----|---|
| 344 | ... | ... | The Special 1894 Camera, | $\frac{1}{2}$ p'ate | ... | ... | £2 | 10 | 0 |
| 345 | ... | ... | "                        | "                   | ... | ... | 4  | 0  | 0 |
| 346 | ... | ... | "                        | "                   | ... | ... | 5  | 5  | 0 |
| 347 | ... | ... | "                        | 10 x 8 plate        | ... | ... | 6  | 10 | 0 |
| 348 | ... | ... | "                        | 12 x 10 "           | ... | ... | 7  | 10 | 0 |
| 349 | ... | ... | "                        | 15 x 12 "           | ... | ... | 8  | 15 | 0 |

COLMORE ROW, BIRMINGHAM.

J. LANCASTER &amp; SON, Opticians.

## FIRST QUALITY SETS.

**Lancaster's Special Patent Camera,**

Brass-bound, Double Dry Slide, Instantaneous Lens, with Patent Adjustable Diaphragms, Instantaneous Shutter, and best Mahogany Folding Stand, Leather-bound Case to carry Camera, Lens and Slide, &c.

|               |               |               |          |          |
|---------------|---------------|---------------|----------|----------|
| $\frac{1}{4}$ | $\frac{1}{4}$ | $\frac{1}{4}$ | 10 X 8   | 12 X 10  |
| 344a          | 345a          | 346a          | 347a     | 348a     |
| £4 4 0        | £6 6 0        | £8 8 0        | £10 10 0 | £12 12 0 |

**Lancaster's Patent Camera, &c., &c.,**

as above, but having Rectigraph Lens and Lancaster's Patent See-saw Shutter in place of Instantaneous Lens and Shutter. This is a perfect Camera and Lens.

|               |               |               |          |         |
|---------------|---------------|---------------|----------|---------|
| $\frac{1}{4}$ | $\frac{1}{4}$ | $\frac{1}{4}$ | 10 X 8   | 12 X 10 |
| 344b          | 345b          | 346b          | 347b     | 348b    |
| £5 5 0        | £7 17 6       | £10 5 0       | £12 15 0 | £15 0 0 |

## First Quality Complete Sets

INCLUDING

**Lancaster's Special Patent Camera,**

three Brass-bound Double Dry Slides, best Camera Stand, Rectigraph Lens, best Leather Case for Camera, Lens, Instantaneous Shutter and three Slides, Lancaster's Patent Ruby Lamp, three Ebonite Dishes, Plates, Scales and Weights, Measures, Vignette Glass, Printing Frame, Cutting Shapes, Light-tight Plate Box, Compound Focuser, Sensitised Paper, and large Stock of Chemicals in Stoppered Bottles, &c., &c.

|               |               |               |         |         |
|---------------|---------------|---------------|---------|---------|
| $\frac{1}{4}$ | $\frac{1}{4}$ | $\frac{1}{4}$ | 10 X 8  | 12 X 10 |
| 344c          | 345c          | 346c          | 347c    | 348c    |
| £8 8 0        | £12 12 0      | £16 16 0      | £21 0 0 | £25 0 0 |

**EXTRA DARK SLIDES.**

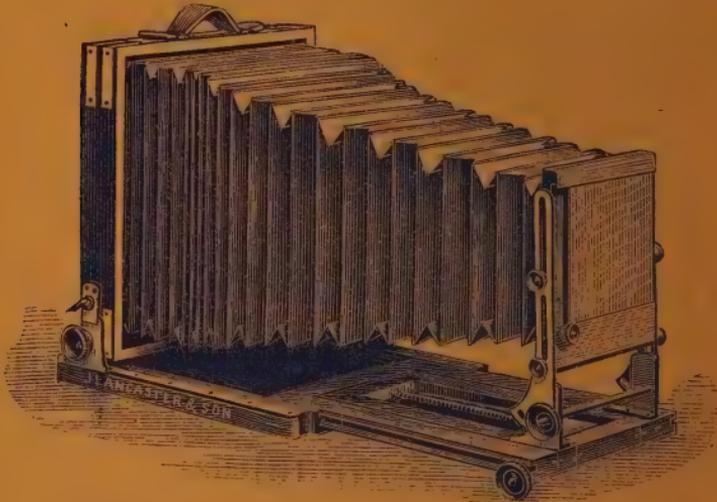
|                   |               |               |               |        |         |         |         |
|-------------------|---------------|---------------|---------------|--------|---------|---------|---------|
|                   | $\frac{1}{4}$ | $\frac{1}{4}$ | $\frac{1}{4}$ | 10 X 8 | 12 X 10 | 15 X 12 | 18 X 16 |
| Double Dry Slides | 12/6          | 17/6          | 25/-          | 30/-   | 42/-    | 50/-    | 55/-    |
| Carriers          | ..            | 1/6           | 2/6           | 3/-    | 3/6     | 4/-     | 5/-     |

COLMORE ROW, BIRMINGHAM.

J. LANCASTER & SON, Opticians.

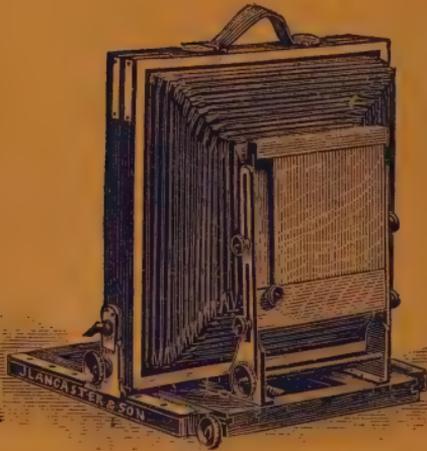
# Lancaster's "Extra Special" Camera.

(PATENT.)



This is a magnificent Camera, having every motion, and extending 50% more than any other Camera in the market.

DOUBLE EXTENSION FOR LONG FOCUS. 2877



CLOSED.

COMBINED TAPER AND SQUARE BELLOWS. FOR SHORT FOCUS LENS

COLMORE ROW, BIRMINGHAM.

J. LANCASTER & SON, Opticians.

# Lancaster's "Extra Special" Camera.

(PATENT.)



**These Cameras are the Lightest, Longest, and most Compact in the Market.**

**T**HE Extra Special opens out to three times the length of plate, and closes to about two inches. It has Rack and Screw Adjustment; the Rack Adjustment commencing when Camera is closed, and racks out to double extension, then the Screw Adjustment extends Camera to triple extension, giving 50 per cent. more extension than any other Camera extant.

DOUBLE SWING BACK, SWING FRONT, REVERSING BACK, NO HINGES, FOCUSING GLASS PROTECTED, &c. CAMERA AND DOUBLE DRY SLIDE.

|         |        |        |                 |                  |                  |
|---------|--------|--------|-----------------|------------------|------------------|
| £2 10 0 | £4 0 0 | £5 5 0 | 10x8<br>£6 10 0 | 12x10<br>£7 10 0 | 15x12<br>£8 15 0 |
|---------|--------|--------|-----------------|------------------|------------------|

**EXTRA SLIDES. BRASS BOUND.**

|                   |      |      |       |                |                |                 |
|-------------------|------|------|-------|----------------|----------------|-----------------|
| Double Dry ... .. | 12/6 | 17/6 | 1 5 0 | 10x8<br>1 10 0 | 12x10<br>2 2 0 | 15x12<br>2 10 0 |
| Carriers ... ..   |      | 1/6  | 2/6   | 3/-            | 3/6            | 4/-             |

This Camera can be used with the shortest focus Wide Angle Lens, and will extend sufficiently far to be used even as an Enlarging Camera.

— IT HAS GIVEN UNIVERSAL SATISFACTION. —

**COLMORE ROW, BIRMINGHAM.**

J. LANCASTER & SON, Opticians.

# First Quality Sets.



**LANCASTER'S EXTRA SPECIAL PATENT CAMERA**, Brass-bound, Double Dry Slide. Instantaneous Lens, with Patent Adjustable Diaphragms, Instantaneous Shutter, and best Mahogany Folding Stand, Leather-bound Case to carry Camera, Lens and Slide, &c

|           |           |           |           |           |           |
|-----------|-----------|-----------|-----------|-----------|-----------|
| Ex. S. A. | Ex. S. A. | Ex. S. A. | 10x8      | 12x10     | 15x12     |
| £4 4 0    | £6 6 0    | £8 8 0    | Ex. S. A. | Ex. S. A. | Ex. S. A. |
|           |           |           | £10 10 0  | £12 12 0  | £14 14 0  |

**LANCASTER'S PATENT CAMERA, &c., &c.**, as above, but having Rectigraph Lens and Lancaster's Patent See saw Shutter in place of Instantaneous Lens and Shutter. This is a perfect Camera and Lens.

|           |           |           |           |           |           |
|-----------|-----------|-----------|-----------|-----------|-----------|
| Ex. S. B. | Ex. S. B. | Ex. S. B. | 10x8      | 12x10     | 15x12     |
| £5 5 0    | £7 17 6   | £10 5 0   | Ex. S. B. | Ex. S. B. | Ex. S. B. |
|           |           |           | £12 15 0  | £15 0 0   | £18 0 0   |

## First Quality Complete Sets,

INCLUDING

**LANCASTER'S EXTRA SPECIAL PATENT CAMERA**, three Brass-bound Double Dry Slides, best Camera Stand, Rectigraph Lens, best Leather Case for Camera, Lens, Instantaneous Shutter and three Slides, Lancaster's Patent Ruby Lamp, three Ebonite Discs, Plates, Scales and Weights, Measures, Vignette Glass, Printing Frame, Cutting Shapes, Light tight Plate Box, Compound Focusser, Sensitised Paper, and large stock of Chemicals in Stoppered Bottles, &c., &c.

|           |           |           |           |           |           |
|-----------|-----------|-----------|-----------|-----------|-----------|
| Ex. S. C. | Ex. S. C. | Ex. S. C. | 10x8      | 12x10     | 15x12     |
| £8 8 0    | £12 12 0  | £16 16 0  | Ex. S. C. | Ex. S. C. | Ex. S. C. |
|           |           |           | £21 0 0   | £25 0 0   | £30 0 0   |

COLMORE ROW, BIRMINGHAM.

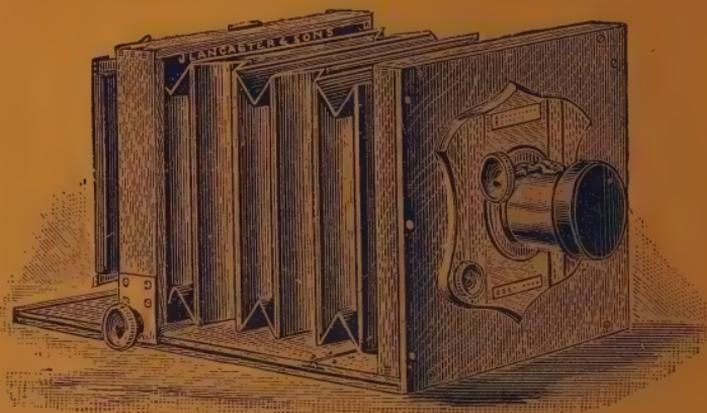


J. LANCASTER &amp; SON, Opticians.

# The Amateur's Camera

(PATENT).

VERY LIGHT AND COMPACT.



NO LOOSE PARTS &amp; EASILY USED.

THIS Apparatus has been especially designed for Ladies. It is entirely free from complications, and, although strong, yet it is extremely light and portable.

The Apparatus consists of an excellent Portable Camera of Polished Mahogany, with Folding Tail-board, Patent Reversible Back, changing from vertical to horizontal in an instant, thus enabling a vertical or a horizontal photo to be taken at will without moving the Camera, Rising Front, &c., excellent Achromatic Lens in Rack Mount, for Portraits, Groups and Views, Triple Folding Stand, &c., &c., making the most portable and complete Apparatus a lady can possibly have.

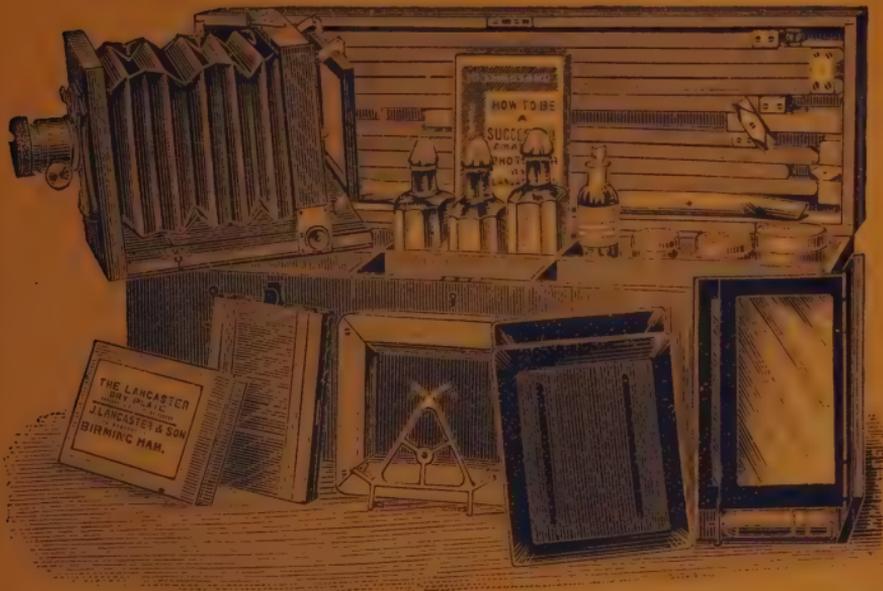
## CAMERA, LENS, SLIDE, AND STAND.

|                                                |               |               |               |      |       |       |     |         |
|------------------------------------------------|---------------|---------------|---------------|------|-------|-------|-----|---------|
| Carte size ( $\frac{1}{4}$ -plate) ... ..      | ...           | ...           | ...           | ...  | ...   | ...   | ... | £1 15 0 |
| Cabinet size ( $\frac{1}{2}$ -plate) ... ..    | ...           | ...           | ...           | ...  | ...   | ...   | ... | 3 0 0   |
| Full Plate size ( $\frac{1}{1}$ -plate) ... .. | ...           | ...           | ...           | ...  | ...   | ...   | ... | 4 5 0   |
|                                                | $\frac{1}{4}$ | $\frac{1}{2}$ | $\frac{1}{1}$ | 10x8 | 12x10 | 15x12 |     |         |
| Camera, Double Dry Slide only ...              | 22/6          | 42/-          | 63/-          | 84/- | 100/- | 120/- |     |         |
| Stand ... ..                                   | 6/6           | 10/-          | 12/6          | 15/- | 21/-  | 25/-  |     |         |
| Double Dry Slides ... ..                       | 5/6           | 10/6          | 18/-          | 25/- | 35/-  | 42/-  |     |         |
| Carriers ... ..                                | —             | 1/6           | 2/6           | 3/-  | 3/6   | 4/-   |     |         |

COLMORE ROW, BIRMINGHAM.

J. LANCASTER & SON, Opticians.

# THE "AMATEUR'S" CAMERA.



THE AMATEUR'S COMPLETE OUTFIT consists of Mahogany Camera with Folding Tail-board and Patent Reversing Back, Best Lens, Three-fold Stand, Chemicals, Plates, Dishes, Patent Folding Ruby Lamp, Printing Frame, Sensitised Paper, Toning and Fixing Solutions, Cards, Cutting Shape, &c., &c., with Book of Instructions, in Polished Box with Lock and Key.

PRICES COMPLETE.

|                                    |                                    |                                    |         |         |
|------------------------------------|------------------------------------|------------------------------------|---------|---------|
| $4\frac{1}{2} \times 3\frac{1}{2}$ | $6\frac{1}{2} \times 4\frac{3}{4}$ | $8\frac{1}{2} \times 6\frac{1}{2}$ | 10 x 8  | 12 x 10 |
| £2 10 0                            | £4 4 0                             | £6 0 0                             | £7 10 0 | £9 0 0  |

EXTRA SLIDES.

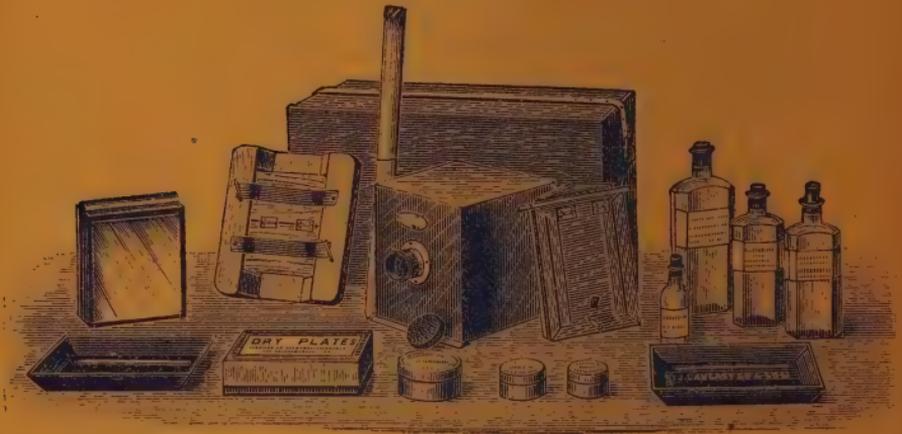
|                   | $\frac{1}{2}$ | $\frac{3}{4}$ | $1$  | 10 x 8 | 12 x 10 |
|-------------------|---------------|---------------|------|--------|---------|
| Double Dry ... .. | 5 6           | 10/6          | 18/- | 25/-   | 35/-    |
| Wet ... ..        | 5/-           | 10/-          | 16/- | 21/-   | 30/-    |
| Carriers ... ..   | 1/6           | 1/6           | 2/6  | 3/-    | 3/6     |

The Carriers hold two plates, and are sent out to hold the next size smaller plate, thus the  $\frac{1}{2}$ -plate Carrier at 1/6 holds two  $\frac{3}{4}$ -plates, the  $\frac{3}{4}$ -plate holds two  $\frac{1}{2}$ -plates, and so on, but Carriers may be had for any of the smaller plates at the above prices.

COLMORE ROW, BIRMINGHAM.

J. LANCASTER & SON, Opticians.

THE  
 "BOY'S OWN" SET.



HAVING been repeatedly asked for a cheap Camera for boys at school, which is of guaranteed quality, they have, therefore, made up the set as above, which consists of polished Mahogany Camera, with single Dark Side, Achromatic Meni-cus Lens, covering the plate all over, Ruby Lamp, Printing Frame, Dishes, Plates, Chemicals for Negatives and Prints, Sensitised Paper, &c., all fitted in Traveling Case with Straps. They do not separate these Sets, but sell them complete with Book of Instructions.

COMPLETE SETS FOR NEGATIVES AND PRINTS.

|                       |                       |                       |
|-----------------------|-----------------------|-----------------------|
| $\frac{1}{2}$ -PLATE, | $\frac{1}{2}$ -PLATE. | $\frac{1}{2}$ -PLATE. |
| £1 1 0 ... ..         | £2 2 0 ... ..         | £3 3 0                |

EXTRA SLIDES.

|                       |  |                       |                       |                       |
|-----------------------|--|-----------------------|-----------------------|-----------------------|
|                       |  | $\frac{1}{2}$ -PLATE. | $\frac{1}{2}$ -PLATE. | $\frac{1}{2}$ -PLATE. |
| Extra Slides ... ..   |  | 4/-                   | 7/6                   | 10/6                  |
| " " Double Dry ... .. |  | 5/-                   | 9/-                   | 13/-                  |
| Carriers ... ..       |  |                       | 1/6                   | 2/6                   |

COLMORE ROW, BIRMINGHAM.

J. LANCASTER &amp; SON, Opticians.

**CAMERAS ONLY.****Le Merveilleux Camera and one Double Slide.***See Page 405.*

| 354                     | $\frac{1}{2}$ | $\frac{3}{4}$ | $\frac{1}{2}$ | 10x8 | 12x10 | 15x12 |
|-------------------------|---------------|---------------|---------------|------|-------|-------|
| CAMERA AND SLIDE ... .. | 14/-          | 28/-          | 42/-          | 56/- | 70/-  | 84/-  |
| Extra Slides ... ..     | 5/6           | 10/6          | 18/-          | 25/- | 35/-  | 40/-  |

**Le Meritoire Camera and Slide.***Page 406.*

| 355                     | $\frac{1}{2}$ | $\frac{3}{4}$ | $\frac{1}{2}$ | 10x8 | 12x10 | 15x12 |
|-------------------------|---------------|---------------|---------------|------|-------|-------|
| CAMERA AND SLIDE ... .. | 21/-          | 42/-          | 63/-          | 84/- | 100/- | 120/- |
| Extra Slides ... ..     | 5/6           | 10/6          | 18/-          | 25/- | 35/-  | 40/-  |

**The Instantograph Camera and Slide.***Page 408.*

| 356                     | $\frac{1}{2}$ | $\frac{3}{4}$ | $\frac{1}{2}$ | 10x8  | 12x10 | 15x12 |
|-------------------------|---------------|---------------|---------------|-------|-------|-------|
| CAMERA AND SLIDE ... .. | 25/-          | 50/-          | 75/-          | 100/- | 120/- | 160/- |
| Extra Slides ... ..     | 7/6           | 12/6          | 20/-          | 28/-  | 40/-  | 45/-  |

**The Special Brass-bound Instantograph Camera and Slide.***Page 412.*

| 356 S B                 | $\frac{1}{2}$ | $\frac{3}{4}$ | $\frac{1}{2}$ | 10x8  | 12x10 | 15x12 |
|-------------------------|---------------|---------------|---------------|-------|-------|-------|
| CAMERA AND SLIDE ... .. | 32/6          | 63/-          | 95/-          | 115/- | 140/- | 160/- |
| Extra Slides ... ..     | 9/6           | 14/6          | 23/-          | 30/-  | 42/-  | 50/-  |

**The International Camera and Slide.***Page 418.*

| 357                     | $\frac{1}{2}$ | $\frac{3}{4}$ | $\frac{1}{2}$ | 10x8  | 12x10 | 15x12 |
|-------------------------|---------------|---------------|---------------|-------|-------|-------|
| CAMERA AND SLIDE ... .. | 32/6          | 63/-          | 95/-          | 115/- | 140/- | 165/- |
| Extra Slides ... ..     | 7/6           | 12/6          | 20/-          | 28/-  | 40/-  | 45/-  |

**The Amateur's Camera.***Page 428.*

| 358                     | $\frac{1}{2}$ | $\frac{3}{4}$ | $\frac{1}{2}$ | 10x8 | 12x10 | 15x12 |
|-------------------------|---------------|---------------|---------------|------|-------|-------|
| CAMERA AND SLIDE ... .. | 22/6          | 42/-          | 63/-          | 84/- | 100/- | 120/- |
| Extra Slides ... ..     | 5/6           | 10/6          | 18/-          | 25/- | 35/-  | 42/-  |

**Sliding Body Wet Plate Cameras.**

| 359                    | $\frac{1}{2}$ | $\frac{3}{4}$ | $\frac{1}{2}$ | 10x8 | 12x10 |
|------------------------|---------------|---------------|---------------|------|-------|
| CAMERA AND SLIDE... .. | 15/-          | 21/-          | 35/-          | 45/- | 63/-  |
| Extra Slides ... ..    | 6/6           | 10/6          | 16/-          | 21/- | 25/-  |

COLMORE ROW, BIRMINGHAM.

J. LANCASTER & SON, Opticians.

# Camera Stands.



**Camera Stands of Mahogany, Birch, Ash, &c.**

|                                         | $\frac{1}{4}$ | $\frac{3}{8}$ | $\frac{1}{2}$ | 10 x 8 | 12 x 10 | 15 x 12 |
|-----------------------------------------|---------------|---------------|---------------|--------|---------|---------|
| 360. Camera Stand with Brass Top ...    | 5/-           | 7/6           | 10/6          | 12/6   | 15/-    | 17/6    |
| 361. Mahogany Stand with Brass Top      | 6/-           | 10/6          | 12/6          | 15/-   | 17/6    | 21/-    |
| 362. Ditto, ditto, with Triangle Top... | 10/-          | 12/6          | 15/-          | 18/-   | 21/-    | 25/-    |
| 363. Strong Ash Folding Stand ...       | 12/6          | 15/-          | 21/-          | 25/-   | 30/-    | 35/-    |

COLMORE ROW, BIRMINGHAM.

J. LANCASTER & SON, Opticians.

# CAMERA STANDS, &c.



365—PILLAR STUDIO STAND.

368—PATENT UNIVERSAL STAND.

| STUDIO CAMERA STANDS. |                                                                                                                        | $\frac{1}{2}$         | $\frac{3}{4}$         | $\frac{7}{8}$         | 10 x 8         | 12 x 10        |
|-----------------------|------------------------------------------------------------------------------------------------------------------------|-----------------------|-----------------------|-----------------------|----------------|----------------|
| 365                   | Studio Stand ... ..                                                                                                    | 10 6                  | 15/-                  | 21/-                  | 25/-           | 30/-           |
| 366                   | Studio Stand with Rack Adjustment                                                                                      | 21-                   | 25/-                  | 30/-                  | 42-            | 52 6           |
| 367                   | Lancaster's International Stand                                                                                        | $\frac{1}{2}$ , 7/6;  | $\frac{3}{4}$ , 12/6; | $\frac{7}{8}$ , 15/-  |                |                |
| 368                   | Lancaster's New Stand, with Patent Universally Adjusting Top, giving any position to Cam-ra, and with Adjustable Legs. | $\frac{1}{2}$ , 10/6; | $\frac{3}{4}$ , 15/-; | $\frac{7}{8}$ , 21/-; | 10 x 8, 25/-;  | 12 x 10, 30/-; |
|                       |                                                                                                                        |                       |                       |                       | 15 x 12, 35/-. |                |

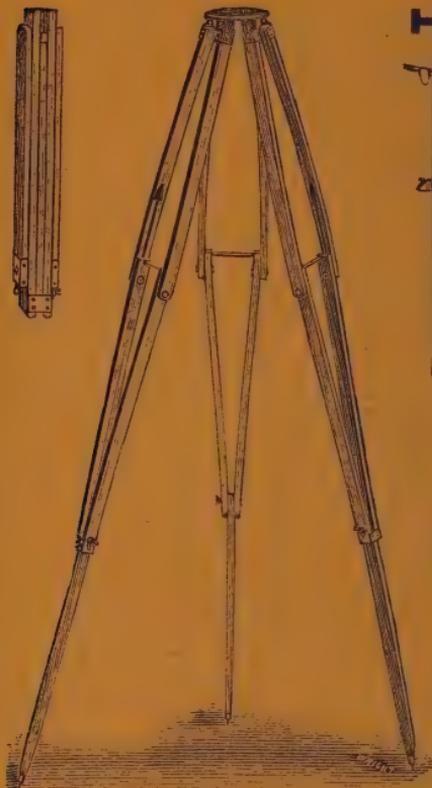


WATERPROOF CASES FOR STANDS.

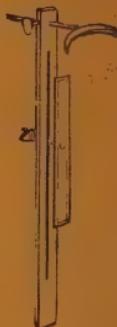
$\frac{1}{2}$ , 3/-;  $\frac{3}{4}$ , 4/-;  $\frac{7}{8}$ , 5/-; 10 x 8, 6/-; 12 x 10, 7/-

COLMORE ROW, BIRMINGHAM.

J. LANCASTER &amp; SON, Opticians.

**PORTABLE CAMERA STANDS, &c.**

370.—THE THREE-FOLD STAND.

**Head Rests.**

French Polished  
Head Rests, to  
attach to Chair,  
with Adjusting  
Screws ... .. 5/-

Ditto, with Uni-  
versal Motions 10/6

Iron Head Rests 30/-



369.—Lancaster's New Camera Stand  
may be used in any and every imaginable  
position.

$\frac{1}{2}$ , 12/6;  $\frac{3}{4}$ , 15/-;  $1\frac{1}{2}$ , 17/6; 10 x 8, 21/-;  
12 x 10, 25/-.

370.—The Ladies' Three-fold Stand.  
This forms a most compact stand, fol-  
into a little over half the usual size.

$\frac{1}{2}$ , 6/6;  $\frac{3}{4}$ , 10/-;  $1\frac{1}{2}$ , 12/6; 10 x 8, 15/  
12 x 10, 21/-.

**CASES FOR STANDS.**

Leather-bound Cases, with lining, to carry Stands in.

$\frac{1}{2}$ , 3/-;  $\frac{3}{4}$ , 4/-;  $1\frac{1}{2}$ , 5/-; 10 x 8, 6/-; 12 x 10, 7/-.

COLMORE ROW, BIRMINGHAM

J. LANCASTER & SON, Opticians.

**LENSES.**

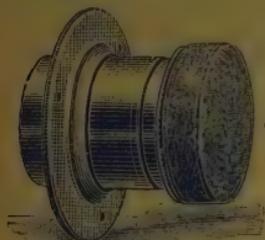
**M**ESSRS. LANCASTER & SON again have pleasure in recording the fact that during the last eleven years they have sold over 160,000 of their Lenses, and have received the most flattering testimonials from the highest in the profession, and the most distinguished amateurs.

MESSRS. LANCASTER & SON see that every lens is stamped with engraved upon it in full. They and Crown, and do not send a stringent testing. These remarks facture.



warn customers before purchasing to their Trade Mark, or has their name carefully select only the best Flint Lens out unless it passes the most apply to all Lenses of their manu-

**LANDSCAPE LENSES.**



No. 374.

Mounted in Brass with Sliding Tubes. The Lenses are of the Meniscus form, giving perfect definition from centre to margin.

|       |                     |               |               |        |         |         |
|-------|---------------------|---------------|---------------|--------|---------|---------|
| Size  | $\frac{1}{2}$       | $\frac{3}{4}$ | $\frac{1}{2}$ | 10 x 8 | 12 x 10 | 15 x 12 |
| Focus | 5 $\frac{1}{2}$ in. | 9in.          | 12in.         | 16in.  | 20in.   | 24in.   |
| Price | 5/-                 | 10/-          | 15/-          | 20/-   | 25/-    | 30/-    |

**SUPERIOR LENSES.**

IN RACKWORK MOUNTS

Same Focus as No. 374.



No. 375.

|               |               |               |        |         |         |
|---------------|---------------|---------------|--------|---------|---------|
| $\frac{1}{2}$ | $\frac{3}{4}$ | $\frac{1}{2}$ | 10 x 8 | 12 x 10 | 15 x 12 |
| 7/6           | 15/-          | 22/6          | 30/-   | 37/6    | 45/-    |

**NARROW ANGLE LENS**

(PATENT).

This is an excellent Lens for Narrow Angle Work, giving superb definition.



No. 376 N. A.

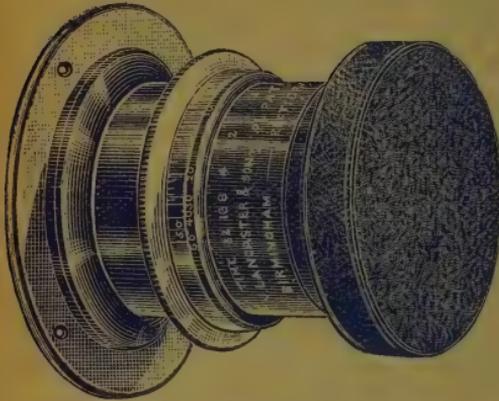
|       |               |               |               |        |         |
|-------|---------------|---------------|---------------|--------|---------|
| Size  | $\frac{1}{2}$ | $\frac{3}{4}$ | $\frac{1}{2}$ | 10 x 8 | 12 x 10 |
| Focus | 8in.          | 12in.         | 18in.         | 21in.  | 24in.   |
| Price | 12/6          | 21/-          | 30/-          | 42/-   | 50/-    |

COLMORE ROW, BIRMINGHAM.

J. LANCASTER & SON, Opticians.

LANCASTER'S NEW LENSES.

The Rectigraph Series.



No. 376.

SILVER RING RAPID RECTIGRAPH  
WITH PATENT  
ADJUSTABLE DIAPHRAGMS.



No. 376 A L

No. 376.

THESE are a series of Lenses of the highest quality, and are the result of long and tedious experiments. With them can be obtained beautifully modelled portraits, excellent groups and landscapes, and for architectural work they cannot be excelled. The Lenses, being both perfectly symmetrical, will work full aperture for portraits and groups, and when stopped down a little, will produce landscape and architectural photos that it would be impossible to surpass.

|                                                  |     |     |               |               |            |        |        |        |        |        |
|--------------------------------------------------|-----|-----|---------------|---------------|------------|--------|--------|--------|--------|--------|
| Diam. of Lens                                    | ... | ... | $\frac{1}{2}$ | $\frac{3}{4}$ | 1          | 1 1/2  | 2      | 2 1/2  | 3      | 3 1/2  |
| Focus                                            | ... | ... | 5 1/2 in.     | 8 1/2 in.     | 11 1/2 in. | 14 in. | 18 in. | 24 in. | 28 in. | 34 in. |
| PRICE                                            | ... | ... | 40/-          | 60/-          | 80/-       | 100/-  | 120/-  | 140/-  | 160/-  | 180/-  |
| Leather Cases lined silk,<br>to carry Rectigraph | ... | ... | 2/6           | 3/-           | 3/6        | 4/-    | 4/6    | 5/-    | 5/6    | 6/-    |

No. 376 A L

IN MOROCCO CASES.

|                                         |     |     |      |      |      |       |       |       |
|-----------------------------------------|-----|-----|------|------|------|-------|-------|-------|
| Mounted in Aluminium,<br>Finest Quality | ... | ... | 50/- | 70/- | 92/- | 115/- | 140/- | 165/- |
|-----------------------------------------|-----|-----|------|------|------|-------|-------|-------|

COLMORE ROW, BIRMINGHAM.

J. LANCASTER & SON, Opticians.

# Lancaster's Rectigraph Lenses.



376 W. A.

## RECTIGRAPH.

THESE Lenses are symmetrical, and when used either together as a Wide-angle Combination, or singly as a Narrow-angle Lens, the definition is perfect. The foci of Combination and Back Lens are both given below.

MOUNTED IN BEST METAL WITH SILVER RING.

|                                    | $\frac{1}{4}$       | $\frac{1}{3}$        | $\frac{1}{2}$       | 10x8  | 12x10 | 15x12 | 18x16 | 22x18 |
|------------------------------------|---------------------|----------------------|---------------------|-------|-------|-------|-------|-------|
| Focus of Wide Angle Rectigraph ... | 3 $\frac{1}{2}$ in. | 5in.                 | 6 $\frac{1}{2}$ in. | 8in.  | 9in.  | 11in. | 14in. | 17in. |
| Focus of Back Lens...              | 7in.                | 10 $\frac{1}{2}$ in. | 14in.               | 18in. | 20in. | 24in. | 30in. | 35in. |
| PRICE ...                          | 30/-                | 42/-                 | 50/-                | 63/-  | 70/-  | 80/-  | 100/- | 120/- |
| Mounted in Aluminium               | 36/-                | 50/-                 | 60/-                | 75/-  | 85/-  | —     | —     | —     |

The graduations on Scale are for the Combination, and when using Back Lenses they must be doubled.



## COMBINATION RECTIGRAPH. (PATENT.)

THESE Lenses are of the highest quality, great care being taken in their construction.

THE COMBINATION RECTIGRAPH can be used as a Wide, Ordinary, and Narrow-angle Lens, the different-foci being given below.

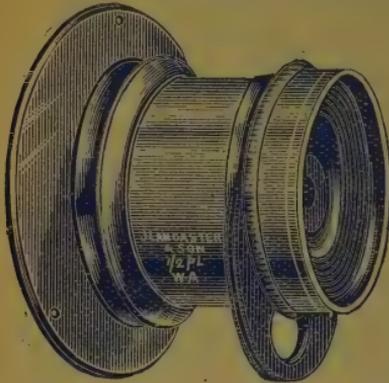
376 C. COMBINATION RECTIGRAPH LENS.

|                         | $\frac{1}{4}$       | $\frac{1}{3}$       | $\frac{1}{2}$       | 10 x 8 | 12 x 10 | 15 x 12 |
|-------------------------|---------------------|---------------------|---------------------|--------|---------|---------|
| Focus of Combination... | 3 $\frac{1}{2}$ in. | 4 $\frac{1}{2}$ in. | 6 $\frac{1}{2}$ in. | 8in.   | 9in.    | 10in.   |
| " Front Lens ...        | 5in.                | 8in.                | 10in.               | 12in.  | 14in.   | 16in.   |
| " Back Lens ...         | 9in.                | 12in.               | 18in.               | 20in.  | 24in.   | 30in.   |
| PRICE ...               | 30/-                | 42/-                | 50/-                | 70/-   | 90/-    | 110/-   |
| Mounted in Aluminium    | 36/-                | 50/-                | 60/-                | 80/-   | 105/-   | —       |

The Scale has three sets of Graduations:—First for Combination second for Front Lens only; third for Back Lens only.

COLMORE ROW, BIRMINGHAM.

J. LANCASTER & SON, Opticians.



Lancaster's New Wide Angle Lens.

# Wide Angle Lenses.

No. 377.

These Lenses are very useful in confined situations and for copying full size in an ordinary Camera. The focus of each is given below.

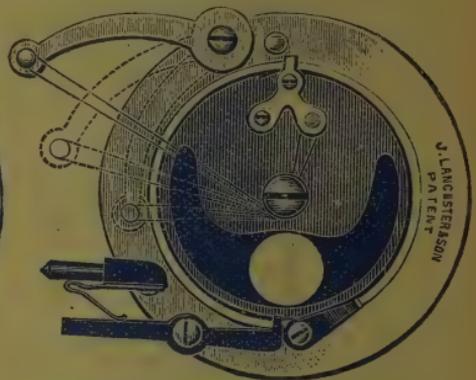
|              |               |                 |                 |      |       |
|--------------|---------------|-----------------|-----------------|------|-------|
| Size ... ..  | $\frac{1}{4}$ | $\frac{1}{2}$   | $\frac{3}{4}$   | 10x8 | 12x10 |
| Focus ... .. | 4             | 6 $\frac{1}{2}$ | 8 $\frac{1}{2}$ | 10   | 12in. |
| PRICE ... .. | 10/6          | 15/-            | 21/-            | 25/- | 30/-  |

## INSTANTANEOUS LENSES.



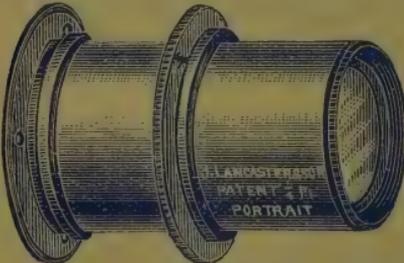
No. 378.

Lancaster's New "Instantaneous" Lens (Patent).



Lancaster's Patent Instantaneous Lenses for Groups, Portraits, Landscapes or Architectural work, with our Patent Shutter, giving any length of exposure, and Patent Adjustable Diaphragms.

|              |                 |                 |               |      |       |       |
|--------------|-----------------|-----------------|---------------|------|-------|-------|
| Size ... ..  | $\frac{1}{4}$   | $\frac{1}{2}$   | $\frac{1}{1}$ | 10x8 | 12x10 | 15x12 |
| Focus ... .. | 5 $\frac{1}{2}$ | 8 $\frac{1}{2}$ | 11            | 14   | 17    | 21in. |
| PRICE ... .. | 21/-            | 30/-            | 42/-          | 52/6 | 63/-  | 84/-  |



No. 376p.

**RAPID, PORTABLE, EXCELLENT DEFINITION.**

# Portrait Lens

WITH PATENT DIAPHRAGMS.

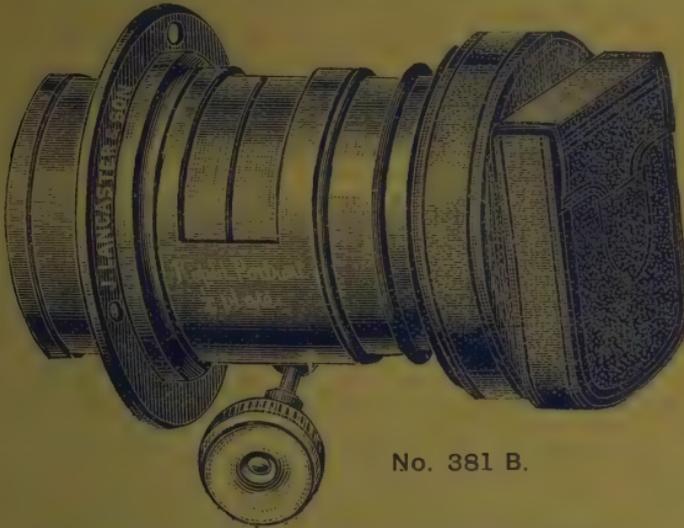
$\frac{1}{2}$ , 21/-;  $\frac{1}{1}$ , 42/-;  $\frac{3}{1}$ , 63/-

COLMORE ROW, BIRMINGHAM.

J. LANCASTER & SON, Opticians,

# PORTRAIT LENSES.

MESSRS. J. LANCASTER & SON have succeeded in producing Portrait Lenses of the highest quality at most reasonable prices.



No. 381 B.

**SERIES A.—GIVING EXCELLENT DEFINITION.**

|      |                                                                  |    |    |    |
|------|------------------------------------------------------------------|----|----|----|
| 379a | Carte Lens, with set of Waterhouse Diaphragms, excellent Working | £  | s. | d. |
|      | Lens ... ..                                                      | 1  | 10 | 0  |
| 380a | Cabinet Lens, ditto ditto ditto                                  | 3  | 3  | 0  |
|      | Full Plate Portrait Lens, ditto ditto ditto                      | 5  | 5  | 0  |
|      | 12 x 10 ditto ditto ditto                                        | 12 | 12 | 0  |

These Lenses have given great satisfaction.

**SERIES B.—GIVING SUPERB DEFINITION, WITH GREAT RAPIDITY OF ACTION.**

## *First Quality Rapid Portrait Lenses*

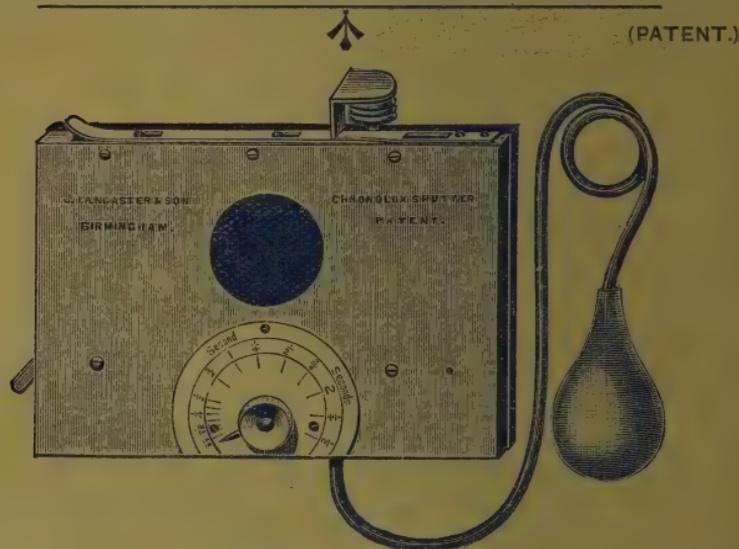
|      |                                                            |    |    |    |
|------|------------------------------------------------------------|----|----|----|
| 381b | Very Rapid Carte Lens, with Set of Waterhouse Diaphragms   | £  | s. | d. |
|      | ...                                                        | 3  | 15 | 0  |
| 382b | Very Rapid Cabinet Lens, with Set of Waterhouse Diaphragms | 5  | 10 | 0  |
| 383b | Ditto ditto Full Plate                                     | 10 | 0  | 0  |
| 384b | Ditto ditto 12 x 10                                        | 18 | 18 | 0  |

COLMORE ROW, BIRMINGHAM.

J. LANCASTER & SON, Opticians.

THE NEW MODEL

# Chronolux \* Shutter.



THE NEW MODEL CHRONOLUX has the same mechanical arrangements as the original Chronolux, with the exception that both Shutters move at the same instant, and not one after the other.

THE NEW MODEL CHRONOLUX opens and closes at the centre, and moves without the slightest vibration. It works from  $\frac{1}{8}$ th of a second to three seconds, and by moving the lever on left-hand side any length of exposure may be obtained.

To set the Shutter, the lever on left-hand side is lifted up until it clicks, then the index finger is moved round to second, or part of second required, and Shutter is then ready for release.

The Shutters are beautifully finished, gilt, and oxidised.

## PRICE.

$\frac{1}{4}$ -plate, 25/-  $\frac{1}{2}$ -plate, 30/-  $\frac{3}{4}$ -plate, 35/- 10x8, 42/- 12x10, 50/-

COLMORE ROW, BIRMINGHAM.

J. LANCASTER & SON, Opticians.

**INSTANTANEOUS SHUTTERS.**

**Lancaster's Pneumatic Shutter.**

*Giving either Rapid or Time Exposures.*

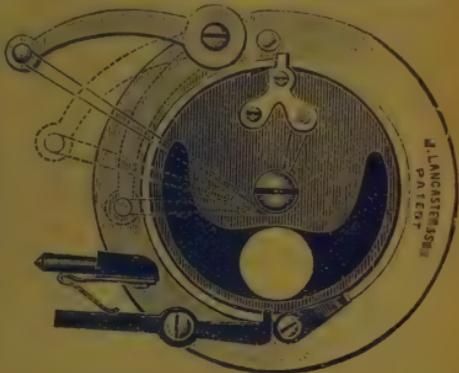


This Shutter is a very good one for any exposure from  $\frac{1}{80}$ th of a second up to any length of time. The ball being pressed keeps Shutter up for any length of time. The Shutter is very light indeed, and moves without the slightest vibration. The cap on right hand tube rotates to allow of either time or instantaneous exposures.

PRICE:  $\frac{1}{2}$ -plate, 7/6;  $\frac{3}{4}$ -plate, 10/6;  $\frac{1}{2}$  plate, 15/-

**Lancaster's Patent Instantograph Shutter.**

$\frac{2}{3}$  Of this Shutter over 40,000 have been sold.



With this Patent Shutter almost any exposure may be given, as bands of all strengths may be used, and two or three may be used at the same time; an exposure of rooth of a second can be obtained with it, and down to almost anything.

$\frac{1}{2}$ , 5/-;  $\frac{3}{4}$ , 7/6;  $\frac{1}{2}$ , 10/-; 10x8, 12/6; 12x10, 15/-



**LANCASTER'S STEREOSCOPIC SHUTTER**

With tension and friction springs giving any required exposure, both being simultaneous.

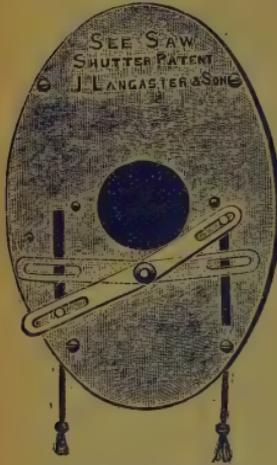
Stereoscopic Shutter,  $\frac{1}{2}$  15/-

COLMORE ROW, BIRMINGHAM.

J. LANCASTER & SON, Opticians.

LANCASTER'S NEW SHUTTER.

# The "See-Saw" Patent



**SEE-SAW SHUTTER.**

SIMPLE FORM A.

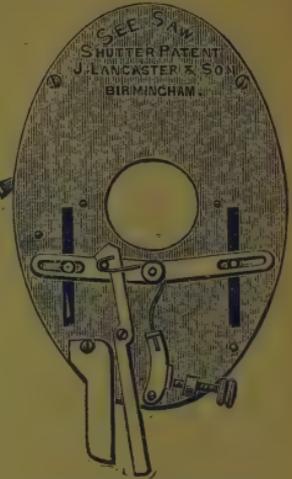
$\frac{1}{2}$ , 5/-;  $\frac{3}{4}$ , 7/6;  $1\frac{1}{2}$ , 10/-

This Shutter opens and closes in centre, and is moved by means of small cords; any exposure can be obtained without the slightest jar.

THESE Shutters have been received by Professionals and Amateurs of long standing with the highest praise. Their encomiums have, we believe, been deserved, as the See-saw Shutter is without doubt

The Simplest, Safest, and most complete Shutter ever made.

Over 10,000 have been already sold, and the demand is increasing enormously.



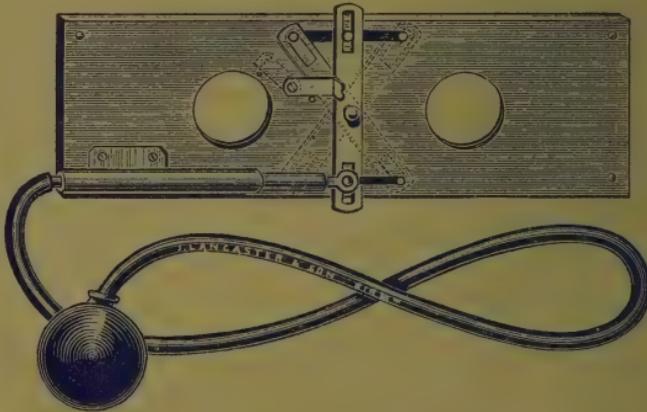
**SEE-SAW SHUTTER.**

FORM B.

$\frac{1}{2}$ , 6/6;  $\frac{3}{4}$ , 8/6;  $1\frac{1}{2}$ , 12/6

This has Spring for exposing, and can be worked at a high speed, or for time exposures, by using the lever at bottom of Shutter.

STEREOSCOPIC SEE-SAW SHUTTER.



With Pneumatic Arrangement, 17/6.

COLMORE ROW, BIRMINGHAM.

J. LANCASTER & SON, Opticians.

LANCASTER'S  
**NEW SHUTTER**

THE

**SEE-SAW PATENT.**

THIS Shutter is driven by compressed air, and can be used for any length of exposure from  $\frac{1}{100}$  second up to hours. The Shutter opens and closes in the centre, and consists of two plates moving across each other, perfectly smooth and without any vibration. They are moved by means of a cylinder and piston connected with a beam or see-saw arrangement, which moves both together. There is a small lever (a) at the top of shutter, which, when pulled down, allows shutter to open only, and on release of pressure on ball to close; by turning (a) upwards, the shutters shoot across at a high speed, regulated by pressure on ball.

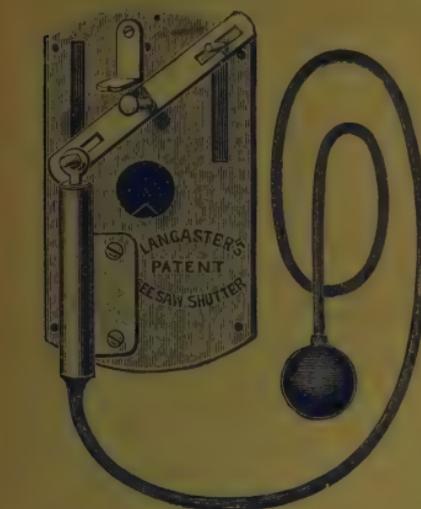
PRICES COMPLETE.

|                     |                                     |                            |                                    |
|---------------------|-------------------------------------|----------------------------|------------------------------------|
|                     | 1- $\frac{1}{2}$ pl.                | 1- $\frac{3}{4}$ pl.       | 1-1 pl. or $\frac{1}{2}$ pl. Rect. |
| Diam. of Aperture } | $\frac{1}{2}$ in.                   | $\frac{3}{4}$ in.          | 1 in.                              |
| PRICE..             | 6/6                                 | 8/6                        | 10/6                               |
|                     | 4-10 x 8 or $\frac{1}{2}$ pl. Rect. | 5-12 x 10 or 1-1 pl. Rect. | 6-20 x 18 or up to 12 x 10 Rect.   |
| Diam. of Aperture } | 1 $\frac{1}{2}$ in.                 | 1 $\frac{3}{4}$ in.        | 2 $\frac{1}{2}$ in.                |
| PRICE..             | 12/6                                | 15/-                       | 21/-                               |

ALUMINIUM SEE-SAW SHUTTERS.

|               |               |               |        |         |
|---------------|---------------|---------------|--------|---------|
| $\frac{1}{4}$ | $\frac{1}{2}$ | $\frac{1}{2}$ | 10 x 8 | 12 x 10 |
| 10/-          | 12/6          | 15/-          | 17/6   | 21/-    |

COLMORE ROW, BIRMINGHAM.



J. LANCASTER &amp; SON, Opticians.

LANCASTER'S

## — 1894 "OMNIGRAPH." —

Everybody's  
Detective.

—

Simplest of  
Hand  
Cameras.

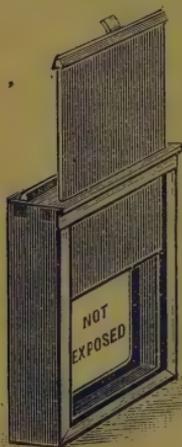


(Patent.)

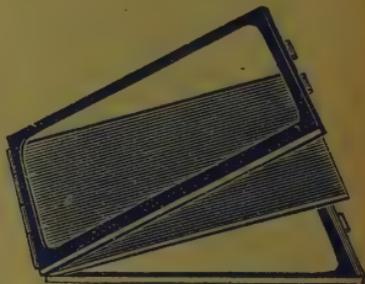
—  
½-plate, 21/-—  
Weight, 1½ lbs.

THE OMNIGRAPH is a simple, cheap, and excellent Hand Camera. The simplicity of its mechanism, and the easy method of exposing and changing plates, have made the Omnigraph already highly popular. The Camera proper consists of a chamber having the lens and shutter at one end, and a specially-prepared roller shutter at the other end. Behind this shutter is a space which holds a changing box, containing six plates, in three double carriers.

The Plates are put into Lancaster's Patent Metal Carriers, each carrier being constructed to hold two plates, with a division between them; the frame is then closed and fastened by means of a sliding pin. The three carriers must then be put into changing box, and when all are in, close both shutters, and the Omnigraph is ready for use.



Changing Box with fawn and black Shutters.



COLMORE ROW, BIRMINGHAM.

J. LANCASTER & SON, Opticians.

EVERYBODY'S  
DETECTIVE.



SIMPLE, RELIABLE,  
EFFICIENT.

No. 385.  
**LANCASTER'S NEW DETECTIVE, "THE OMNIGRAPH."**  
(PATENT.)

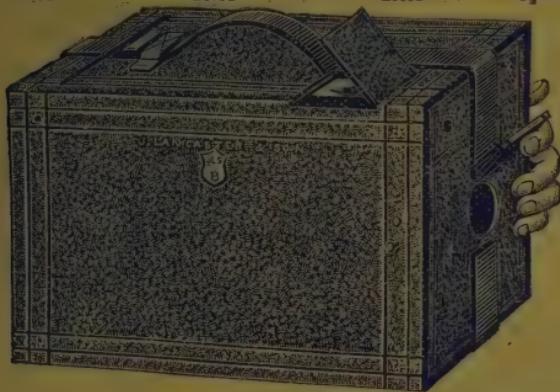
THE "OMNIGRAPH" is a Detective Camera made to satisfy a large and increasing demand for a really serviceable Camera at a moderate and popular price.

The "Omnigraph" is a very good Camera, strongly made, and either covered in good cloth, or of a superior finish and covered in best Leather.

The Lens is an Achromatic Meniscus one, and has our patent "See-saw" Shutter. The changing box carries six plates or films changed in an instant, and extra boxes may be had so that any number of films or plates can be carried. The plates are put in our Patent Carriers, which cannot possibly damage a plate.

Size of  $\frac{1}{2}$ -plate Omnigraph, 8 x 6 x 5 in.

|                                                                                         |     |       |    |    |   |
|-----------------------------------------------------------------------------------------|-----|-------|----|----|---|
| Price, complete with Finder, to carry six $4\frac{1}{2} \times 3\frac{1}{2}$ in. plates | ... | ...   | £1 | 1  | 0 |
| Ditto ditto covered in best leather                                                     | ... | ...   | 1  | 5  | 0 |
| Ditto ditto ditto $5 \times 4$ in.                                                      | ... | ...   | 2  | 10 | 0 |
| Ditto ditto ditto $6\frac{1}{2} \times 4\frac{1}{2}$ in.                                | ... | ditto | 2  | 5  | 0 |



Superior Omnigraph  $4\frac{1}{2} \times 3\frac{1}{2}$   
£1 11 6

Superior Omnigraph ...  $5 \times 4$   
£2 2 0

Superior Omnigraph,  $6\frac{1}{2} \times 4$   
£3 3 0

Extra Changing Boxes  
with Metal Carriers for six  
plates:—

$4\frac{1}{2} \times 3\frac{1}{2}$ , 7/6     $5 \times 4$ , 10/6  
 $6\frac{1}{2} \times 4\frac{1}{2}$ , 15/-

**SUPERIOR OMNIGRAPH.**

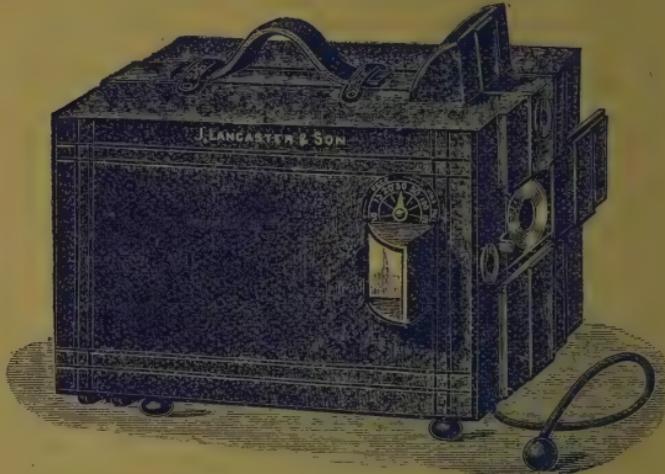
Superior Omnigraph covered in best leather, all parts hidden, made to represent travelling case. Complete with finder, best Achromatic Meniscus Lens, See-saw Shutter, and Iris Diaphragms.

COLMORE ROW, BIRMINGHAM.

J. LANCASTER & SON, Opticians.

LANCASTER'S '94 PERFECT OMNIGRAPH. (PATENT.)

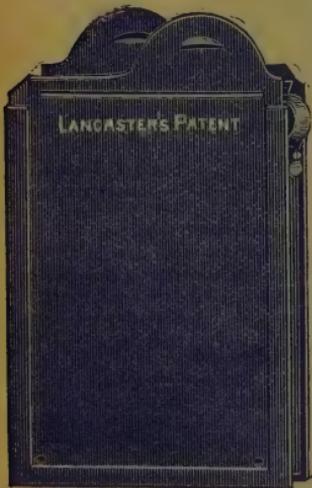
DOUBLE FINDERS.



EVERY ADJUSTMENT.

THE '94 Perfect Omnigraph is a perfect model Hand Camera. It has Horizontal and Vertical Finders in same plane as lens, Registered Adjustment for any focus, First Quality Rapid Lens, See-saw Shutter with Pneumatic Release, Patent Diaphragms, etc., etc.

The '94 P.O. has the ordinary Changing Box or Three Double Metal Slides, as below, at same prices.  $\frac{1}{2}$ -plate, £2 2s.  $5 \times 4$ , £3 3s.  $\frac{1}{2}$ -plate, £4 4s.



LANCASTER'S PATENT '94 METAL SLIDES are the simplest form of Slide possible. They are made of light metal, and the top of frame is hinged so that plates can be removed without the least danger of scratching or rubbing. The woodcut on left shows slide closed, and that on right side shows frame open to receive plates. The Slides can be adapted to any of J. L. & Son's Cameras.

Set of Three Slides,  $\frac{1}{2}$ -plate ... 7/6.  
Adapted to any Camera, including Focussing ... 2/6.  
Glass, extra ... ..



COLMORE ROW, BIRMINGHAM.

J. LANCASTER &amp; SON, Opticians.

**LANCASTER'S**  
**PERFECT HAND, MAGAZINE or DETECTIVE CAMERA**  
 "THE ROVER." (PATENT.)



No. 386.

**COMPLETE.**

|        |                                    |         |
|--------|------------------------------------|---------|
| No. 1. | $3\frac{1}{4} \times 3\frac{1}{4}$ | £2 12 6 |
| No. 2. | $4\frac{1}{4} \times 3\frac{1}{4}$ | £3 3 0  |
| No. 3. | $5 \times 4$                       | £4 4 0  |
| No. 4. | $6\frac{1}{2} \times 4\frac{3}{4}$ | £5 5 0  |

**T**HE Lens is a specially-made one, very rapid, with See-saw Shutter, Patent Adjustable Diaphragms, and each Camera has a Finder. The whole is enclosed in a best Leather Case, of most convenient and handy size.

Only one Plate is in Camera at time of exposure, all others are in light-proof chambers.

The Camera is exceedingly simple in use.

**T**HE "Rover" is one of the most perfect Cameras ever put in the market; it consists of practically three chambers: (A) a space at top holding twelve Plates or Films in our new patent Sheaths or Carriers, (B) the Camera proper, and (C) a space at back to hold twelve Plates after exposure. Each chamber is light proof.

The method of exposure is as follows:—Press Lever at bottom of Camera slightly forward; this allows one Plate to fall, then move Lever backward, and Plate falls into position.

The Plate, after exposure, goes into back chamber, a venetian shutter being opened and closed



COLMORE ROW BIRMINGHAM.

J. LANCASTER &amp; SON, Opticians.

**LANCASTER'S 1894 WATCH CAMERA.**

IMPROVED PATTERN.

PATENT.

**POCKET SIZE**TAKING  $2 \times 1\frac{1}{2}$ in. PLATES.

Folding into size of Gold Lever.



**L**ANCASTER'S PATENT WATCH CAMERA is a new departure in Cameras. The Camera when closed is exactly like an ordinary watch. The Camera is opened in an instant by rotating button, when a series of about half-a-dozen tubes instantly shoot out into position, and by means of another spring, an instantaneous exposure is made. The Lens is a very rapid one, and can be adjusted for taking portraits, groups, or views, &c. Extra Plate Holders may be had to carry Sensitised Plates.

**PRICES.**

WATCH CAMERA, easily carried in waistcoat pocket, taking Photos  $2 \times 1\frac{1}{2}$ in., with three Slides.

**£1 11s. 6d.**

Extra Slides, 1/6 each. Instantaneous Plates, 6d. dozen. Sets of Plates, Dishes, Chemicals, &c., 3/6. Printing Set, 3/6.

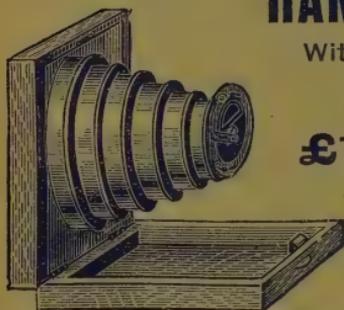
No. 388.

**HAND DETECTIVE CAMERA**

With three Slides,  $2 \times 1\frac{1}{2}$ in., folding up to carry in waistcoat pocket.

**£1 11 6**

Extra Slides,  
1s. 6d. each.



The above Cameras take really good pictures, and pack into the smallest possible compass. The Watch Camera is  $2\frac{1}{2}$ in. diameter, and only  $\frac{7}{8}$ in. in depth.

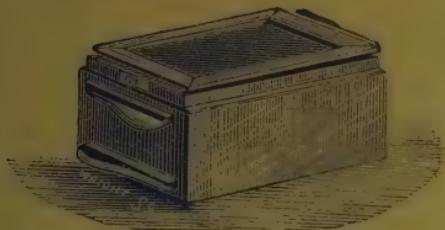
**COLMORE ROW BIRMINGHAM.**

J. LANCASTER & SON, Opticians.

IMPROVED

# CHANGING BOXES

NEW  
FORM



MUCH  
IMPROVED.

THE New Changing Box contains Patent Metal Carriers carrying 12 Dry Plates, which can be transferred in a few seconds to or from the Dark Slide, with the greatest ease, and in the brightest sunshine, without fear of fogging the plate.

They are much superior to the old form of Changing Box.

|     |                                                                                                |        |         |
|-----|------------------------------------------------------------------------------------------------|--------|---------|
| 391 | Changing Box and Slide carrying 12 $\frac{1}{2}$ -plates to fit Instantograph or International | ... .. | £0 16 6 |
| 392 | " " " " " " Brass Bound...                                                                     | ... .. | 1 0 0   |
| 393 | " " " " " " 12 $\frac{1}{2}$ -plates ...                                                       | ... .. | 1 10 0  |
| 394 | " " " " " " Brass Bound...                                                                     | ... .. | 1 16 0  |
| 395 | " " " " " " 12 $\frac{1}{2}$ -plates ..                                                        | ... .. | 2 0 0   |
| 396 | " " " " " " Brass Bound...                                                                     | ... .. | 2 8 0   |

LANCASTER'S

PATENT METAL SLIDES AND CARRIERS.

THESE Double Dry Slides are of the solid form and have no hinges, &c. The Plates are put into the Carriers (426), and then the Carriers are fastened together, so that a pair of plates are always ready to put into Slide. The Carriers are put in and out with the greatest ease, under any black cloth, or in a small bag they may be changed in the brightest sunshine.

PRICES: Sets of three only,  $\frac{1}{2}$ -plate, 7/6;  $\frac{1}{4}$ -plate, 12/6.

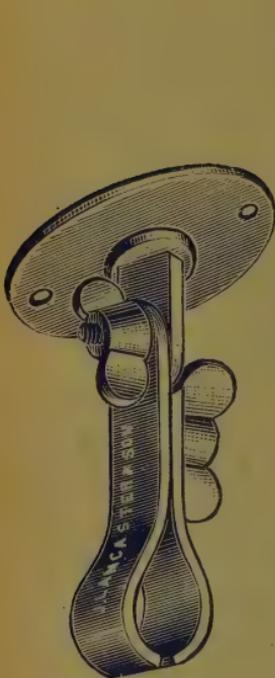
Extra Carriers: Three  $\frac{1}{2}$ , 1/6; three  $\frac{1}{4}$ , 2/3.

Adapters and Ground Glass Slide, to fit above Slides to either kind Camera, 2/6 each.

COLMORE ROW, BIRMINGHAM.

J. LANCASTER & SON, Opticians.

# CYCLISTS' Touring Apparatus.



ORDINARY CLIP.



SUPERIOR CLIP,  
with Universal Motions  
and Sliding Tube.

**T**HE CYCLE CLIP, specially constructed to fit on any size bicycle or tricycle wheel, is sent with either Le Merveilleux, Meritoire, or Instantograph, in place of stand at same prices, or may be had in addition to the stand at the following prices.

### CYCLE CLIPS.

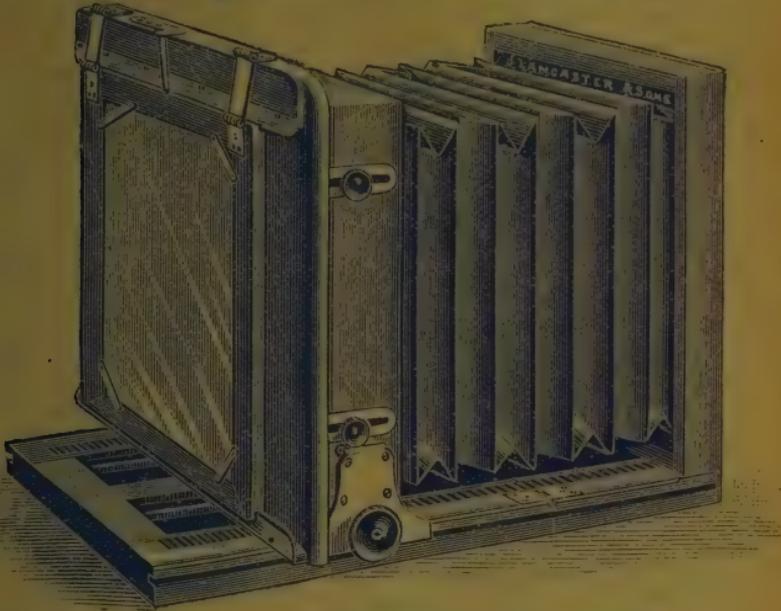
|                         |     |               |               |               |      |       |       |
|-------------------------|-----|---------------|---------------|---------------|------|-------|-------|
|                         |     | $\frac{1}{2}$ | $\frac{3}{4}$ | $\frac{1}{1}$ | 10x8 | 12x10 | 15x12 |
| Ordinary quality ... .. | 5/- | 7/6           | 10/-          | 12/6          | 15/- | 15/-  |       |
| Best quality ... ..     | 7/6 | 10/6          | 15/-          | 21/-          | 25/- | 30/-  |       |

Either of the Clips can be attached to any Camera having a screw into bottom of tail-board

COLMORE ROW, BIRMINGHAM.

J. LANCASTER & SON, Opticians.

# New Studio Camera.



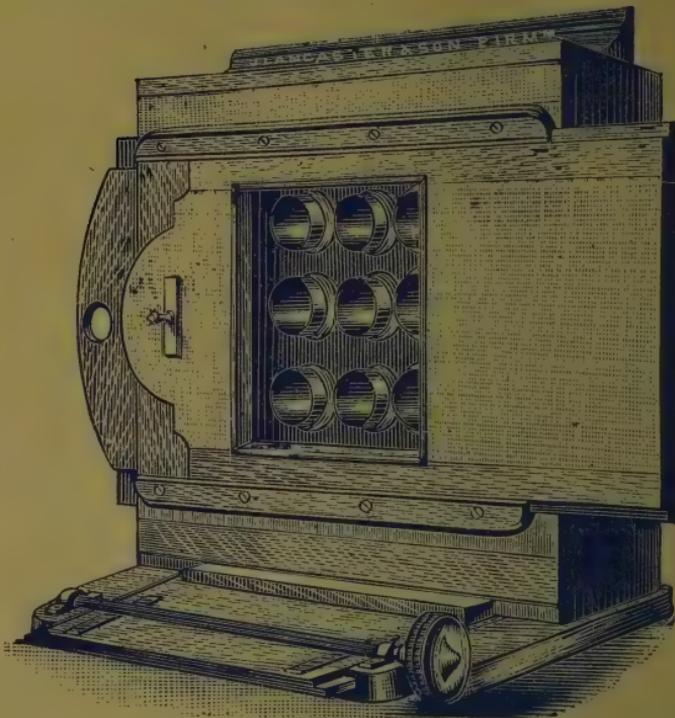
- |       |                                                                                                                                                                                      |    |    |   |
|-------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|---|
| 398.  | UNIVERSAL CAMERA, $\frac{1}{2}$ -plate, with Repeating Back, Rack Adjustment, Double Swing, Bellows Body, taking Cabinet, Portrait or Group, and one or two Cartes on a plate ... .. | £2 | 5  | 0 |
|       | Extra Slides, 12/6 each.                                                                                                                                                             |    |    |   |
| 398B. | BRASS-BOUND STUDIO CAMERA of best quality and finish, Leather Bellows... ..                                                                                                          | 3  | 5  | 0 |
|       | Extra Slides, 17/6 each.                                                                                                                                                             |    |    |   |
| 399.  | UNIVERSAL CAMERA, $\frac{1}{2}$ -plate, ditto, ditto, taking two Cabinets on one plate, two Cartes on one plate, or one Cabinet or one Carte                                         | 3  | 10 | 0 |
|       | Extra Slides, 18/- each.                                                                                                                                                             |    |    |   |
| 399B. | BRASS-BOUND ditto; ditto ... ..                                                                                                                                                      | 4  | 12 | 6 |
|       | Extra Slides, 24/- each.                                                                                                                                                             |    |    |   |
| 400.  | UNIVERSAL CAMERA, 10 x 8, ditto, ditto, to take Promenade, Malvern, Cabinets, and Carte size ... ..                                                                                  | 6  | 5  | 0 |
|       | Extra Slides, 24/- each.                                                                                                                                                             |    |    |   |
| 400B. | BRASS-BOUND ditto, ditto ... ..                                                                                                                                                      | 7  | 10 | 0 |
|       | Extra Slides, 35/- each.                                                                                                                                                             |    |    |   |
| 401.  | UNIVERSAL CAMERA, 12 x 10, with Carriers for all sizes down to $\frac{1}{4}$ , and every convenience for large Studio work ... ..                                                    | 9  | 9  | 0 |
| 401.  | BRASS-BOUND ditto, ditto ... ..                                                                                                                                                      | 11 | 0  | 0 |
|       | Extra Fronts: 398, 2/6; 399, 3/-; 400, 3/6; 401, 4/-                                                                                                                                 |    |    |   |
|       | Double Dry Slides: 398, 15/-; 399, 21/-; 400, 30/-; 401, 42/- each.                                                                                                                  |    |    |   |

COLMORE ROW, BIRMINGHAM.

J. LANCASTER &amp; SON, Opticians.

*Gem and Victoria Apparatus.*

Will take 36 Gems on 7 x 5 plate.  
Will take 9 Victorias on 7 x 5 plate.



Will take 12 Gems on  $\frac{1}{4}$ -plate.  
Will take 4 Victorias on  $\frac{1}{4}$ -plate.

No. 410 APPARATUS.

OUR Apparatus have now been in the Market for years, and have received the highest approbation. We guarantee every Lens of the best quality.

- |                                                                                                                                                                                                                                          |         |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| 403. Polished Mahogany Camera, with four superior double combination Achromatic Lenses, Repeating Back, taking twelve superior gems on a $\frac{1}{4}$ -plate Ferrotypes ... ..                                                          | £2 10 0 |
| 404. Ditto ditto, with six Lenses, to take twelve on $\frac{1}{4}$ -plate in two positions, with Rackwork Adjustment... ..                                                                                                               | 3 0 0   |
| 405. Superior ditto, with nine Lenses, to take nine on $\frac{1}{8}$ -plate, or 18 on $5 \times 3\frac{1}{2}$ plate, with Rackwork Adjustment ... ..                                                                                     | 4 0 0   |
| 406. Superior Mahogany Camera, with 12 selected Lenses, Rackwork Adjustment, Instantaneous Shutter, will take nine Gems on $\frac{1}{2}$ -plate, 12 on $\frac{1}{4}$ -plate, 24 on $5 \times 4$ , and 36 on $7 \times 5$ plates, &c. ... | 6 6 0   |

**GEM LENSES.**

FINEST QUALITY, 6/- per Lens, in sets of 4, 6, 9 and 12 on plate.

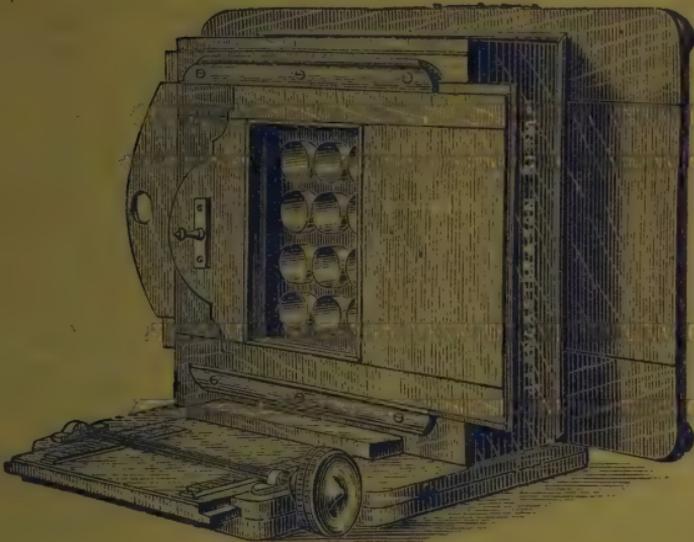
SECOND QUALITY, 5/- per Lens, in sets of any number.

COLMORE ROW, BIRMINGHAM.

J. LANCASTER & SON, Opticians.

# Gem and Victoria Apparatus.

Will take 36 Gems on 7 x 5 plate.



Will take 12 Gems on 1/4 plate.

No. 406.

- |      |                                                                                                                                                                                                                                                             |         |
|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| 407. | Pushed Mahogany Camera, with two large Achromatic Double Combination Lenses, to take four Victorias in two positions, on 1/4-plate                                                                                                                          | £2 10 0 |
| 408. | Superior Camera, with Rackwork Adjustment, Instantaneous Shutter, four best Lenses, to take four Victorias on 1/4-plate                                                                                                                                     | 3 10 0  |
| 409. | Excellent Camera, with Rackwork Adjustment Repeating Back, and set of Victoria Lenses, to take either four Victorias at once on 1/4-plate, or eight on 7 x 5, in two positions                                                                              | 5 5 0   |
| 410. | Combined Gem and Victoria Camera, best quality, with nine selected Victoria Lenses, Extra Dark Slide, Rackwork Adjustment, and all latest improvements, taking four Victorias on 1/4-plate, nine Victorias on 7 x 5, or 36 Gems on 7 x 5, in four positions | 8 8 0   |

## VICTORIA LENSES.

FINEST QUALITY, 9/- per Lens in sets of two, four, six or nine on plate.  
 SECOND QUALITY, 7/- per Lens in sets of any number.

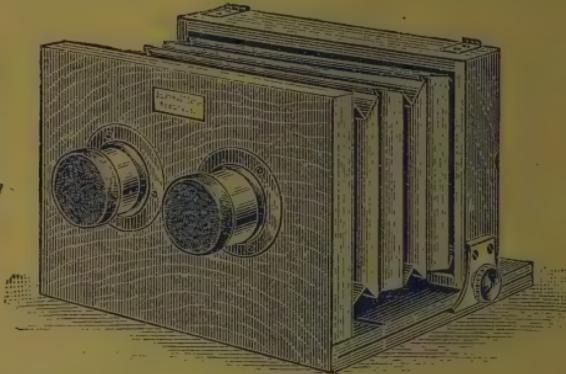
Apparatus for Carte, Midgets, &c. Other Sizes and Combinations to order.

COLMORE ROW, BIRMINGHAM.

J. LANCASTER & SON, Opticians.

# STEREOSCOPIC CAMERAS.

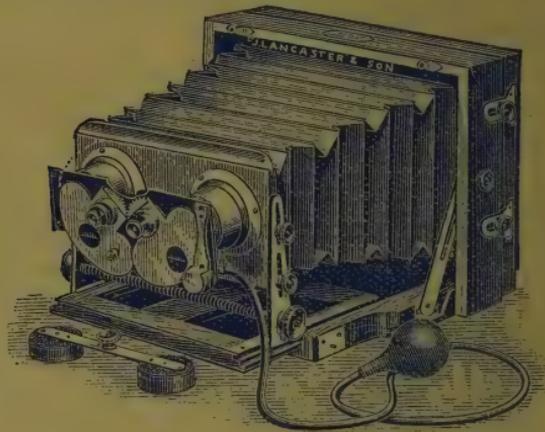
Best Lenses.  
Rapid or Slow  
at will.



Cameras  
Best Make,  
Portable.

## Stereo Merveilleux.

- |     |                                                                                                                              |     |   |   |   |
|-----|------------------------------------------------------------------------------------------------------------------------------|-----|---|---|---|
| 419 | THE STEREO MERVEILLEUX consists of a well made mahogany Camera, with one Double Slide, pair of good Lenses, and Camera Stand | £2  | 2 | 0 |   |
| 420 | THE STEREO MERITOIRE, much superior                                                                                          | ... | 3 | 3 | 0 |



## Stereo Instantograph.

- |     |                                                                                                                                                                                              |     |   |   |   |
|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|---|---|---|
| 421 | THE STEREO INSTANTOGRAPH is a most excellent apparatus, with Instantaneous Shutter, best Lenses and Stand; the Slide measures $6\frac{3}{4} \times 3\frac{1}{4}$                             | £4  | 4 | 0 |   |
| 422 | THE STEREO INSTANTOGRAPH, with an arrangement for taking plates $7\frac{1}{2} \times 4\frac{1}{2}$ and smaller plates, and extra bellows for Stereo Work, a splendid Camera for general work | ... | 5 | 5 | 0 |

RECTIGRAPH LENSES fitted to 421 and 422, £2 2 0 extra.

DOUBLE DRY SLIDES, 419 and 420, 10/6; 421, 12/6; 422, 15/- each.

COLMORE ROW, BIRMINGHAM.

J. LANCASTER & SON, Opticians.

**CASES FOR CAMERAS.**



**THE LEATHER-BOUND CASE.**

A WELL-MADE CASE,  
TO CARRY CAMERA LENS, AND THREE  
SLIDES.

$\frac{1}{2}$ , 7/6;  $\frac{3}{4}$ , 10/6;  $1\frac{1}{4}$ , 15/-; 10 x 8 21/-  
12 x 10, 25/-; 15 x 12, 30/-

These Cases are strong and are  
lined with Green Baize.

**WATERPROOF CASES**

WITH SHOULDER STRAPS.

$\frac{1}{2}$ , 5/-;  $\frac{3}{4}$ , 7/6;  $1\frac{1}{4}$ , 10/-; 10 x 8, 12/6  
12 x 10, 15/-; 15 x 12, 17/6.

**BEST LEATHER CASES.**

THESE are made out of the  
best Hide, lined with velvet,  
with partitions to carry Camera,  
Lens, three Slides, Tail-board,  
etc. Nickel plated Lock and Key,  
Hand and Shoulder Straps.

$\frac{1}{2}$ , 17/6;  $\frac{3}{4}$ , 25/-;  $1\frac{1}{4}$ , 35/-; 10 x 8, 42/-;  
12 x 10, 45/-; 15 x 12, 50/-

OTHER SIZES MADE TO ORDER.



COLMORE ROW, BIRMINGHAM.

J. LANCASTER & SON, Opticians.

# "LANCASTER" DRY PLATES.

OUR PLATES have now been sufficiently long before the public, and have been so well received as to need no commendation from ourselves. We shall still use every endeavour to maintain the reputation we have acquired as Dry Plate Manufacturers.

**ORDINARY, about 10 Times Wet. EXTRA RAPID, about 40 Times Wet.**

*Per dozen, with full instructions.*

|                    | $\frac{1}{2}$ | 5 x 4 | $\frac{3}{4}$ | $\frac{1}{2}$ | 10 x 8 | 12 x 10 | 15 x 12 |
|--------------------|---------------|-------|---------------|---------------|--------|---------|---------|
| Ordinary ... ..    | 1/3           | 2/-   | 3/-           | 5/6           | 9/6    | 13/-    | 20/-    |
| Extra Rapid ... .. | 1/6           | 2/6   | 3/6           | 6/6           | 10/6   | 15/-    | 25/-    |

**STEREOSCOPIC PLATES.**—Ordinary, 2/9; Rapid, 3/- per doz.

**SETS OF SOLUTIONS for Developing One Dozen Plates:—**

$\frac{1}{2}$ -plate, 1/;  $\frac{3}{4}$ -plate, 1/6;  $\frac{1}{2}$ -plate, 2/-

## PRINTING MATERIALS.

SET OF PRINTING MATERIALS, INCLUDING SENSITISED PAPER, TONING AND FIXING SOLUTIONS, PRINTING FRAME, PORCELAIN AND EBONITE DISHES, AND INSTRUCTIONS, FOR  $\frac{1}{2}$ -PLATE

|                                        |        |
|----------------------------------------|--------|
| Ditto, ditto, for $\frac{1}{2}$ -plate | £0 5 0 |
| " " " $\frac{3}{4}$ "                  | 0 10 6 |
| " " " 10 x 8 plate                     | 0 15 0 |
|                                        | 1 1 0  |

**SENSITISED PAPER.**—Best quality only, per sheet, 1/-; 3 sheets, 2/6; 6 sheets, 4/6 quire, 13/6. Tin Cans, to hold one quire, 1/6.

### DEVELOPING DISHES.

|                  | $\frac{1}{2}$ | $\frac{3}{4}$ | $\frac{1}{2}$ | 10 x 8 | 12 x 10 | 15 x 12 |
|------------------|---------------|---------------|---------------|--------|---------|---------|
| Best only ... .. | -/6           | 1/-           | 2/-           | 3/-    | 4/6     | 7/-     |

### PORCELAIN DISHES, &c

|                | $\frac{1}{2}$ | $\frac{3}{4}$ | $\frac{1}{2}$ | 10 x 8 | 12 x 10 | 15 x 12 |
|----------------|---------------|---------------|---------------|--------|---------|---------|
| Shallow ... .. | -/9           | 1/6           | 2/3           | 3/-    | 4/-     | 5/-     |
| Deep ... ..    | -/10          | 1/8           | 2/6           | 3/4    | 5/-     | 7/6     |



**LANCASTER'S**

## NEW LANTERN SLIDE PRINTING FRAME.

This Printing Frame is so made that any part of plate can be copied.

Price 9d. and 1/- each.

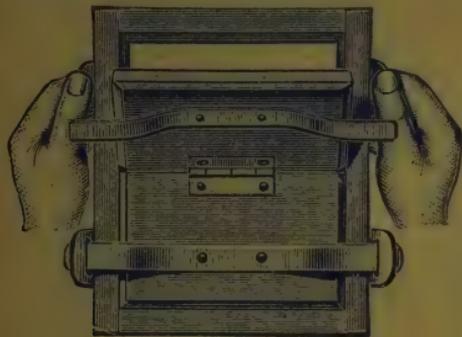
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J. LANCASTER & SON, Opticians.

# Printing Frames.



|                              |               |               |               |      |       |       |
|------------------------------|---------------|---------------|---------------|------|-------|-------|
| Cheap Printing Frames ... .. | $\frac{1}{2}$ | $\frac{1}{2}$ | $\frac{1}{2}$ | 10x8 | 12x10 | 15x12 |
| Best Quality ... ..          | -/6           | 1/-           | 1/6           | 2/-  | 3/-   | 4/-   |
|                              | -/9           | 1/6           | 2/3           | 3/-  | 4/3   | 5/3   |



## NEW PRINTING FRAME.

WITH SIDE CLIP ARRANGEMENT.

$\frac{1}{2}$ -pl., -/9;  $\frac{1}{2}$ -pl., 1/6;  
 $\frac{1}{2}$ -pl., 2/3; 10x8, 3/-

## LANCASTER'S

### New Mahogany Triple-pressure Printing Frames,

enabling both ends of Print to be examined at same time without the least fear of moving Print.

$\frac{1}{2}$ , 1/6;  $\frac{1}{2}$ , 2/3; Stereo, 2/3;  $\frac{1}{2}$ , 3/6; 10x8, 4/9; 12x10, 6/-;  
 15x12, 7/6 each.

This is a perfect Printing Frame, no unequal pressure and no breaking of negatives. The Frames are well made and very durable.

## PLATE BOXES, &c.-I

|                                                                             |               |               |               |      |       |       |
|-----------------------------------------------------------------------------|---------------|---------------|---------------|------|-------|-------|
|                                                                             | $\frac{1}{2}$ | $\frac{1}{2}$ | $\frac{1}{2}$ | 10x8 | 12x10 | 15x12 |
| White Wood Plate Boxes to hold 12 ...                                       | 1/-           | 1/9           | 2/6           | 4/-  | 5/-   | 7/-   |
| Ditto ditto " 25 ...                                                        | 1/6           | 2/3           | 3/6           | 5/6  | 7/-   | 9/6   |
| Ditto ditto " 50 ...                                                        | 2/-           | 3/-           | 4/-           | 6/6  | 8/-   | 10/6  |
| Draining Racks, 12 ... ..                                                   | 1/3           | 1/6           | 2/-           |      |       |       |
| " " 24 ... ..                                                               | 1/6           | 2/-           | 2/6           |      |       |       |
| Mahogany or Walnut Plate Boxes, with<br>Lock and Key, to hold 12 Plates ... | 3/-           | 4/-           | 6/-           | 8/6  | 10/6  | 12/6  |
| Vignette Glasses ... ..                                                     | each -/9      | 1/6           | 2/3           | 3/-  | 4/6   |       |

CARDS, Carte Size, 1/-, 1/3, 1/6, 1/8, 2/-, 3/- and 4/- per 100.  
 " Cabinet Size, 6d., 8d., 1/- and 1/6 per dozen.

COLMORE ROW, BIRMINGHAM.



J. LANCASTER &amp; SON, Opticians.

## Sundries—Continued.

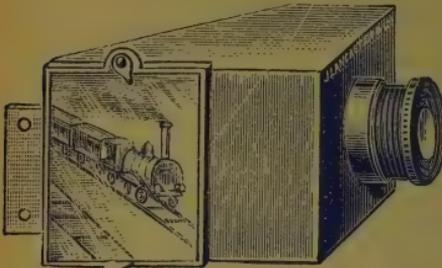
|                                                        | $\frac{1}{2}$ | $\frac{3}{4}$ | $1$  | 10x8 | 12x10 | 15x12 |
|--------------------------------------------------------|---------------|---------------|------|------|-------|-------|
| M. Clip Hinges for Dark Slides, per pair ...           | -.2           | -.2           | -.3  | -.3  | -.4   | -.4   |
| N. Hinges for Focussing Glass, per pair ...            | -.2           | -.2           | -.3  | -.3  | -.4   | -.4   |
| O. Rising Front Screws, each ...                       | -.4           | -.5           | -.6  | -.8  | -.8   | -.8   |
| P. Screws for bottom of Camera, each ...               | -.4           | -.6           | -.6  | -.6  | -.9   | -.9   |
| Q. T Screws for Stands ...                             | -.6           | -.8           | -.8  | 1/-  | 1/-   | 1/-   |
| R. Ears for Stands, per set of six ...                 | -.4           | -.6           | -.9  | 1/-  | 1/-   | 1/4   |
| S. Bushes for Screws, per pair ...                     | -.1           | -.1           | -.1  | -.2  | -.2   | -.2   |
| T. Screw and Butterfly for Stands ...                  | -.6           | -.9           | 1/-  | 1/3  | 1/6   | 1/6   |
| U. T Bushes for Cameras, each ...                      | -.1           | -.2           | -.2  | -.3  | -.3   | -.3   |
| V. Screws for Stands, set of three ...                 | 1/-           | 1/3           | 1/6  | 1/6  | 1/9   | 2/-   |
| W. Straps for Focussing Frame set of four ...          | -.2           | -.3           | -.4  | -.4  | -.4   | -.4   |
| X. Double Hinges for Focussing Frame ...               | -.3           | -.3           | -.4  | -.4  | -.6   | -.6   |
| Y. Toe Caps, all in one piece (three) ...              | -.3           | -.4           | -.4  | -.6  | -.6   | -.6   |
| Z. Hinges for Dark Slides, &c., per pair ...           | -.2           | -.3           | -.4  | -.4  | -.6   | -.6   |
| A' Corner Plates for reversing back, &c., per pair ... | -.3           | -.4           | -.4  | -.6  | -.6   | -.6   |
| B' Corner Plates for Slides, &c., per pair ...         | -.2           | -.2           | -.3  | -.3  | -.4   | -.4   |
| C' Angle Plates for reversing back, &c., per pair ...  | -.2           | -.2           | -.3  | -.3  | -.4   | -.4   |
| Cloth Bellows, ordinary length ...                     | 1/6           | 3/-           | 4/6  | 6/-  | 9/-   | 12/-  |
| " " square ...                                         | 2/-           | 3/9           | 5/6  | 7/6  | 10/-  | 13/-  |
| " " Kinnear ...                                        | 2/6           | 5/-           | 7/6  | 10/- | 15/-  | 18/6  |
| Leather Bellows, ordinary, oblong ...                  | 2/6           | 4/6           | 6/6  | 8/6  | 12/6  | 15/-  |
| " " square ...                                         | 3/-           | 6/-           | 8/6  | 10/6 | 15/-  | 20/-  |
| " " Kinnear ...                                        | 4/-           | 8/-           | 12/6 | 15/- | 21/-  | 30/-  |
| Complete set of Brass Work for 1894 Merveilleux ...    | 5/6           | 7/6           | 10/6 | 12/6 | 15/-  |       |
| Ditto, for 1894 Meritoire ...                          | 7/6           | 10/6          | 12/6 | 15/- | 18/-  |       |
| Ditto, for 1894 Instantograph ...                      | 10/6          | 15/-          | 21/- | 25/- | 30/-  |       |
| Fine Ground Focussing Glass ...                        | -.6           | 1/-           | 1/6  | 2/-  | 2/6   | 3/-   |
| Merveilleux Lens, unmounted ...                        | 3/-           | 6/-           | 10/- | 15/- | 20/-  | 30/-  |
| Instantograph Lens ...                                 | 12/6          | 21/-          | 30/- | 40/- | 50/-  | 60/-  |
| Brass Tops for Stands ...                              | 1/6           | 2/-           | 2/6  | 3/-  | 3/6   | 4/-   |
| Triangle Tops for Stands ...                           | 2/6           | 3/-           | 4/-  | 5/-  | 6/-   | 7/-   |
| Leather Caps for Lenses ...                            | -.6           | -.6           | -.8  | -.8  | 1/-   | 1/-   |
| Black Cardboard for Slides, per doz. ...               | -.6           | -.9           | 1/-  | 1/6  | 2/-   | 2/6   |
| Springs for Printing Frames, per pair ...              | -.3           | -.4           | -.6  | -.8  | -.10  | 1/-   |
| Flanges to Lenses ...                                  | 1/-           | 1/6           | 2/-  | 2/6  | 3/-   | 3/6   |
| Extra Fronts ...                                       | 1/-           | 2/-           | 2/6  | 3/-  | 3/6   | 4/-   |

*Bellows of any size made to order. Dark Slides made to order.*

COLMORE ROW, BIRMINGHAM.

J. LANCASTER & SON, Opticians.

**LANCASTER'S  
NEW FINDER.**



This is an excellent Finder, which can be attached in a second to the side or top of Camera, giving an exact image, covering same field as lens in Camera.

Beautifully finished, 5/-, with two Brackets, one to screw on to side and the other on top of Camera

**Lancaster's Amateurs' Retouching Desk.**

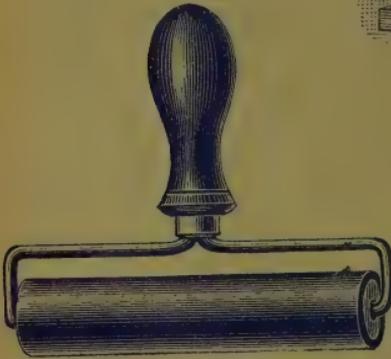
Folding into small compass, fitted with two Retouching Pencils, with side wings.

- 1/2-plate, 5/-; 1/2-plate, 7/6
- 3/4-plate, 10/6;
- 10 x 8, 15/-; 12 x 10, 21/-

**Retouching Desks**

In Polished Mahogany of Highest Finish.

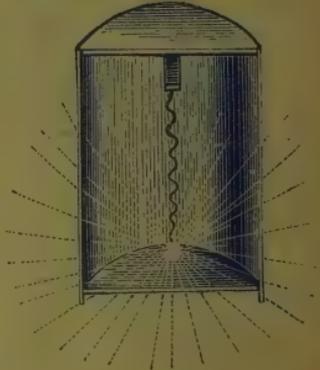
- 1/2, 12/6; 3/4, 15/-; 1, 18/-
- 10 x 8, 22/6; 12 x 10 30/-



Rubber Squeegees, -/9, 1/-, and 1/6  
Print Trimmer, 1/- and 2/6

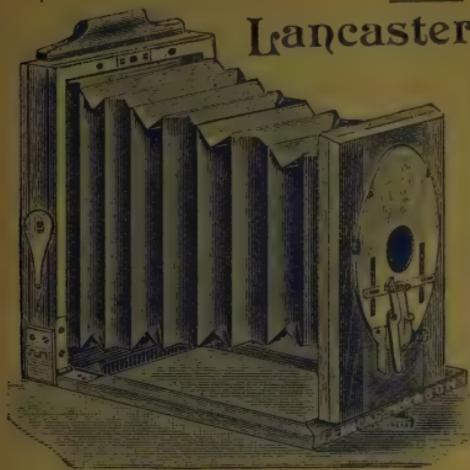
**Magnesium Lamps.**

- For taking Portraits at night 3/6
- Magnesium Ribbon, per yard -/2
- Ditto, per ounce ... 3/-
- Ditto, Torches, each 3/6 and 6/6



J. LANCASTER & SONS, Opticians.

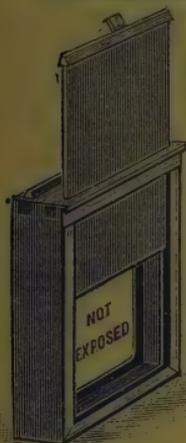
# Lancaster's New Cameras.



A MARVEL OF COMPACTNESS, CLOSES INTO 1 1/4 INCH.

LANCASTER'S "SNAP SHOT" CAMERA (Patent).

This Camera is the most portable ever made. The 1/4-plate Camera, Lens, and Shutter, fold into 1 1/4 in. depth, and weigh 1 lb. The 1/2-plate is equally light and compact.



The Changing Box carries three Double Carriers, which may be filled with Plates, Films, or Bromide Paper. There is no dark slide, and no trouble focussing. The Lens is of fixed focus, and has our "See-saw" Shutter for Instantaneous or Time exposures.

PRICE, COMPLETE.

1/4-plate, £2 2s.; 1/2-plate, £4 4s.



THE "LONG SHOT" CAMERA.

Opens in a second, and carries six plates.

Folds into 1 inch.

1/2, 42/-; 1/4, 84/-

COLMORE ROW, BIRMINGHAM.

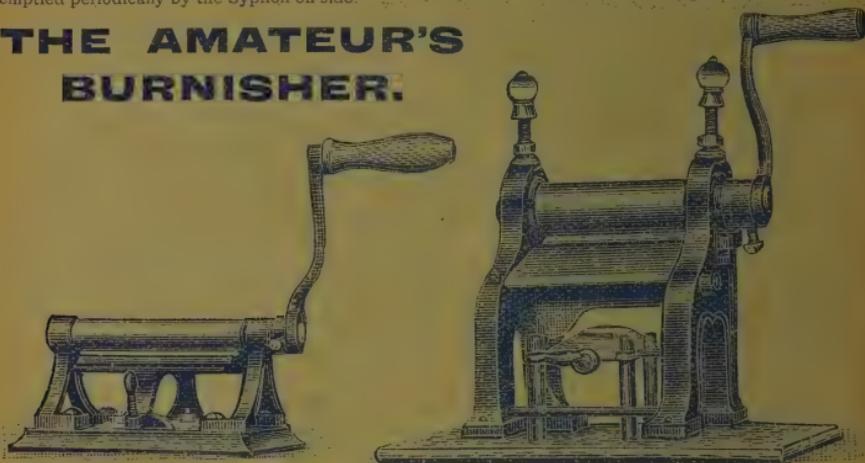
J. LANCASTER &amp; SON, Opticians.

**LANCASTER'S "HIERO" WASHER****FOR NEGATIVES OR PRINTS.**For  $\frac{1}{4}$ -plates, 5/-;  $\frac{1}{2}$ -plates, 7/6;  $\frac{3}{4}$ -plates, 10/6.

EACH HOLDS 26 PLATES.



The "Hiero" Washer consists of a square metal vessel, japanned outside and enamelled white inside. It has two racks to hold the plates which may be used as dryers. The water enters through funnel and passes down centre tube and out of the bent ends, thus causing the funnel and tubes to rotate; this gives a supply of water under the whole of the plates, and keeps up a continuous circulation, the waste being emptied periodically by the Syphon on side.

**THE AMATEUR'S BURNISHER.****Lancaster's Amateurs' Burnishers****WELL MADE AND EXCELLENT IN ACTION.**

Carte, 10/6; Cabinet, 15/-;  $\frac{1}{2}$ , 21/-; 10 x 8, 24/-; 12 x 10, 27/6; 15 x 12, 31/6  
 Superior Quality,  $\frac{3}{4}$ , 15/-;  $\frac{3}{4}$ , 21/-;  $\frac{1}{2}$ , 30/-; 10 x 8, 35/-; 12 x 10, 40/-

COLMORE ROW, BIRMINGHAM.



J. LANCASTER & SON, Opticians.

# Compound Focuser.

To be used without a Cloth ... 2/6.

**A MOST USEFUL ACCESSORY.**

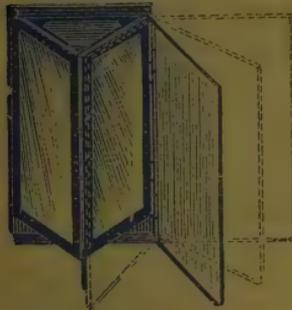


# Ruby Lamps.

+++

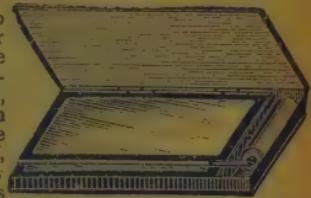
RUBY LAMP with self-feeding arrangement for Candle .. .. 3/-

Ditto, ditto, with Oil Burner .. 2/-



## Lancaster's Patent Folding Lamp.

THIS LAMP folds into  $\frac{3}{4}$  in., and is opened or closed in less than one second. It has a self-feeding Candle Chamber, and when opened, as in wood-cut, may have the door closed on one half, giving only darkest Ruby light, and may, as developing proceeds, be gradually opened, thus regulating amount of light to the greatest possible nicety. 5/-



### LIGHT-TIGHT PLATE BOXES.

Made of Metal, blackened, to hold 1 dozen

|                                      |     |     |     |        |
|--------------------------------------|-----|-----|-----|--------|
| 1-plates                             | ... | ... | ... | £0 1 6 |
| Ditto, 1 dozen $\frac{1}{2}$ -plates | ... | ... | ... | 0 3 0  |
| " 1 " $\frac{1}{2}$ " "              | ... | ... | ... | 0 4 6  |
| " 1 " 10 x 8 "                       | ... | ... | ... | 0 6 0  |
| " 1 " 12 x 10 "                      | ... | ... | ... | 0 7 6  |

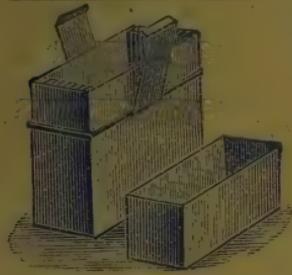
EBONITE TWEEZERS, 3d. per pair.

GLASS MEASURES, common, 4d. and 6d each.

best, 1-oz., 9d.; 2-oz., 1/-; 4-oz., 1/3; 6-oz., 1/6; 8-oz., 1/9; 20-oz., 2/6.

GLASS FUNNELS, 4d., 6d. 9d., and 1/-

BOXES OF SCALES AND WEIGHTS, with Brass Pans, 3/- Ditto, with Glass Pans, 4/-

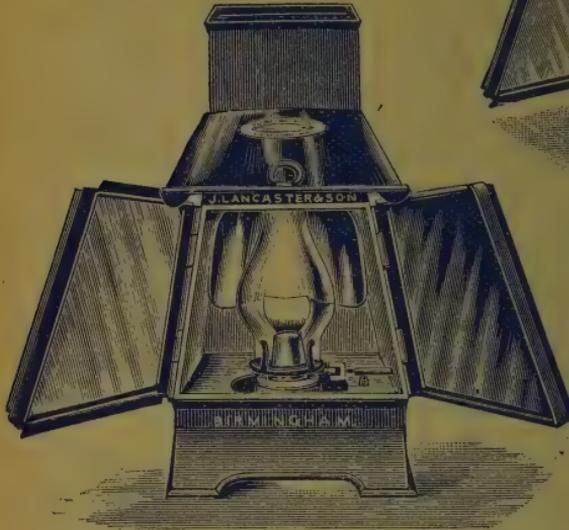


CUTTING SHAPES, Carte, 6d.; Cabinet 1/-; Full Plate, 2/-; 10 x 8, 3/-  
 OVAL " 9d. " 1/6 " 2/6 " 3/6.  
 FOCUSsing CLOTH, 1/6. VELVET Ditto, 2/6.

COLMORE ROW, BIRMINGHAM.

J. LANCASTER & SON, Opticians.

## LANCASTER'S New Dark Room Lamp



### THE RUBRALUX PATENT.

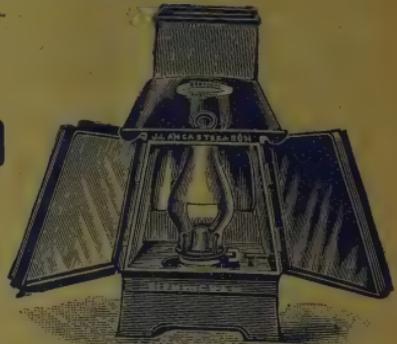
THIS Lamp is said to be the best ever invented for the Dark Room. The Rubralux consists of a paraffin lamp giving a large amount of light, with a parabolic reflector reflecting the light forward and downwards.

There are two folding glazed doors, one Ruby and the other Canary Yellow. Each can be used separately or both together. The front is hinged and lined with a silver red reflector, which floods the plate with Ruby light, and prevents any light reaching the eye of operator excepting that reflected from plate.

### LARGE PARABOLOID LAMP.

THIS is an excellent Lamp for a large room; it gives a large amount of light, and has sliding frames containing coloured screens. It is made with Oil Burner, and also with Solar Gas Burner.

|                               |     |      |
|-------------------------------|-----|------|
| Oil Paraboloid Lamp, complete | ... | 10/6 |
| Gas " " " " " "               | ... | 17/6 |

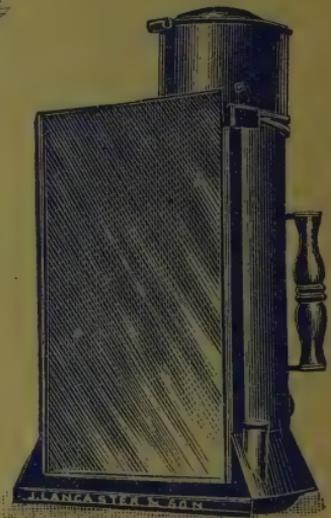


LANCASTER'S NEW  
"RUBRALUX" LAMP.

Price - 7/6

Larger Lamp .. 10/6

Ditto, for Gas .. 12/6



COLMORE ROW, BIRMINGHAM.

J. LANCASTER &amp; SON, Opticians.

# Lancaster's Multum-in-Parvo Camera.

FOR ENLARGING AND REDUCING.

THE MULTUM-IN-PARVO CAMERA can be used with any ordinary Camera, and may be used for enlarging, copying same size, or reducing. Also for Lantern Transparencies.

**A CAPITAL DAYLIGHT ENLARGING APPARATUS.**

**FOR ENLARGING.**—The Negative must be placed in a Dark Slide of ordinary Camera, and the enlargement taken in Multum-in-Parvo, the plate going into the end of Camera.

**FOR COPYING same size,** the two Cameras must be opened out equally to about twice the length of focus of lens used.

**FOR REDUCING.**—The Negative must be placed in Multum-in-Parvo Camera, and Plate put into Dark Slide of ordinary Camera.

## PRICES.

|                                       |             |                              |            |
|---------------------------------------|-------------|------------------------------|------------|
| To enlarge up to $\frac{1}{2}$ -plate | ... £0 10 6 | To enlarge up to 18x16-plate | ... £3 0 0 |
| " " $\frac{3}{4}$ "                   | ... 0 15 0  | " " 20x18 "                  | ... 3 15 0 |
| " " 1 "                               | ... 1 1 0   | " " 24x20 "                  | ... 4 4 0  |
| " " 10x8-plate                        | ... 1 5 0   | " " 30x24 "                  | ... 5 5 0  |
| " " 12x10 "                           | ... 1 10 0  | " " 36x30 "                  | ... 8 8 0  |
| " " 15x12 "                           | ... 2 0 0   |                              |            |

Extra Slides:— $\frac{1}{2}$ , 5/-;  $\frac{3}{4}$ , 7/8; 1, 10/-; 10x8, 13/6; 12x10, 16/-; 15x12, 20/-

The Amount of Enlargement or Reduction can be varied to any amount.

## REQUISITES FOR LANTERN SLIDES.



PAPER MASKS  $3\frac{1}{2}$  in. Square.—In Shapes, Oblong Cushion, Circle Cushion, Oval, and Dome, 3/ per dozen; 3/- per gross.

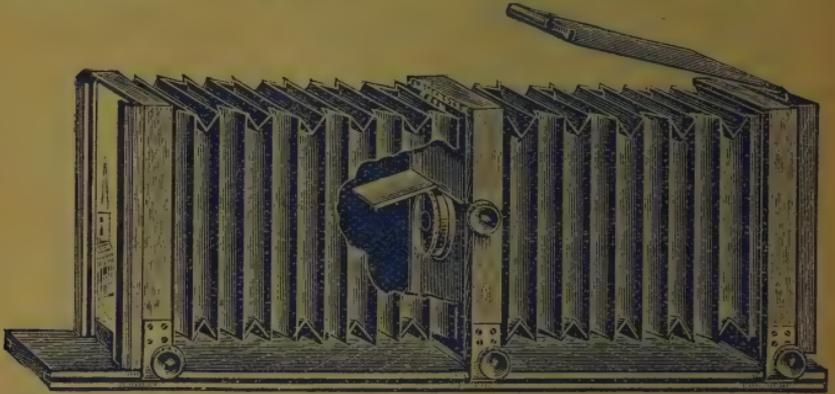
BEST POLISHED CROWN COVER GLASSES,  $3\frac{1}{2}$  in. square, for Mounting Transparencies, 6d. per dozen; 5/- per gross.

ADHESIVE BINDING STRIPS.—1d. per dozen; 1/- per gross.

COLMORE ROW, BIRMINGHAM.

J. LANCASTER & SON, Opticians.

# LANCASTER'S LANTERN SLIDE MULTUM-IN-PARVO.



**T**HIS is a well-made Camera, with Double Bellows, Mahogany Slide, and Focussing Slide; excellent Lens with Shutter. The Camera can be used for copying prints, photographs, etc., exactly as an ordinary Camera, and for making Lantern Slides it is used as represented in wood-cut.  
Camera, Lens, Flap Shutter, etc.,  $\frac{1}{2}$ -plate, 21/-



**F**OR Lantern Slides from larger plates an "Adapter" is required; this slides into one end of "Multum-in-Parvo," and can be had for any size plate.  
 $\frac{1}{2}$ -plate, 3/-  $\frac{1}{3}$ -plate, 4/- 10 x 8, 5/- 12 x 10, 6/- 15 x 12, 7/6.

COLMORE ROW, BIRMINGHAM.

J. LANCASTER & SON, Opticians.

**LANCASTER'S**

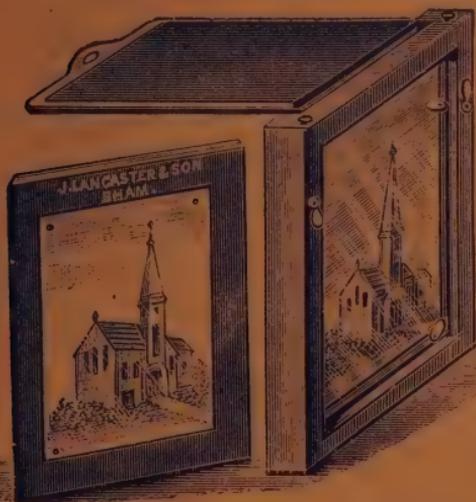
**Combination Multum-in-Parvo.**



THIS is a well-made Camera with Double Bellows, the front board detachable, so that Camera and Lens may be used for ordinary work. The Lens is an Achromatic one, specially constructed for enlarging and reducing. Each Set consists of Camera, Dark Slide, and Achromatic Lens.

‡ Combination Multum-in-Parvo, 35/-

10 x 8, 42/-; 12 x 10, 50/-; 15 x 12, 63/-; 18 x 16, 105/-; 24 x 20, 128/-



The Dark Slide will hold either a Dry Plate or Bromide Paper, and can have Carriers to carry any size plate.

**EXTRA SLIDES.**

|         |     |     |     |      |
|---------|-----|-----|-----|------|
| ‡       | ... | ... | ... | 10/- |
| 10 x 8  | ... | ... | ... | 13 6 |
| 12 x 10 | ... | ... | ... | 16/- |
| 15 x 12 | ... | ... | ... | 20/- |
| 18 x 16 | ... | ... | ... | 30/- |
| 24 x 20 | ... | ... | ... | 35/- |

**CARRIERS, Each.**

|                 |     |     |     |     |
|-----------------|-----|-----|-----|-----|
| ‡, ‡, ‡         | ... | ... | ... | 1/- |
| 10 x 8, 12 x 10 | ... | ... | ... | 1 6 |
| 15 x 12         | ... | ... | ... | 1 6 |
| 18 x 16         | ... | ... | ... | 3/- |
| 24 x 20         | ... | ... | ... | 3 6 |

COLMORE ROW, BIRMINGHAM.

J. LANCASTER & SON, Opticians.

The "Lancaster"  
**ENLARGING LANTERN.**

THIS LANTERN has a pair of our best Condensers, mounted in Brass, Three-wick Lamp, giving a brilliant light, producing excellent enlargements, and a new formula double Achromatic Objective, and Carrier for Negative.

With our enlarging Lantern first-class enlargements can be obtained with the greatest ease.



427 With 5in. Condensers ... £3 3 0 | 428 With 6in. Condensers ... £4 4 0



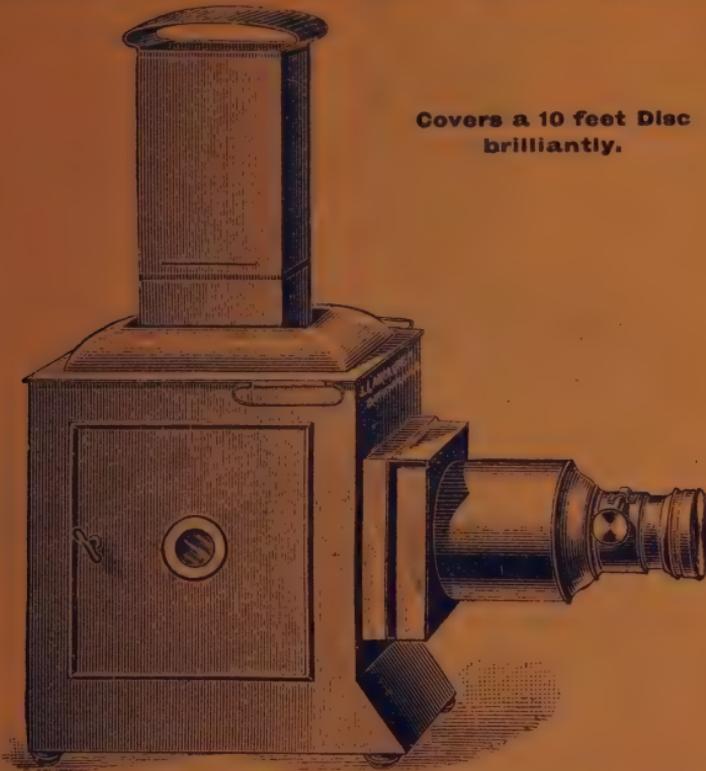
First Quality Enlarging Lantern, with best Objectives, giving exquisite definition.

|     |                          |         |     |                           |          |
|-----|--------------------------|---------|-----|---------------------------|----------|
| 429 | With 6in. Condensers ... | £6 6 0  | 433 | With 10in. Condensers ... | £12 12 0 |
| 430 | " 7in. " ...             | 8 8 0   | 434 | " 11in. " ...             | 14 14 0  |
| 431 | " 8in. " ...             | 9 9 0   | 435 | " 12in. " ...             | 16 16 0  |
| 432 | " 9in. " ...             | 10 10 0 |     |                           |          |

COLMORE ROW, BIRMINGHAM.

J. LANCASTER & SON, Opticians.

**LANCASTER'S  
AMATEUR ENLARGING AND HOME LANTERN.**



Covers a 10 feet Disc  
brilliantly.

THESE Lanterns are well made. have best 4in. Condensing Lenses, and Achromatic Object Lenses. They will enlarge up to 30 x 24, and will, as a Home Lantern, cover a 10 feet disc.

- 438 Lantern, with 4in. Condensers, Achromatic Front, and Three-wick Lamp £1 7 6  
 453 Ditto, with Brass Fronts, Rackwork Adjustment, 4in. Condensers, and Best Front Lenses ... .. 2 2 0  
 453A Ditto ditto with 5in. Condensers... .. 2 17 6

**BEST QUALITY CONDENSERS, Mounted in Brass.**

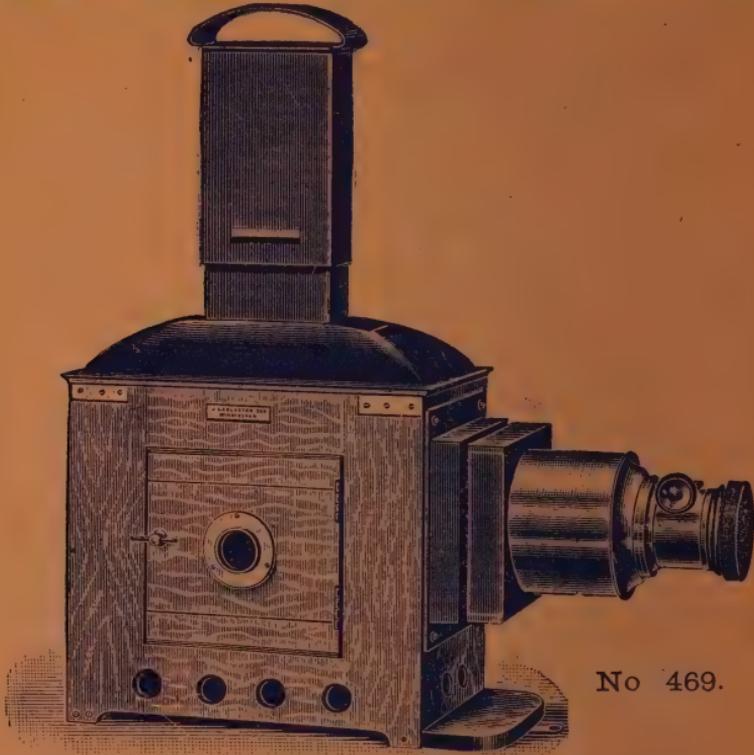
|               |               |               |                 |                 |
|---------------|---------------|---------------|-----------------|-----------------|
| 4in. ... 12/6 | 6in. ... 35/- | 8in. ... 65/- | 10in. ... 110/- | 12in. ... 180/- |
| 5in. ... 21/- | 7in. ... 50/- | 9in. ... 80/- | 11in. ... 140/- |                 |

ACHROMATIC OBJECTIVES in Rack Mounts, 12/6, 15/-, 21/- each. TRIPLE-WICK LAMPS, 10/6 each. FOUR-WICK LAMPS, 13/6 each. ARGAND GAS LAMP, giving beautiful light for enlarging purposes, fitted on Stand, 10/.

**COLMORE ROW, BIRMINGHAM.**

J. LANCASTER & SON, Opticians.

# The New Model "1893 Excelsior."



No 469.

**T**HE "EXCELSIOR" is made of Mahogany, Brass Bound, and has 4in. best Condensers, mounted in Brass, with Ventilation Apertures to prevent Condensing Lenses steaming during exhibition. Special Achromatic Front, with large Back Combination, giving brilliant definition, and covering well a 12ft. disc, with crispness, from centre to margin.

Our new Four-wick Lamp, with the light concentrated into smallest possible space, and giving brilliant illumination in every part of a 12ft. disc; new system of ventilation, in which air currents enter between the wicks, producing maximum of light from Hydrocarbons burnt.

**The whole, packed in Polished Wood Case, with Handle, Lock, and Key 63/-**

|                                                                                              |        |
|----------------------------------------------------------------------------------------------|--------|
| Our New Dissolver, giving the most perfect dissolving effects possible with a single Lantern | £0 5 0 |
| New Dissolving Slide                                                                         | 0 3 6  |
| Achromatic Microscope, adaptable to any Lantern, with double combination power, &c.          | 1 1 0  |
| Ditto, ditto, three power                                                                    | 2 2 0  |

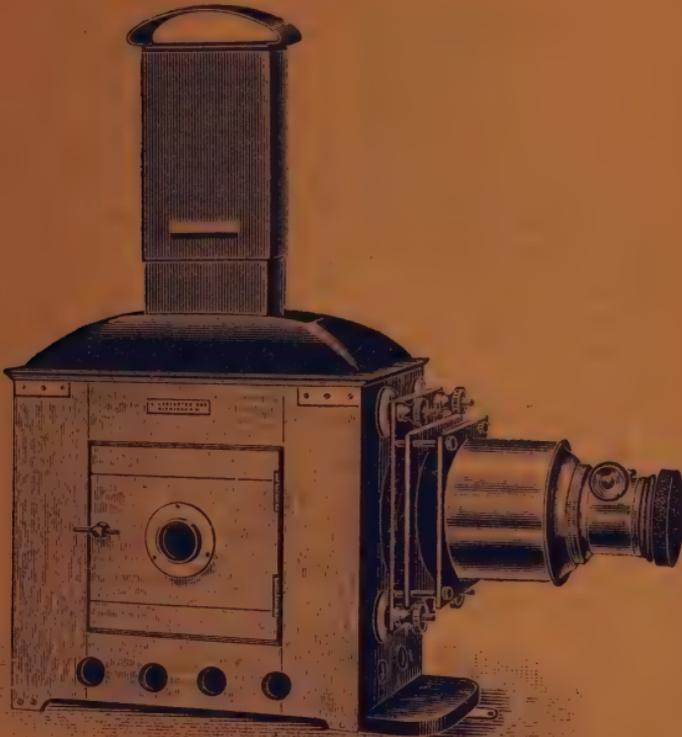
COLMORE ROW, BIRMINGHAM.

J. LANCASTER & SON, Opticians.

**LANCASTER'S**

# Improved Model 'Excelsior'

(PATENT).



No. 469 B.

**I**MPROVED "EXCELSIOR." This is a new Lantern on the model of "Excelsior," but with considerable improvements. The whole of the front stages are of strong, well finished brass. The Lamp is one of our latest productions, and the Front Combination is our new Patent Objective, giving an almost infinite variety of different sized pictures at one distance, with perfect definition at all sizes.

Price complete, in polished box, with lock and key, 84/-

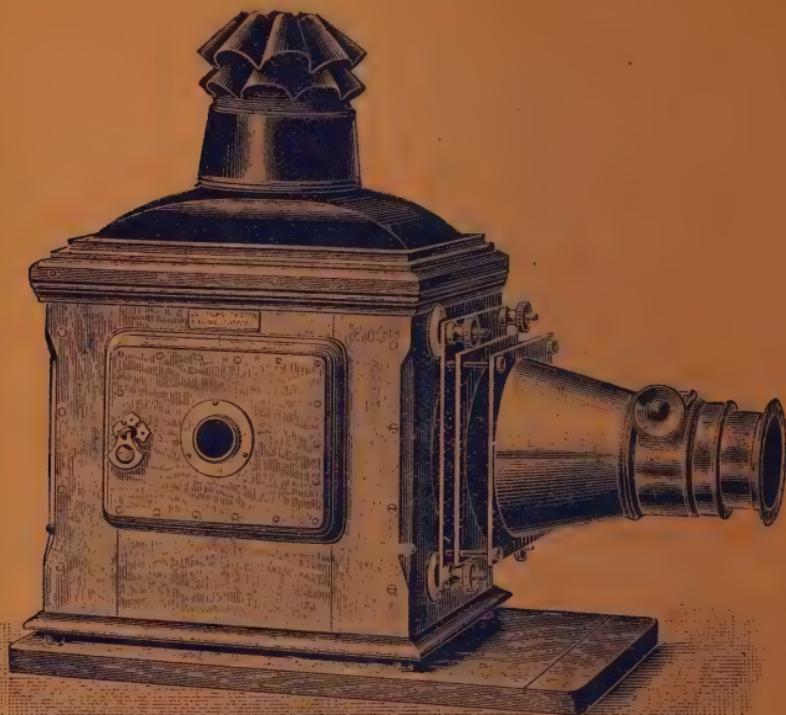
This Lantern is the most compact and perfect ever introduced.

COLMORE ROW, BIRMINGHAM.

J. LANCASTER & SON, Opticians.

FIRST QUALITY

# Optical Lantern.



No. 470.

**A** SUPERB LANTERN with all modern improvements. Finest quality Condensers, 4in. diameter; Triple Achromatic Object Lenses, giving same sized pictures at seven different distances, thus a 20ft. disc at any distance between 16ft. and 70ft. from the screen, or seven different sizes at one distance. Built in finest mahogany, in best possible manner, and on best mahogany base.

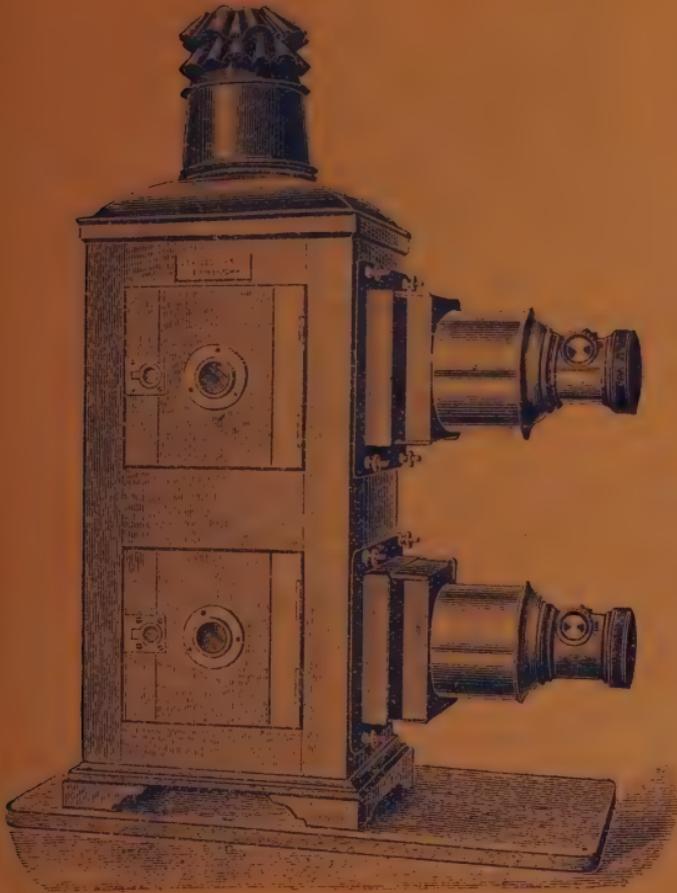
The whole in polished case, with lock and key, 126/-

|                                                                   |        |
|-------------------------------------------------------------------|--------|
| Best Blow-through Gas Jet, Bag, Board, Tubing, &c. ... ..         | £3 3 0 |
| Best Oxy-hydrogen Jet, with pair of Bags, Boards, Tubing, &c. ... | 4 15 0 |

COLMORE ROW, BIRMINGHAM.

J. LANCASTER & SON, Opticians.

# BIUNIAL LANTERN



No. 471.

**T**HIS is a well made and strongly built Biunial in mahogany, well lined with metal casing, and ventilated. Best 4 in. Double Combination Condensers, Achromatic Compound Object Lenses, in rack mounts. All Brass Stages, with sliding adjustment; new adjusting and obanging centring arrangement, so that a perfect coincidence of discs is quickly obtained.

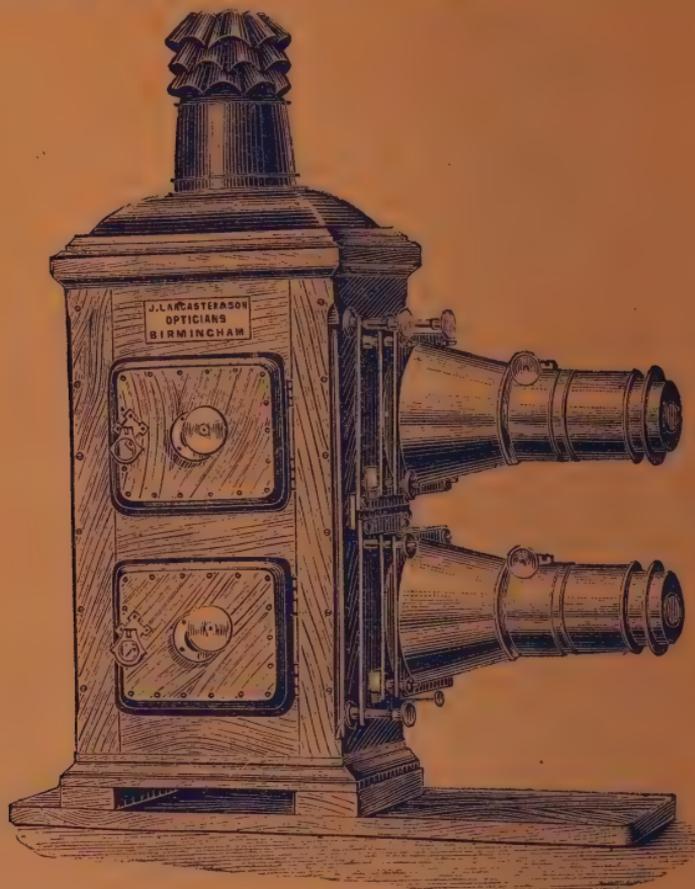
Complete, 126/-

- Pair Blow-through Jets, Cog-wheel Lime Adjustment, Gas Bag, Board, Retort, Purifier, or Compressed Gas Cylinder, Dissolver, &c. ... .. **£4 4 0**
- Ditto, Oxy-hydrogen Jets, Platinum Points, pair of Bags, Boards, &c., complete ... .. **6 6 0**
- Strong polished Cabinet, with drawer, etc., to carry Biunial, &c.

**COLMORE ROW, BIRMINGHAM.**

J. LANCASTER &amp; SON, Opticians.

# BIUNIAL LANTERN.



No. 472.

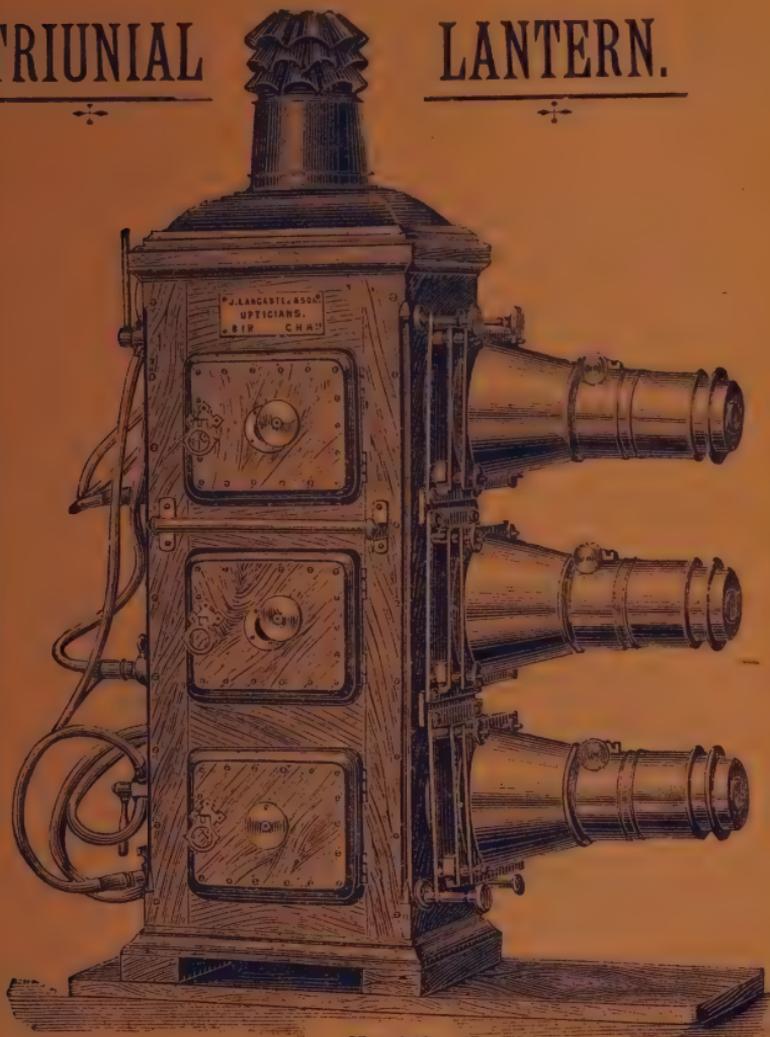
- |                                                                                                                                                                                                                                                                | £  | s. | d. |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|
| 472. First quality Mahogany Biunial, with best 4in. Condensers, Triple Achromatic Objectives, mounted in best Brass Fronts, Cones and Sliding Tubes, giving a 20ft. disc at any distance from screen. In Cabinet, with drawers and space for all extras ... .. | 12 | 12 | 0  |
| 473. Pair Blow-through Jets, Cog-wheel Lime Adjustment, Gas Bag, Board, Retort, Purifier, or Compressed Gas Cylinder, Dissolver, &c.                                                                                                                           | 4  | 4  | 0  |
| 474. Ditto, Oxy-hydrogen Jets, Platinum Points, pair Bags, Boards, &c., complete ... ..                                                                                                                                                                        | 6  | 6  | 0  |

COLMORE ROW, BIRMINGHAM.

J. LANCASTER & SON, Opticians.

TRIUNIAL

LANTERN.



Contains all Modern Improvements

Best Money can Purchase.

No. 476. BRIGHT SHAM

|     |                                                                                                                                  |    |    |    |
|-----|----------------------------------------------------------------------------------------------------------------------------------|----|----|----|
| 476 | Mahogany Triunial, with 4in. Condensers, Achromatic Fronts, &c..                                                                 | £  | s. | d. |
|     | Top Lantern to be used separately when required . . . . .                                                                        | 8  | 8  | 0  |
| 476 | First Quality Triunial, as Best Biunial . . . . .                                                                                | 17 | 10 | 0  |
| 477 | Three Blow-through Jets, and complete set of apparatus for Triunial,<br>or Compressed Gas Cylinder in place of Gas Bag . . . . . | 6  | 6  | 0  |
| 478 | Oxy-hydrogen Jets, &c., &c. . . . .                                                                                              | 9  | 9  | 0  |

COLMORE ROW, BIRMINGHAM.

J. LANCASTER & SON, Opticians.

# APPARATUS FOR OPTICAL LANTERNS.

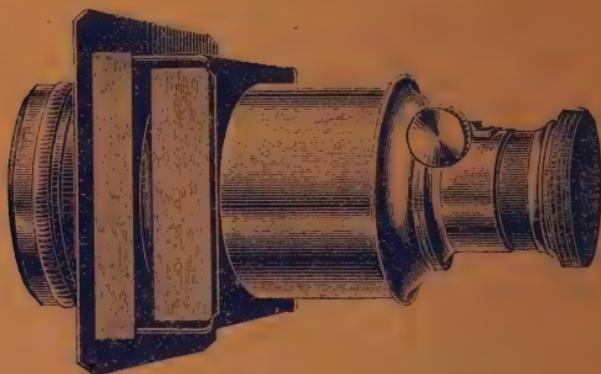


£ s. d.

- 444 Best Condensing Lenses, mounted in Brass, with Ventilation arrangement. 4in., 12/6; 5in., 21/-; 6in., 35/-; 7in., 50/-; 8in., 65/-; 9in., 80/-; 10in., 110/-

WE MAKE ONLY BEST QUALITY.

- 445 Rackwork Fronts, with 2in. Lenses, Meniscus Form .. 0 7 6  
 446 Achromatic Double Combination Fronts in Rackwork .. 0 12 6  
 447 A Superior ditto ditto .. 0 15 0  
 448 Triple Combination, Achromatic Front, giving a 20ft. or any other size Disc at seven different distances. In Rackwork, with Lengthening Tubes .. 2 10 0



No. 449.

- 449 Optical Portion of Lantern, with best 4in. Condensers, and best Achromatic Front, Brass Mounted .. 1 7 6  
 450 Tin Bodies for Lanterns, from .. 0 10 0  
 451 Mahogany Bodies for Single Lanterns .. 0 15 0  
 452 Ditto ditto for Biunials, from .. 1 15 0  
 Oxygen Mixture, per lb. .. 0 1 0  
 Lime Cylinders, per dozen .. 0 3 6

COLMORE ROW, BIRMINGHAM.

J. LANCASTER &amp; SON, Opticians.

## APPARATUS FOR OPTICAL LANTERNS.

|                                                     | s. | d.   |
|-----------------------------------------------------|----|------|
| 454 Oxy-calcium                                     | 0  | 12 6 |
| 455 Oxy-hydrogen Blow-through Jets, of good quality | 0  | 12 6 |



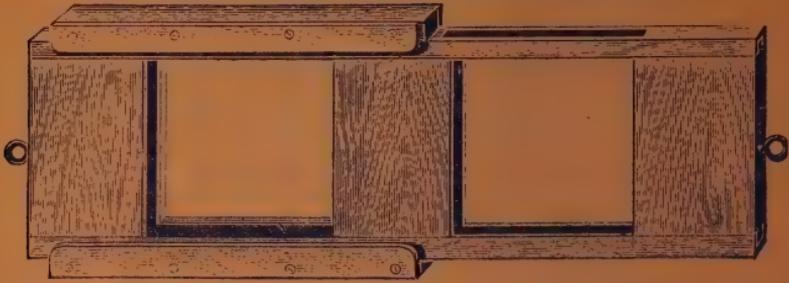
|                                                                                   |   |      |
|-----------------------------------------------------------------------------------|---|------|
| 456 Best Oxy-hydrogen Blow-through Jet, with Rack Adjustment to Lime Cylinder     | 0 | 15 0 |
| 457 Oxy-hydrogen High Pressure Jet, with Lancaster's Packing, and Platinum Nozzle | 0 | 18 0 |



|                                                                                                                                                                                     |       |                 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-----------------|
| 458 Lancaster's Best High Pressure Jet, with Safety Packing in Chamber, producing perfect admixture of gas, and pure combustion in flame, with Rackwork Adjustment to Lime Cylinder | 1     | 1 0             |
| 460 Three-wick Lamps                                                                                                                                                                | 0     | 10 6            |
| 461 Four " "                                                                                                                                                                        | 0     | 13 6            |
| 462 Argand Gas Burner, mounted for Lantern                                                                                                                                          | 0     | 10 6            |
| 463 Gas Bags                                                                                                                                                                        | 25/-  | 30/- 42/- 3 3 0 |
| 464 Pressure Boards, per pair, from                                                                                                                                                 | 1     | 0 0             |
| 465 Retorts for Oxygen                                                                                                                                                              | 0     | 8 6             |
| 466 Six-way Tap Dissolvers                                                                                                                                                          | 0     | 15 0            |
| 467 Best Linen Sheets, 8ft., 21/-; 10ft., 30/-; 12ft., 40/-                                                                                                                         | 15ft. | 3 0 0           |
| 468 Oxygen Gas Cylinders with Valve, 5ft., 35/-; 10ft., 60/-                                                                                                                        | 15ft. | 3 10 0          |

COLMORE ROW, BIRMINGHAM.

**J. LANCASTER & SON, Opticians.**

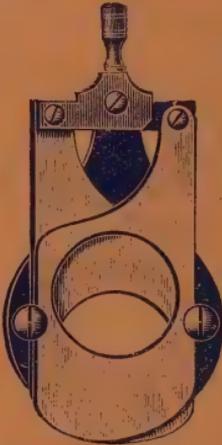


**LANCASTER'S DISSOLVING SLIDE.**

To use with their Lantern Dissolver, in Mahogany and Brass Runners. **PRICE, 3/6.**

**Lancaster's Dissolver.**

To use with a Single Lantern, giving with Dissolving Slide a most perfect Dissolving Effect. **Price, 5s.**



**LANCASTER'S NEW READING LAMP.**

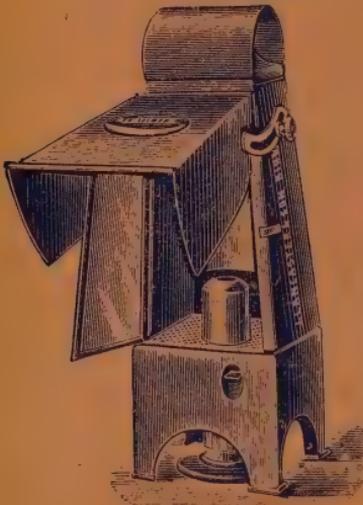
THE  
ALBOLUX"  
PATENT.



THIS Lamp carries a candle which burns for over two hours. It has parabolic reflector, ground-glass screen, and shield reflector, giving a beautifully soft light on the manuscript.

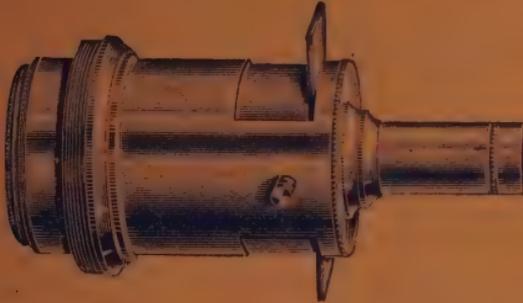
|                                           |     |     |                         |       |
|-------------------------------------------|-----|-----|-------------------------|-------|
| "ALBOLUX" No. 1                           | ... | ... | ...                     | s. d. |
|                                           |     |     |                         | 5 0   |
| Ditto, No. 2, larger size, with bell, &c. |     |     |                         | 7 6   |
| For No. 1 Candles, 1/- per dozen.         |     |     | For No. 2               |       |
|                                           |     |     | Candles, 2/6 per dozen. |       |

**COLMORE ROW, BIRMINGHAM.**



J. LANCASTER &amp; SON, Opticians.

# Apparatus for Optical Lanterns

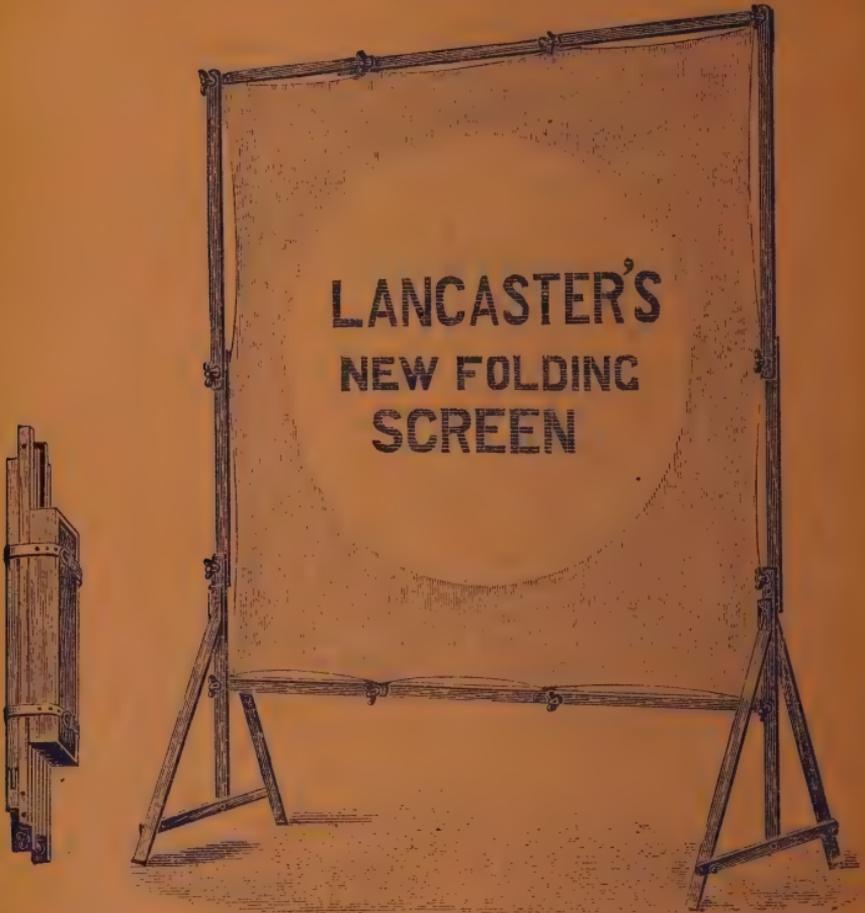


|     |                                                                                                                                    |    |    |   |
|-----|------------------------------------------------------------------------------------------------------------------------------------|----|----|---|
| 480 | Achromatic Microscope, to be used with any of the Optical Lanterns, giving a clear disc with splendid definition .. .. .           | £1 | 1  | 0 |
| 481 | Ditto, ditto, with three Achromatic Powers, and suitable for oil or limelight Lantern .. .. .                                      | 2  | 2  | 0 |
|     | Rack Adjustment, 10 per cent. extra.                                                                                               |    |    |   |
| 482 | Finest Quality Achromatic Microscope, with four Achro Powers, Negative Amplifier, Alum Trough, etc., for limelight Lantern .. .. . | 5  | 5  | 0 |
| 485 | Aphengoscope for Lantern Projections .. 10/- to 10                                                                                 | 10 | 10 | 0 |
| 486 | Endless Screw, set of concave and plane mirrors, prism, convex and concave lenses to demonstrate laws of light .. .. .             | 4  | 4  | 0 |
| 487 | Limelight apparatus for stage illumination, 6in. Lens with Jet, and no bags or boards .. .. .                                      | 2  | 10 | 0 |
| 488 | Ditto, ditto, with 8in. Lens .. .. .                                                                                               | 5  | 0  | 0 |
| 489 | Lengthening Tubes for Lantern Fronts .. .. . each                                                                                  | 0  | 3  | 6 |
| 490 | Lime Cylinder Holders, air-tight .. .. .                                                                                           | 0  | 2  | 0 |
| 491 | Alum and Zoophyte Troughs, from .. .. . each                                                                                       | 0  | 2  | 6 |
| 492 | Lantern stands .. .. . 15/- and                                                                                                    | 1  | 1  | 0 |
| 493 | Portable Reading Lamp, with Bell and Flashlight .. .. .                                                                            | 0  | 7  | 6 |
| 494 | Folding Reading Desk .. .. .                                                                                                       | 0  | 10 | 6 |
| 495 | Pine Lantern Slide Box to hold 50 Slides .. .. .                                                                                   | 0  | 2  | 6 |
| 496 | Polished Mahogany Lantern Slide Box to hold 50 Slides .. .. .                                                                      | 0  | 5  | 0 |
| 497 | Carriers for 3½ Slides .. .. .                                                                                                     | 0  | 1  | 6 |
| 498 | „ „ Dissolving in Single Lantern .. .. .                                                                                           | 0  | 3  | 6 |

COLMORE ROW, BIRMINGHAM.

J. LANCASTER &amp; SON, Opticians.

## LANCASTER'S New Portable Lantern Screen & Stand.



No. 499.

Can be erected or taken down in a few minutes, the whole packing into the smallest possible space.

|                                                       |      |
|-------------------------------------------------------|------|
| 7ft. Stand and Screen complete, with box for sheet .. | 25/- |
| 9ft. do. do. do. do. ..                               | 45/- |

LAGER SIZES TO ORDER.

COLMORE ROW, BIRMINGHAM.

J. LANCASTER & SON, Opticians.

# LANTERN SLIDES

Lancaster's Graphochrome Slides are very good Slides, at a moderate price, and in some instances are equal to fine coloured Photographs.

5/- per Set of twelve  $3\frac{1}{4}$  Slides, including Reading for each Set.

## Each Set contains 12 Slides.

Aladdin, or the Wonderful Lamp.  
 Arctic Expedition 1875-6.  
 Ali Baba.  
 Blue Beard.  
 Bob, the Fireman, or Life in the Red Brigade.  
 Canadian Life (Past and Present).  
 Cinderella.  
 Cinderella, No. 2.  
 Continental Views.  
 Curlew must not ring to-night.  
 Charge of the Light Brigade.  
 Dick Whittington.  
 Dogs and Monks of St. Bernard.  
 Don Quixote.  
 Dwarf Long Nose (An Arabian Night Story).  
 Educated Cats (How they were brought up).  
 Elephant's Revenge.  
 Emigrants' Voyage to Australia.  
 Gulliver's Travels.  
 Heroes of the Lifeboat.  
 Heroes of the Victoria Cross.  
 Incidents in the Life of our Saviour  
 Jackdaw of Rheims.  
 Jack, the Giant Killer.  
 Jack Martinspike.  
 John Gilpin.  
 Jack and the Bean Stalk.  
 Life in Africa.  
 Life of Christ.  
 Life of Joseph.  
 Life on Board an Ocean Palace.  
 Mischievous Tommy, or a Boy's Trouble.  
 Mother Hubbard.

Mottoes, Compliments of the Season, Curtains, Intervals, Good Night, etc.  
 Natural Phenomena, or the Wonders of Nature (entirely New Designs).  
 Nehie's Prayer (by G. R. Sims).  
 Old London and our Ancesters.  
 On the Bank (a tale of Monte Carlo).  
 Overland Route to India.  
 Pilgrim's Progress, No. 1.  
 Pigri n's Progress, No. 2.  
 Parable of the Prodigal Son.  
 Precocious Piggles.  
 Punch and Judy.  
 Pussy's Road to Ruin.  
 Puss in Boots.  
 Reuben Davidger, or captured by Pirates.  
 Robinson Crusoe, No. 1.  
 Robinson Crusoe, No. 2.  
 Red Riding Hood.  
 Santa Claus.  
 Sinbad the Sallor.  
 Subjects of Natural History (Animals).  
 Swiss Family Robinson.  
 Temperance Story—The Calculating Cobbler.  
 Temperance Story—Cash Three.  
 Tiger and Tub.  
 The House that Jack Built.  
 The Phantom Ship.  
 The Pilot's Story.  
 Twelve Stations of the Cross.  
 Views in London, No. 1.  
 Views in London, No. 2.  
 Views in Palestine, No. 1.  
 Views in Palestine, No. 2.

COLMORE ROW BIRMINGHAM.

J. LANCASTER & SON, Opticians.

## FINEST QUALITY LANTERN SLIDES.

Direct Photographs, Plain, 15/- dozen; Coloured, 30/- dozen.

|    |                        |    |                           |
|----|------------------------|----|---------------------------|
| 50 | Isle of Man.           | 50 | Ireland.                  |
| 50 | Switzerland, No. 1.    | 50 | Switzerland, No. 2.       |
| 50 | London to Rome.        | 50 | Pompeii.                  |
| 50 | Cape Diamond Mines.    | 50 | Central Africa.           |
| 50 | Mediterranean.         | 50 | America.                  |
| 50 | Holy Land.             | 50 | India.                    |
| 50 | Canada.                | 50 | New York.                 |
| 50 | East Coast of Africa.  | 50 | Egypt.                    |
| 50 | Holland.               | 50 | Street Cries of London.   |
| 50 | Cannibal Islands.      | 50 | Natural History.          |
| 50 | Highlands of Scotland. | 50 | Lowlands of Scotland.     |
| 50 | Scotch Coast.          | 50 | Norway.                   |
| 50 | Edinburgh.             | 50 | China.                    |
| 50 | London.                | 50 | English Cathedrals.       |
| 50 | Warwickshire.          | 50 | Stately Homes of England. |
| 50 | Oxford.                | 50 | Cambridge.                |
| 50 | Derbyshire and Peak.   | 50 | Yorkshire.                |

### Smaller Sets, same Prices.

|    |                           |    |                          |
|----|---------------------------|----|--------------------------|
| 40 | Windsor Castle.           | 40 | Balmoral.                |
| 40 | Brighton.                 | 36 | Heart, and its Action.   |
| 42 | Temperance Set.           | 32 | Chatsworth.              |
| 34 | Round the Farm Yard.      | 24 | Round London.            |
| 24 | Ten Nights in a Bar Room. | 24 | Christie's Od Organ.     |
| 24 | Enoch Arden.              | 20 | Devonshire Coast.        |
| 27 | River Wye.                | 17 | Jane Conquest.           |
| 12 | Christmas Carol.          | 12 | Sayings of Jesus.        |
| 12 | Sambo and Crab.           | 12 | Stations of the Cross.   |
| 10 | Sweep and Miller.         | 10 | Drunkard's Death.        |
| 10 | "May Queen"               | 10 | "Dora."                  |
| 19 | A Bunch of Primroses.     | 9  | The Rope Trick.          |
| 8  | Railway Chase.            | 9  | The Magic Wand.          |
| 9  | Billy's Rose.             | 8  | Elephant and Tailor.     |
| 8  | The Railway Chase.        | 7  | Life Boat.               |
| 7  | Colonel Slasher.          | 7  | Coastguardsman.          |
| 7  | Angel's Story.            | 6  | Hampton Court.           |
| 6  | Androcles and the Lion.   | 6  | Sleepy Hollow.           |
| 6  | Signal Box.               | 6  | Ruined Home.             |
| 6  | How I won my Wife.        | 4  | Elephant and Crocodiles. |
| 4  | Bridge of Sighs.          |    |                          |

Plain Photographs of Hymns, Tales, Travels, Towns, Flowers, Temperance and Bible Subjects.

6/- per dozen Plain.

COLMORE ROW, BIRMINGHAM.

J. LANCASTER & SON, Opticians.

# LANTERN SLIDES.



Lever Slides.. .. 3/6 to 5/6  
 Chromatropes .. 4/6 to 10/6  
 Skipping Slides .. 2/6 to 4/6

Effects from 2/6 per Set.  
**SLIDES PAINTED TO ORDER.**

## COMIC MOVABLES.

1/- each, 10/- per dozen.



Box with Best Colours, for Painting Slides .. .. . 2/6  
 Tin Case with Best Colours .. .. . 5/-  
 Complete Case of Colours of Best Quality with Medium, Brushes, &c.,  
 as Woodcut,  
 Price .. .. . 10/6.

COLMORE ROW, BIRMINGHAM.

J. LANCASTER & SON, Opticians,

## Juvenile Lanterns.



Excellent Lanterns, with condensing and Object Lenses, the latter mounted in Brass Sliding Tube, Paraffin Lamp with Glass Chimney, much superior to ordinary Juvenile Lanterns.

No. 436.

|       |                   |                 |     |     |        |
|-------|-------------------|-----------------|-----|-----|--------|
| No. 1 | Lantern, complete | ...             | ... | ... | £0 2 6 |
| No. 2 | "                 | "               | ... | ... | 0 3 6  |
| No. 3 | "                 | "               | ... | ... | 0 6 0  |
| No. 4 | "                 | "               | ... | ... | 0 8 6  |
| No. 5 | "                 | "               | ... | ... | 0 10 6 |
| No. 6 | "                 | 3in. Condensers | ... | ... | 0 15 0 |
| No. 7 | "                 | 3½in. "         | ... | ... | 1 1 0  |

## LANTERN SLIDES FOR ABOVE LANTERNS.

No. 1, 2/- per dozen. No. 2, 3/6 per dozen. No. 3, 5/- per dozen. No. 4, 7/6 per dozen. No. 5, 10/6 per dozen. *Three or four Pictures on each Slide.*

## SETS OF LENSES FOR CONSTRUCTING LANTERNS.

|     |                                                                             |                  |     |     |     |        |
|-----|-----------------------------------------------------------------------------|------------------|-----|-----|-----|--------|
| 439 | Set of Lenses to make a Lantern, with 2in Condensers, and full instructions | ...              | ... | ... | ... | £0 3 6 |
| 440 | Ditto ditto                                                                 | 2½in. Condensers | ... | ... | ... | 0 5 6  |
| 441 | Ditto ditto                                                                 | 3in. "           | ... | ... | ... | 0 8 6  |
| 442 | Ditto ditto                                                                 | 3½in. "          | ... | ... | ... | 0 10 6 |
| 443 | Ditto ditto                                                                 | 4in. "           | ... | ... | ... | 0 12 6 |
| 444 | Best Condensing Lenses, mounted in brass, 3½in., 10/-; 4in. 12/6; 5in. 21/- | ...              | ... | ... | ... | 1 15 0 |
| 445 | Sliding Front, with 2in. Lenses                                             | ...              | ... | ... | ... | 0 5 0  |

## TRANSFER SHEETS FOR LANTERN SLIDES.

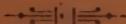
Sheets of 12 Coloured Slides, 3/- each. Gluino, 6d.

**SUBJECTS** (12 of each).—Holy Land, Life of Christ, 1 and 2, Pilgrim's Progress, Robinson Crusoe, Whittington, Cinderella, Snowed, Arctic, Continental Views, India, Gipsy, Bluebeard, Heroes of the Lifeboat, Heroes of the Victoria Cross, London, Natural History, Tale of a Tub, Emigrants' Voyage, Aladdin, Joseph, Gulliver, Jackdaw of Rheims, Jack the Giant Killer.

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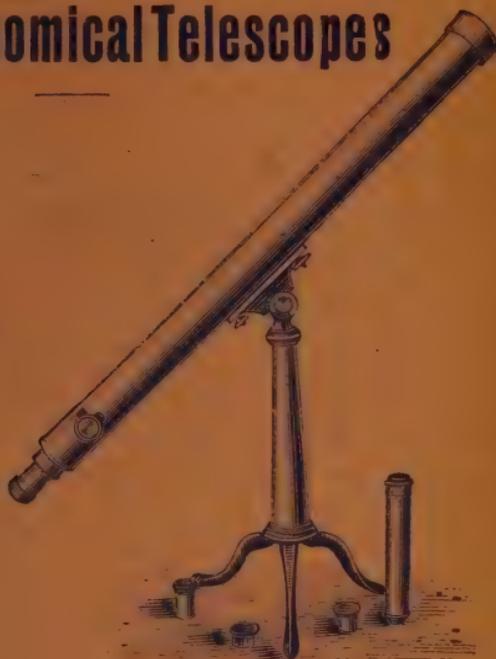
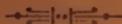
# Student's Astronomical Telescopes



UNIVERSAL MOTIONS.

RACK AND PINION FINE  
ADJUSTMENT, ETC.

HIGH-CLASS QUALITY  
THROUGHOUT.



No. 1.

THE Bodies are made of Polished Brass, with Rackwork Adjustment, Brass Pillar, with Horizontal and Vertical Motions, Claw Feet, one Pancratic, two Astronomical Eyepieces, and one Sunshade to each Telescope, and first quality Object Lenses.

| No. |                                                                                                                                                                                                                                        | £  | s. | d. |
|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|
| 1   | ASTRONOMICAL TELESCOPE, with first quality Achromatic Object Lens, 2½in. aperture, 30in. focus, one Pancratic Eyepiece, magnifying from 30 to 50 diameters, two Astronomical Eyepieces, one magnifying 40, and the other 100, complete | 5  | 0  | 0  |
| 2   | Ditto, ditto, with Object Lens, 2½in. aperture, 36in. focus, one Pancratic Eyepiece, magnifying from 36 to 65, and two Astronomical Eyepieces, one magnifying 50, and the other 120                                                    | 7  | 10 | 0  |
| 3   | Ditto, ditto, with Object Lens, 2½in. aperture, 42in. focus, Pancratic Eyepiece, magnifying from 42 to 75, two Astronomical Eyepieces, one magnifying 60, and the other 130                                                            | 10 | 0  | 0  |
| 4   | Ditto ditto, with Object Lens, 3in. aperture, 45in. focus Pancratic Eyepiece, magnifying from 45 to 80, two Astronomical Eyepieces, one magnifying 70, and the other 160; on Garden Stand                                              | 12 | 10 | 0  |
|     | Pine Cabinet, for No. 1 or 2, with Fittings to take Eyepieces, etc.                                                                                                                                                                    | 0  | 10 | 6  |
|     | Ditto ditto, for Nos. 3 and 4, with Lock and Key                                                                                                                                                                                       | 0  | 15 | 0  |

COLMORE ROW, BIRMINGHAM.

## J. LANCASTER &amp; SON, Opticians.

This Instrument is one of the finest we make for amateur observation. The O.G. is one of the first quality, and has an aperture of 3.25in. clear. It will resolve doubles 1.5 apart. For Lunar or Planetary Observations it is a most useful Instrument.



No. 5.

COLMORE ROW, BIRMINGHAM.

No. 5 **ASTRONOMICAL TELESCOPE**, with object lens,  $3\frac{1}{4}$ in. aperture, 45in focus, pancratic eyepiece, magnifying from 45 to 90; two astronomical eyepieces, one magnifying 70 and the other 160; on garden stand, with achromatic finder and steadying rod, &c. . . . . £15 15 0

No. 5 can be readily carried out of the house into the garden without removing any portion, its total weight being between 40 and 45 lbs.

J. LANCASTER & SON, Opticians.

| No |                                                                                                                                                                                                                                                                                            | £  | s. | d. |
|----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|
| 6  | ASTRONOMICAL TELESCOPE, with our best object lens, 4in. clear aperture, 60 in. focus, prismatic eyepiece, magnifying power from 60 to 120, two astronomical eyepieces, 85 and 200, mounted on garden stand, the telescope having best achromatic finder and strong steadying rod, complete | 25 | 0  | 0  |
| 7  | Ditto, ditto, with 4½in. aperture, 66in. focus, prismatic and three astronomical eyepieces, on massive garden stand                                                                                                                                                                        | 40 | 0  | 0  |
| 8  | Ditto, ditto, 5in. O.G.                                                                                                                                                                                                                                                                    | 55 | 0  | 0  |
| 9  | Ditto, ditto, 6in. O.G.                                                                                                                                                                                                                                                                    | 85 | 0  | 0  |

ASTRONOMICAL TELESCOPES.

With our Good Object Lenses.

|    |                                   |    |    |   |
|----|-----------------------------------|----|----|---|
| 1A | Same fittings and powers as No. 1 | 4  | 0  | 0 |
| 2A | Ditto ditto as No. 2              | 6  | 10 | 0 |
| 3A | Ditto ditto as No. 3              | 8  | 0  | 0 |
| 4A | Ditto ditto as No. 4              | 10 | 0  | 0 |
| 5A | Ditto ditto as No. 5              | 12 | 0  | 0 |
| 6A | Ditto ditto as No. 6              | 20 | 0  | 0 |

All the above Telescopes are well and substantially made, good, and neatly finished.

EQUATORIAL TELESCOPES.

|    |                                                                                    |     |    |   |
|----|------------------------------------------------------------------------------------|-----|----|---|
| 1E | Telescope similar in every respect to No. 1, on equatorial stand, with-out circles | 7   | 10 | 0 |
| 2E | Ditto ditto No. 2                                                                  | 10  | 10 | 0 |
| 3E | Ditto ditto No. 3                                                                  | 14  | 14 | 0 |
| 4E | Ditto ditto No. 4                                                                  | 18  | 0  | 0 |
| 5E | Ditto ditto No. 5                                                                  | 21  | 0  | 0 |
| 6E | Ditto ditto No. 6                                                                  | 35  | 0  | 0 |
| 7E | Ditto ditto No. 7                                                                  | 60  | 0  | 0 |
| 8E | Ditto ditto No. 8                                                                  | 75  | 0  | 0 |
| 9E | Ditto ditto No. 9                                                                  | 100 | 0  | 0 |
|    | Divided Circles to Nos. 1E, 2E, 3E, and 4E                                         | 2   | 10 | 0 |
|    | Ditto to Nos. 5E, 6E, and 7E                                                       | 4   | 0  | 0 |
|    | Ditto to Nos. 8E and 9E                                                            | 5   | 0  | 0 |

Ncs. 7E, 8E, and 9E are on iron pillars, and have tangent screw motions in R.A. and Declination.

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J. LANCASTER & SON, Opticians.

# TOURISTS' TELESCOPES.



No. 10.

|    |                                                                       |     | £    | s. | d.    |
|----|-----------------------------------------------------------------------|-----|------|----|-------|
| 10 | Telescope, with 1in. achromatic object lens and terrestrial eyepiece. |     | 0    | 7  | 6     |
|    | Length when drawn out, 17in., when closed 6in., in case               | ... | 0    | 10 | 0     |
| 11 | Doitto ditto object lens, 1½in.                                       | ... | 0    | 12 | 6     |
| 12 | " " " " 1½in.                                                         | ... | 0    | 16 | 0     |
| 13 | " " " " 1½in.                                                         | ... | 1    | 1  | 0     |
| 14 | " " " " 1½in.                                                         | ... | 1    | 10 | 0     |
| 15 | " " " " 2in.                                                          | ... | 2    | 2  | 0     |
| 16 | " " " " 2in.                                                          | ... | 30/- | to | 7 0 0 |
|    | Best quality Tourists' Telescopes                                     | ... |      |    |       |

# ASTRONOMICAL OBJECT GLASSES.

TESTED AND WARRANTED.

| Diameter. | Focus. | £ | s. | d. | Diameter.                          | Focus.  | £  | s. | d. |
|-----------|--------|---|----|----|------------------------------------|---------|----|----|----|
| 1 inch    | 9 inch | 0 | 4  | 0  | 2 <sup>1</sup> / <sub>2</sub> inch | 35 inch | 1  | 10 | 0  |
| 1½ "      | 9 "    | 0 | 5  | 0  | 2 "                                | 40 "    | 2  | 5  | 0  |
| 1½ "      | 14 "   | 0 | 6  | 0  | 3 "                                | 42 "    | 3  | 0  | 0  |
| 1½ "      | 18 "   | 0 | 8  | 0  | 3½ "                               | 45 "    | 4  | 4  | 0  |
| 1½ "      | 20 "   | 0 | 12 | 0  | 3½ "                               | 55 "    | 8  | 8  | 0  |
| 2 "       | 30 "   | 1 | 0  | 0  | 4 "                                | 60 "    | 10 | 10 | 0  |

# EYEPIECES, DIAGONALS, ETC.

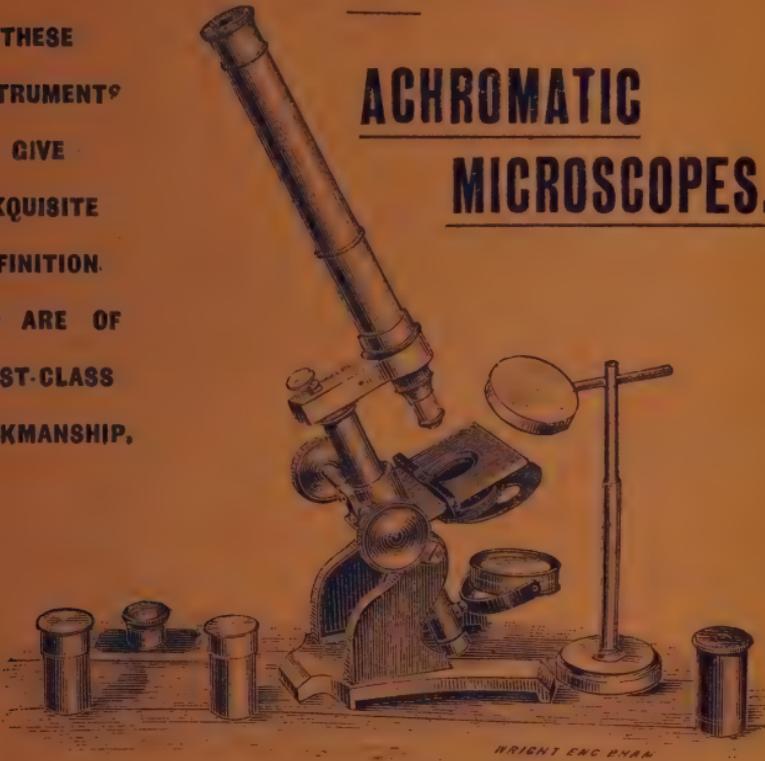
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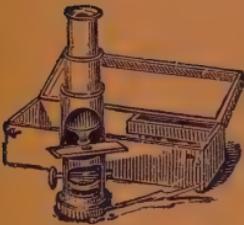
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No. 53



No. 55

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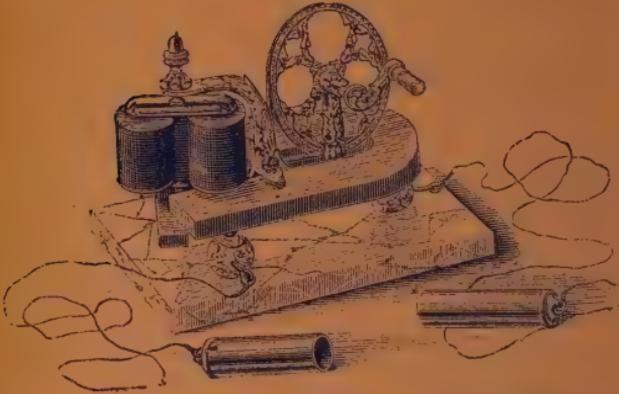
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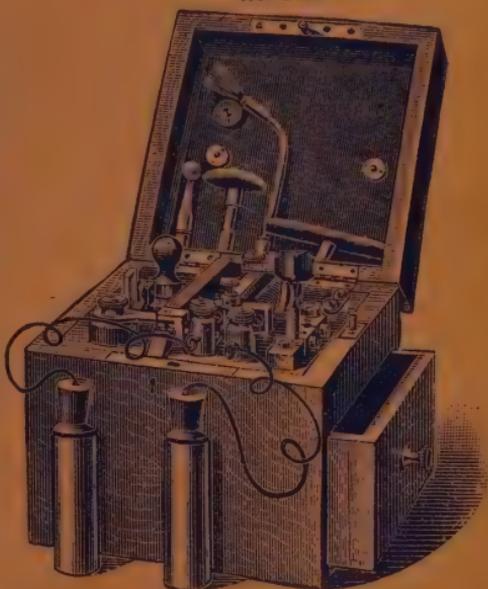


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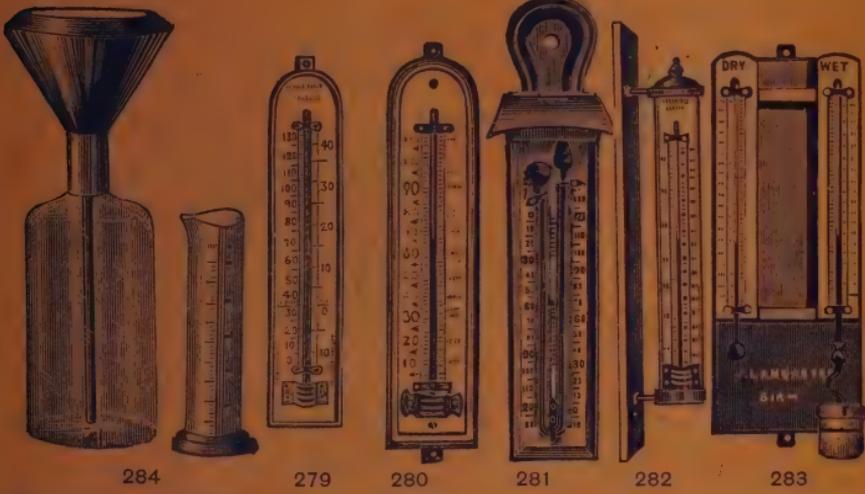
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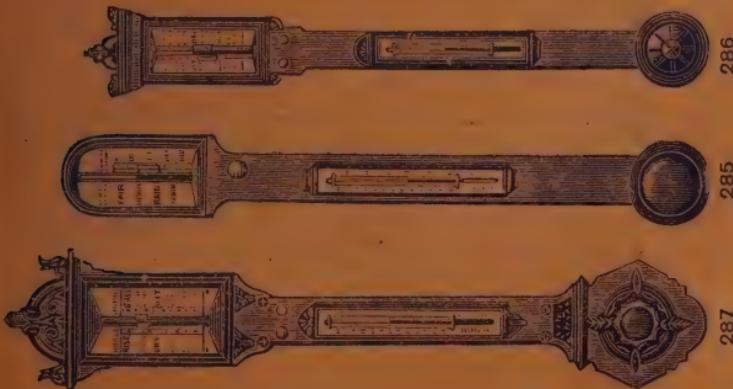
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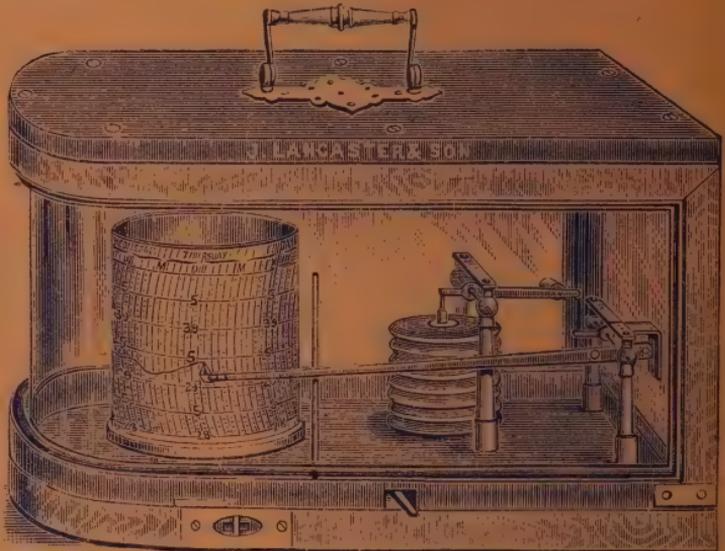
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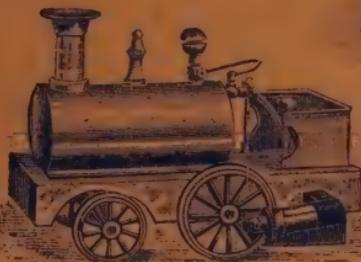
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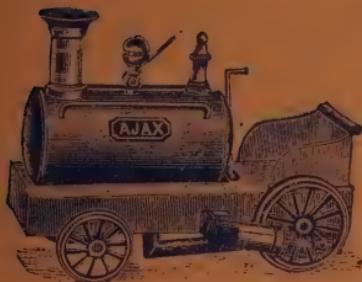


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FOR

1894.

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EDITED BY J. TRAILL TAYLOR.

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## PREFACE.

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It is one of the pleasantest of my tasks in connexion with the preparation of this annual to acknowledge the readiness with which so many good friends have assisted me in making it what constitutes its chief source of value to innumerable photographers throughout the world, that is, a record of the year's work and progress in photography, and on this occasion I approach the agreeable duty with feelings of great pleasure.

Throughout the work will be found interspersed interesting and instructive illustrations of processes, &c., by Messrs. Waterlow, Messrs. Beck, and Messrs. B. J. Edwards, and to these gentlemen, as well as to Messrs. Morgan & Kidd for the frontispiece, to which reference is made elsewhere, I herewith tender my acknowledgments.

The number of articles sent me shows no diminution on that of former years, while I should add that their practical import supplies a mine of useful technical information which it would be difficult to excel in a work of this nature. To the various writers, therefore, I beg to express my great thanks for their collaboration, and, following the precedent of former years, I hereby dedicate this annual to them.

J. TRAILL TAYLOR,  
*Editor.*

*2 York Street, Covent Garden, London.*

*December 1, 1893.*

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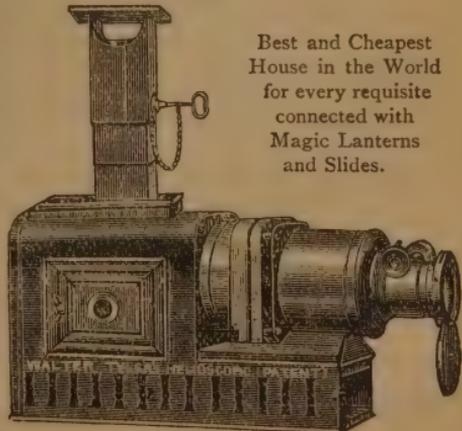
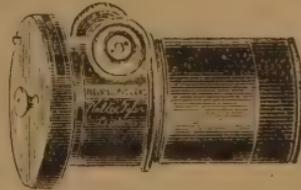
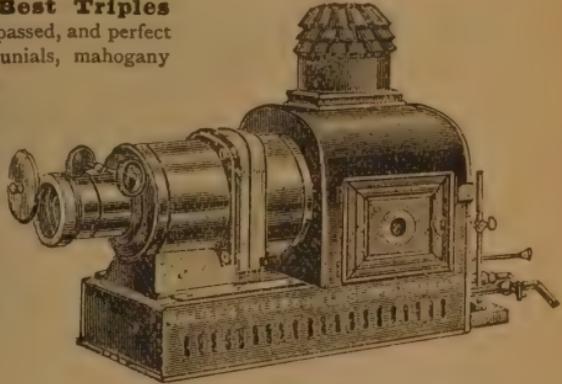
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[See following page.]

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|-----------------------------------------|-------------------|-----|--------|--------|--------|--------|
|                                         | 1                 | 2   | 3      | 4      | 5      | 6      |
| Solid Body ... ..                       | I                 | 2   | 3      | —      | 5      | 6      |
| Folding Body ... ..                     | —                 | —   | —      | 4      | —      | —      |
| Wray $\frac{5}{8}$ in. R.R. Lens ... .. | I                 | 2   | 3      | 4      | 5*     | 6†     |
| 'Standard' Shutter ... ..               | I                 | 2   | 3      | 4      | 5      | 6      |
| Iris Diaphragm... ..                    | I                 | 2   | 3      | 4      | 5      | 6      |
| Self-Cap ... ..                         | I                 | 2   | 3      | 4      | 5      | 6      |
| Hand Release ... ..                     | I                 | 2   | 3      | 4      | 5      | 6      |
| Pneumatic Release ... ..                | I                 | 2   | 3      | 4      | 5      | 6      |
| Vertical Rising Front ... ..            | I                 | 2   | 3      | —      | 5      | —      |
| Horizontal Rising Front ... ..          | —                 | 2   | 3      | —      | —      | 6      |
| Double Extension ... ..                 | —                 | 2   | 3      | —      | 5      | 6      |
| Swing-back and Plumb Indicator ... ..   | —                 | —   | 3      | —      | —      | —      |
| Spirit Level ... ..                     | —                 | —   | —      | —      | 5      | —      |
| 'N. & G.' Changing-Box ... ..           | I                 | 2   | 3      | 4      | 5*     | 6      |
| 'N. & G.' Finders ... ..                | I                 | 2   | 3      | 4      | 5      | 6      |
| Celluloid Focussing Screen ... ..       | I                 | 2   | 3      | —      | 5      | 6      |
| 'N. & G.' Twin Focussing Device ... ..  | —                 | —   | —      | —      | —      | 6      |
| Rack and Pinion Focussing ... ..        | I                 | 2   | 3      | 4      | 5      | 6      |
| Tripod Fittings ... ..                  | I                 | 2   | 3      | 4      | 5      | 6      |
| Wired Handle ... ..                     | I                 | 2   | 3      | 4      | 5      | 6      |
| Swivel Carrying Strap... ..             | I                 | 2   | 3      | 4      | 5      | 6      |
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| Price, 5×4 ... ..                       | £15 15            | £17 | £20    | £14 14 | —      | £21    |

\* No. 5, Stereoscopic Pattern, has two lenses, double Shutter, Iris Diaphragm, Self Cap, and a special Changing-Box.

† No. 6, Twin Lens Pattern, has two lenses, and a special Focussing Device.

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*See Pages 35 to 66.*

## CALENDAR, 1894.

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Index to Advertisements, pages 1019 to 1022.

| JANUARY. |                | FEBRUARY.      |                   | MARCH.     |     |
|----------|----------------|----------------|-------------------|------------|-----|
| S        | ... 7 14 21 28 | ... 4 11 18 25 | ... 4 11 18 25    | ...        | ... |
| M        | 1 8 15 22 29   | ... 5 12 19 26 | ... 5 12 19 26    | ...        | ... |
| T        | 2 9 16 23 30   | ... 6 13 20 27 | ... 6 13 20 27    | ...        | ... |
| W        | 3 10 17 24 31  | ... 7 14 21 28 | ... 7 14 21 28    | ...        | ... |
| T        | 4 11 18 25     | 1 8 15 22      | ... 1 8 15 22 29  | ...        | ... |
| F        | 5 12 19 26     | 2 9 16 23      | ... 2 9 16 23 30  | ...        | ... |
| S        | 6 13 20 27     | 3 10 17 24     | ... 3 10 17 24 31 | ...        | ... |
| APRIL.   |                | MAY.           |                   | JUNE.      |     |
| S        | 1 8 15 22 29   | ... 6 13 20 27 | ... 3 10 17 24    | ...        | ... |
| M        | 2 9 16 23 30   | ... 7 14 21 28 | ... 4 11 18 25    | ...        | ... |
| T        | 3 10 17 24     | 1 8 15 22 29   | ... 5 12 19 26    | ...        | ... |
| W        | 4 11 18 25     | 2 9 16 23 30   | ... 6 13 20 27    | ...        | ... |
| T        | 5 12 19 26     | 3 10 17 24 31  | ... 7 14 21 28    | ...        | ... |
| F        | 6 13 20 27     | 4 11 18 25     | ... 1 8 15 22 29  | ...        | ... |
| S        | 7 14 21 28     | 5 12 19 26     | ... 2 9 16 23 30  | ...        | ... |
| JULY.    |                | AUGUST.        |                   | SEPTEMBER. |     |
| S        | 1 8 15 22 29   | ... 5 12 19 26 | ... 2 9 16 23 30  | ...        | ... |
| M        | 2 9 16 23 30   | ... 6 13 20 27 | ... 3 10 17 24    | ...        | ... |
| T        | 3 10 17 24 31  | ... 7 14 21 28 | ... 4 11 18 25    | ...        | ... |
| W        | 4 11 18 25     | 1 8 15 22 29   | ... 5 12 19 26    | ...        | ... |
| T        | 5 12 19 26     | 2 9 16 23 30   | ... 6 13 20 27    | ...        | ... |
| F        | 6 13 20 27     | 3 10 17 24 31  | ... 7 14 21 28    | ...        | ... |
| S        | 7 14 21 28     | 4 11 18 25     | ... 1 8 15 22 29  | ...        | ... |
| OCTOBER. |                | NOVEMBER.      |                   | DECEMBER.  |     |
| S        | ... 7 14 21 28 | ... 4 11 18 25 | ... 2 9 16 23 30  | ...        | ... |
| M        | 1 8 15 22 29   | ... 5 12 19 26 | ... 3 10 17 24 31 | ...        | ... |
| T        | 2 9 16 23 30   | ... 6 13 20 27 | ... 4 11 18 25    | ...        | ... |
| W        | 3 10 17 24 31  | ... 7 14 21 28 | ... 5 12 19 26    | ...        | ... |
| T        | 4 11 18 25     | 1 8 15 22 29   | ... 6 13 20 27    | ...        | ... |
| F        | 5 12 19 26     | 2 9 16 23 30   | ... 7 14 21 28    | ...        | ... |
| S        | 6 13 20 27     | 3 10 17 24     | ... 1 8 15 22 29  | ...        | ... |

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## JANUARY.

| D.<br>M. | D.<br>W. | REMARKABLE EVENTS.                      | SUN.         |             |    |    | MOON.           |                 |      |    |
|----------|----------|-----------------------------------------|--------------|-------------|----|----|-----------------|-----------------|------|----|
|          |          |                                         | Rises.<br>H. | Sets.<br>M. | H. | M. | Rises.<br>Morn. | Sets.<br>After. |      |    |
| 1        | M        |                                         | 8            | 8           | 4  | 0  | 2               | 46              | 0    | 11 |
| 2        | Tu       | <i>Photographisches Archiv</i> f. 1860  | 8            | 8           | 4  | 1  | 4               | 2               | 0    | 27 |
| 3        | W        | Prof. J. W. Draper d. 1882              | 8            | 8           | 4  | 2  | 5               | 16              | 0    | 48 |
| 4        | Th       |                                         | 8            | 8           | 4  | 3  | 6               | 27              | 1    | 18 |
| 5        | F        |                                         | 8            | 8           | 4  | 4  | 7               | 31              | 1    | 59 |
| 6        | S        | Epiphany [● 3.7 M.                      | 8            | 8           | 4  | 5  | 8               | 24              | 2    | 53 |
| 7        | S        | 1st S. aft. Epiph. Daguerreotype        | 8            | 7           | 4  | 7  | 9               | 3               | 3    | 59 |
| 8        | M        | [com. to Acad. of Sc. (Paris), 1839     | 8            | 7           | 4  | 8  | 9               | 32              | 5    | 12 |
| 9        | Tu       |                                         | 8            | 6           | 4  | 10 | 9               | 53              | 6    | 28 |
| 10       | W        |                                         | 8            | 6           | 4  | 11 | 10              | 9               | 7    | 44 |
| 11       | Th       |                                         | 8            | 5           | 4  | 12 | 10              | 21              | 8    | 58 |
| 12       | F        |                                         | 8            | 4           | 4  | 13 | 10              | 32              | 10   | 13 |
| 13       | S        | William Bedford d. 1893                 | 8            | 3           | 4  | 15 | 10              | 43              | 11   | 30 |
| 14       | S        | 2nd Sun. aft. Epiphany.                 | 8            | 3           | 4  | 17 | 10              | 55              | Morn |    |
| 15       | M        | G. W. Simpson d. 1880 ) 0.9 M.          | 8            | 2           | 4  | 19 | 11              | 8               | 0    | 50 |
| 16       | Tu       |                                         | 8            | 1           | 4  | 20 | 11              | 24              | 2    | 15 |
| 17       | W        |                                         | 8            | 0           | 4  | 22 | 11              | 47              | 3    | 42 |
| 18       | Th       | E. Lacan d. 1879. Rejlander d. 1875     | 7            | 59          | 4  | 23 | After           |                 | 5    | 10 |
| 19       | F        | Regnault d. 1878                        | 7            | 58          | 4  | 24 | 1               | 15              | 6    | 33 |
| 20       | S        | Photo. Soc. of Lond. f. 1853 [○ 3.11 A. | 7            | 57          | 4  | 26 | 2               | 31              | 7    | 40 |
| 21       | S        | Septuagesima Sun. Fox Talbot            | 7            | 56          | 4  | 28 | 4               | 3               | 8    | 25 |
| 22       | M        | Sir W. Newton d. 1869. [h. 1800         | 7            | 55          | 4  | 30 | 5               | 37              | 8    | 54 |
| 23       | Tu       |                                         | 7            | 54          | 4  | 32 | 7               | 8               | 9    | 15 |
| 24       | W        |                                         | 7            | 52          | 4  | 33 | 8               | 34              | 9    | 30 |
| 25       | Th       | E. V. Boissonas d. 1890                 | 7            | 51          | 4  | 35 | 9               | 56              | 9    | 42 |
| 26       | F        |                                         | 7            | 50          | 4  | 37 | 11              | 15              | 9    | 53 |
| 27       | S        |                                         | 7            | 48          | 4  | 39 | Morn            | 10              | 4    |    |
| 28       | S        | Sexagesima Sun. Photo-sculpture         | 7            | 47          | 4  | 40 | 0               | 32              | 10   | 17 |
| 29       | M        | [pat. by Willème, 1863 [(4.51 A.        | 7            | 46          | 4  | 42 | 1               | 48              | 10   | 32 |
| 30       | Tu       | Fox Talbot's first c. to Roy. Soc. 1839 | 7            | 45          | 4  | 44 | 3               | 3               | 10   | 52 |
| 31       | W        |                                         | 7            | 43          | 4  | 46 | 4               | 16              | 11   | 18 |

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## JANUARY.

| D.<br>M. | D.<br>W. | MEMORANDA.                                         |
|----------|----------|----------------------------------------------------|
| 1        | M        | <i>For MEETINGS OF SOCIETIES, see pp. 536-593.</i> |
| 2        | Tu       |                                                    |
| 3        | W        |                                                    |
| 4        | Th       |                                                    |
| 5        | F        |                                                    |
| 6        | S        |                                                    |
| 7        | S        |                                                    |
| 8        | M        |                                                    |
| 9        | Tu       |                                                    |
| 10       | W        |                                                    |
| 11       | Th       |                                                    |
| 12       | F        |                                                    |
| 13       | S        |                                                    |
| 14       | S        |                                                    |
| 15       | M        |                                                    |
| 16       | Tu       |                                                    |
| 17       | W        |                                                    |
| 18       | Th       |                                                    |
| 19       | F        |                                                    |
| 20       | S        |                                                    |
| 21       | S        |                                                    |
| 22       | M        |                                                    |
| 23       | Tu       |                                                    |
| 24       | W        |                                                    |
| 25       | Th       |                                                    |
| 26       | F        |                                                    |
| 27       | S        |                                                    |
| 28       | S        |                                                    |
| 29       | M        |                                                    |
| 30       | Tu       |                                                    |
| 31       | W        |                                                    |

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| D<br>M. | D.<br>W. | REMARKABLE EVENTS.                      | SUN.            |                | MOON.           |                |
|---------|----------|-----------------------------------------|-----------------|----------------|-----------------|----------------|
|         |          |                                         | Rises.<br>H. M. | Sets.<br>H. M. | Rises.<br>Morn. | Sets.<br>Morn. |
| 1       | Th       |                                         | 7 41            | 4 47           | 5 24            | 11 55          |
| 2       | F        |                                         | 7 40            | 4 49           | 6 21            | After          |
| 3       | S        |                                         | 7 38            | 4 50           | 7 4             | 1 46           |
| 4       | S        | Quinquagesima (Shrove) Sunday           | 7 37            | 4 53           | 7 36            | 2 58           |
| 5       | M        | W. D. Sanderson d. 1885 ● 9.45 A.       | 7 35            | 4 54           | 7 59            | 4 14           |
| 6       | Tu       |                                         | 7 33            | 4 56           | 8 15            | 5 30           |
| 7       | W        |                                         | 7 31            | 4 58           | 8 29            | 6 47           |
| 8       | Th       | Calotype Process pat. 1841              | 7 30            | 5 0            | 8 40            | 8 2            |
| 9       | F        |                                         | 7 28            | 5 2            | 8 51            | 9 18           |
| 10      | S        | Sir David Brewster d. 1868              | 7 26            | 5 4            | 9 2             | 10 36          |
| 11      | S        | 1st Sunday in Lent                      | 7 24            | 5 5            | 9 14            | 11 57          |
| 12      | M        | Edwin Cocking d. 1892                   | 7 22            | 5 7            | 9 28            | Morn           |
| 13      | Tu       | Leon Foucault d. 1868 ) 10.43 M.        | 7 20            | 5 9            | 9 48            | 1 22           |
| 14      | W        | St. Valentine                           | 7 19            | 5 11           | 10 17           | 2 49           |
| 15      | Th       | Oliver Sarony b. 1820                   | 7 17            | 5 13           | 11 1            | 4 13           |
| 16      | F        | Glasgow Photo. Society f. 1860          | 7 15            | 5 15           | After           | 5 25           |
| 17      | S        |                                         | 7 13            | 5 16           | 1 27            | 6 18           |
| 18      | S        | 2nd S. in Lent. Moule's Photogen        | 7 11            | 5 18           | 2 59            | 6 52           |
| 19      | M        | [(arti. light for portraiture) pat. '57 | 7 9             | 5 19           | 4 32            | 7 16           |
| 20      | Tu       | Poitevin's p. of Helioplastie pub. '55  | 7 7             | 5 22           | 6 2             | 7 33           |
| 21      | W        | Bingham d. 1870 [○ 2.16 M.              | 7 5             | 5 24           | 7 27            | 7 47           |
| 22      | Th       |                                         | 7 3             | 5 26           | 8 49            | 7 58           |
| 23      | F        |                                         | 7 1             | 5 27           | 10 9            | 8 10           |
| 24      | S        |                                         | 6 58            | 5 29           | 11 28           | 8 22           |
| 25      | S        | 3rd Sun. in Lent. [Arago b. 1786        | 6 56            | 5 31           | Morn            | 8 36           |
| 26      | M        | Senefelder d. '34. Padre Secchi d. 76.  | 6 54            | 5 33           | 0 46            | 8 53           |
| 27      | Tu       | ( 0.28 A.                               | 6 52            | 5 34           | 2 1             | 9 17           |
| 28      | W        |                                         | 6 50            | 5 36           | 3 12            | 9 50           |

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|----------|----------|----------------------------------------------------|
| 1        | Th       | <i>For MEETINGS OF SOCIETIES, see pp. 586-593.</i> |
| 2        | F        |                                                    |
| 3        | S        |                                                    |
| 4        | S        |                                                    |
| 5        | M        |                                                    |
| 6        | Tu       |                                                    |
| 7        | W        |                                                    |
| 8        | Th       |                                                    |
| 9        | F        |                                                    |
| 10       | S        |                                                    |
| 11       | S        |                                                    |
| 12       | M        |                                                    |
| 13       | Tu       |                                                    |
| 14       | W        |                                                    |
| 15       | Th       |                                                    |
| 16       | F        |                                                    |
| 17       | S        |                                                    |
| 18       | S        |                                                    |
| 19       | M        |                                                    |
| 20       | Tu       |                                                    |
| 21       | W        |                                                    |
| 22       | Th       |                                                    |
| 23       | F        |                                                    |
| 24       | S        |                                                    |
| 25       | S        |                                                    |
| 26       | M        |                                                    |
| 27       | Tu       |                                                    |
| 28       | W        |                                                    |

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|-------|-------|--------------------------------------|--------|-------|-----------|--------|-------|
|       |       |                                      | Rises. | Sets. |           | Rises. | Sets. |
|       |       |                                      | H.     | M.    | H. M.     | Morn.  | Morn. |
| 1     | Th    |                                      | 6 48   | 5 38  |           | 4 15   | 10 35 |
| 2     | F     |                                      | 6 46   | 5 40  |           | 5 2    | 11 32 |
| 3     | S     |                                      | 6 44   | 5 41  |           | 5 38   | After |
| 4     | S     | 4th Sun. in Lent. Poitevin d. '82    | 6 41   | 5 43  |           | 6 4    | 1 56  |
| 5     | M     | La Place d. 1827. J. Albert b. 1825  | 6 39   | 5 45  |           | 6 23   | 3 13  |
| 6     | Tu    | Fraunhofer b. 1787                   | 6 37   | 5 47  |           | 6 37   | 4 30  |
| 7     | W     | J. N. Niepce b. 1765. Herschel b.    | 6 35   | 5 48  |           | 6 48   | 5 47  |
| 8     | Th    | [1792. ● 2.19 A.                     | 6 32   | 5 50  |           | 6 59   | 7 5   |
| 9     | F     |                                      | 6 30   | 5 52  |           | 7 11   | 8 24  |
| 10    | S     |                                      | 6 28   | 5 54  |           | 7 22   | 9 45  |
| 11    | S     | 5th Sunday in Lent. St. Claire       | 6 26   | 5 55  |           | 7 35   | 11 10 |
| 12    | M     | [Deville b. 1818                     | 6 24   | 5 57  |           | 7 53   | Morn  |
| 13    | Tu    |                                      | 6 21   | 5 59  |           | 8 18   | 0 37  |
| 14    | W     | Herschel int. hypo for fixing, 1839. | 6 19   | 6 1   |           | 8 56   | 2 2   |
| 15    | Th    | F. A. Wenderoth d. 1884 ) 6.28 A.    | 6 17   | 6 2   |           | 9 52   | 3 17  |
| 16    | F     |                                      | 6 14   | 6 4   |           | 11 7   | 4 15  |
| 17    | S     |                                      | 6 12   | 6 5   |           | After  | 4 54  |
| 18    | S     | Palm Sunday.                         | 6 10   | 6 7   |           | 2 5    | 5 20  |
| 19    | M     | Thos. Sutton d. 1875                 | 6 8    | 6 9   |           | 3 33   | 5 38  |
| 20    | Tu    |                                      | 6 5    | 6 11  |           | 4 59   | 5 52  |
| 21    | W     |                                      | 6 3    | 6 12  | ○ 2.11 A. | 6 22   | 6 4   |
| 22    | Th    |                                      | 6 1    | 6 14  |           | 7 43   | 3 16  |
| 23    | F     | Good Friday                          | 5 59   | 6 16  |           | 9 3    | 6 28  |
| 24    | S     | Becquerel b. 1820                    | 5 56   | 6 18  |           | 10 22  | 6 41  |
| 25    | S     | Easter Sun. Hermagis d. 1868         | 5 54   | 6 19  |           | 11 41  | 6 56  |
| 26    | M     |                                      | 5 51   | 6 21  |           | Morn   | 7 17  |
| 27    | Tu    |                                      | 5 49   | 6 22  |           | 0 56   | 7 46  |
| 28    | W     | La Place b. 1749                     | 5 47   | 6 24  |           | 2 3    | 8 26  |
| 29    | Th    |                                      | 5 45   | 6 26  | ( 8.28 M. | 2 58   | 9 19  |
| 30    | F     | Balard d. 1876                       | 5 42   | 6 28  |           | 3 38   | 10 24 |
| 31    | S     | Bunsen b. 1811                       | 5 40   | 6 30  |           | 4 6    | 11 37 |

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## MARCH.

| D.<br>M. | D.<br>W. | MEMORANDA.                                         |
|----------|----------|----------------------------------------------------|
| 1        | Th       | <i>For MEETINGS OF SOCIETIES, see pp. 536-593.</i> |
| 2        | F        |                                                    |
| 3        | S        |                                                    |
| 4        | S        |                                                    |
| 5        | M        |                                                    |
| 6        | Tu       |                                                    |
| 7        | W        |                                                    |
| 8        | Th       |                                                    |
| 9        | F        |                                                    |
| 10       | S        |                                                    |
| 11       | S        |                                                    |
| 12       | M        |                                                    |
| 13       | Tu       |                                                    |
| 14       | W        |                                                    |
| 15       | Th       |                                                    |
| 16       | F        |                                                    |
| 17       | S        |                                                    |
| 18       | S        |                                                    |
| 19       | M        |                                                    |
| 20       | Tu       |                                                    |
| 21       | W        |                                                    |
| 22       | Th       |                                                    |
| 23       | F        |                                                    |
| 24       | S        |                                                    |
| 25       | S        |                                                    |
| 26       | M        |                                                    |
| 27       | Tu       |                                                    |
| 28       | W        |                                                    |
| 29       | Th       |                                                    |
| 30       | F        |                                                    |
| 31       | S        |                                                    |

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## APRIL.

| D.<br>M. | D.<br>W. | REMARKABLE EVENTS.                           | SUN.            |                | MOON.           |                 |
|----------|----------|----------------------------------------------|-----------------|----------------|-----------------|-----------------|
|          |          |                                              | Rises.<br>H. M. | Sets.<br>H. M. | Rises.<br>Morn. | Sets.<br>After. |
| 1        | S        | Low Sunday                                   | 5 38            | 6 31           | 4 28            | 0 52            |
| 2        | M        | First Sun Photo. by Fizeau and Fou-          | 5 36            | 6 33           | 4 44            | 2 9             |
| 3        | Tu       | [cault, 1845. Morse d. 1872                  | 5 34            | 6 34           | 4 56            | 3 26            |
| 4        | W        | [Niece b. 1795                               | 5 31            | 6 36           | 5 7             | 4 44            |
| 5        | Th       | Rev. J. B. Reade b. 1801. Isidore            | 5 29            | 6 37           | 5 18            | 6 3             |
| 6        | F        | ● 4.0 m. [Victor d. 1870                     | 5 27            | 6 39           | 5 29            | 7 25            |
| 7        | S        | Voigtländer d. 1878. Niepce de St.           | 5 25            | 6 41           | 5 42            | 8 51            |
| 8        | S        | 2nd Sunday after Easter [1839                | 5 22            | 6 43           | 5 59            | 10 20           |
| 9        | M        | Fox Talbot's First Art. in <i>Athenæum</i> , | 5 20            | 6 44           | 6 21            | 11 49           |
| 10       | Tu       | Pouney's Carbon Process pat. 1858            | 5 18            | 6 46           | 6 55            | Morn            |
| 11       | W        | Nottage d. 1885                              | 5 16            | 6 47           | 7 46            | 1 9             |
| 12       | Th       | T. R. Williams d. 1871                       | 5 13            | 6 49           | 8 56            | 2 12            |
| 13       | F        | ) 0.33 m.                                    | 5 11            | 6 51           | 10 19           | 2 56            |
| 14       | S        |                                              | 5 9             | 6 53           | 11 49           | 3 25            |
| 15       | S        | 3rd Sunday after Easter                      | 5 7             | 6 54           | After           | 3 44            |
| 16       | M        |                                              | 5 5             | 6 56           | 2 39            | 4 0             |
| 17       | Tu       | Fargier's Carbon Process pat. 1861           | 5 3             | 6 57           | 4 1             | 4 13            |
| 18       | W        | Joseph Beck d. 1891                          | 5 0             | 6 59           | 5 21            | 4 24            |
| 19       | Th       | Warren de la Rue d. 1889                     | 4 58            | 7 0            | 6 40            | 4 35            |
| 20       | F        | J. A. Spencer d. 1878 ○ 3.2 m.               | 4 56            | 7 2            | 8 0             | 4 47            |
| 21       | S        | Talbot's Photo.-etch. Process pat. '58       | 4 54            | 7 4            | 9 20            | 5 1             |
| 22       | S        | 4th Sun. after Easter. Rev. F. F.            | 4 52            | 7 6            | 10 37           | 5 19            |
| 23       | M        | [Statham d. 1884                             | 4 50            | 7 7            | 11 49           | 5 44            |
| 24       | Tu       | Celsius d. 1744                              | 4 48            | 7 9            | Morn            | 6 20            |
| 25       | W        | 'Sun-blinds' pat. 1862                       | 4 46            | 7 10           | 0 48            | 7 8             |
| 26       | Th       | Adam Salomon d. 1881                         | 4 44            | 7 12           | 1 34            | 8 9             |
| 27       | F        | Morse b. 1791                                | 4 42            | 7 14           | 2 7             | 9 19            |
| 28       | S        | Böttger b. 1806 (3.21 m.)                    | 4 40            | 7 16           | 2 31            | 10 33           |
| 29       | S        | Regation Sun. Böttger d. 1881                | 4 38            | 7 17           | 2 49            | 11 50           |
| 30       | M        | Col. Stuart Wortley d. 1890                  | 4 36            | 7 19           | 3 2             | After           |

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*For Prices see Advertisement, pages 91 to 98.*

38 GREAT QUEEN ST., LONG ACRE, LONDON, W.C.

## APRIL.

| D.<br>M. | D.<br>W. | MEMORANDA.                                         |
|----------|----------|----------------------------------------------------|
| 1        | S        | <i>For MEETINGS OF SOCIETIES, see pp. 536-593.</i> |
| 2        | M        |                                                    |
| 3        | Tu       |                                                    |
| 4        | W        |                                                    |
| 5        | Th       |                                                    |
| 6        | F        |                                                    |
| 7        | S        |                                                    |
| 8        | S        |                                                    |
| 9        | M        |                                                    |
| 10       | Tu       |                                                    |
| 11       | W        |                                                    |
| 12       | Th       |                                                    |
| 13       | F        |                                                    |
| 14       | S        |                                                    |
| 15       | S        |                                                    |
| 16       | M        |                                                    |
| 17       | Tu       |                                                    |
| 18       | W        |                                                    |
| 19       | Th       |                                                    |
| 20       | F        |                                                    |
| 21       | S        |                                                    |
| 22       | S        |                                                    |
| 23       | M        |                                                    |
| 24       | Tu       |                                                    |
| 25       | W        |                                                    |
| 26       | Th       |                                                    |
| 27       | F        |                                                    |
| 28       | S        |                                                    |
| 29       | S        |                                                    |
| 30       | M        |                                                    |

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## M A Y.

| D.<br>M. | D.<br>W. | REMARKABLE EVENTS.                        | SUN.            |                | MOON.           |                 |
|----------|----------|-------------------------------------------|-----------------|----------------|-----------------|-----------------|
|          |          |                                           | Rises.<br>H. M. | Sets.<br>H. M. | Rises.<br>Morn. | Sets.<br>After. |
| 1        | Tu       |                                           | 4 34            | 7 21           | 3 13            | 2 21            |
| 2        | W        |                                           | 4 33            | 7 22           | 3 24            | 3 38            |
| 3        | Th       |                                           | 4 31            | 7 23           | 3 35            | 4 59            |
| 4        | F        | Senebier b. 1742                          | 4 29            | 7 25           | 3 48            | 6 23            |
| 5        | S        | J. W. Draper b. 1811 ● 2.42 A.            | 4 27            | 7 27           | 4 3             | 7 53            |
| 6        | S        | Sun. after Ascension. Humboldt            | 4 26            | 7 29           | 4 23            | 9 25            |
| 7        | M        | Fortier d. 1882 [d. 1859                  | 4 24            | 7 30           | 4 53            | 10 52           |
| 8        | Tu       | Peroxide of H. rec. for rem. of Hypo, '66 | 4 22            | 7 32           | 5 37            | Morn            |
| 9        | W        | Gay Lussac d. 1850                        | 4 20            | 7 33           | 6 42            | 0 4             |
| 10       | Th       | South London Photo. Soc. f. 1859          | 4 19            | 7 35           | 8 4             | 0 56            |
| 11       | F        | Becquerel d. 1891                         | 4 17            | 7 36           | 9 34            | 1 29            |
| 12       | S        | Sir John Herschel d. 1871 ) 6.21 M.       | 4 16            | 7 38           | 11 3            | 1 51            |
| 13       | S        | Whit Sunday. Justus von Liebig            | 4 14            | 7 39           | After           | 2 8             |
| 14       | M        | Fahrenheit b. 1686 [b. 1803               | 4 13            | 7 41           | 1 48            | 2 21            |
| 15       | Tu       |                                           | 4 11            | 7 42           | 3 8             | 2 32            |
| 16       | W        | C. Breese d. 1875. C. Russell d. 1887     | 4 10            | 7 44           | 4 25            | 2 43            |
| 17       | Th       | Association Belge founded, 1874           | 4 8             | 7 45           | 5 43            | 2 55            |
| 18       | F        |                                           | 4 6             | 7 47           | 7 2             | 3 8             |
| 19       | S        | ○ 4.43 A.                                 | 4 5             | 7 48           | 8 20            | 3 24            |
| 20       | S        | Trinity Sunday                            | 4 4             | 7 50           | 9 34            | 3 47            |
| 21       | M        | Scheele d. 1786                           | 4 2             | 7 51           | 10 38           | 4 18            |
| 22       | Tu       |                                           | 4 1             | 7 53           | 11 28           | 5 1             |
| 23       | W        | J. W. Gough d. 1878. W. A. Geddes         | 4 0             | 7 54           | Morn            | 5 58            |
| 24       | Th       | [d. 1890                                  | 3 59            | 7 55           | 0 7             | 7 3             |
| 25       | F        | T. J. Pearsall d. 1883                    | 3 58            | 7 56           | 0 34            | 8 17            |
| 26       | S        | H. B. Berkeley d. 1890                    | 3 56            | 7 58           | 0 53            | 9 32            |
| 27       | S        | 1st Sun. after Trinity ( 8.4 A.           | 3 55            | 7 59           | 1 8             | 10 45           |
| 28       | M        |                                           | 3 54            | 8 0            | 1 20            | 11 59           |
| 29       | Tu       | Sir H. Davy d. 1829                       | 3 53            | 8 1            | 1 31            | After           |
| 30       | W        | J. Sidebotham d. 1885                     | 3 53            | 8 3            | 1 41            | 2 32            |
| 31       | Th       |                                           | 3 52            | 8 4            | 1 52            | 3 53            |

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## M A Y.

| D.<br>M. | D.<br>W. | MEMORANDA.                                                |
|----------|----------|-----------------------------------------------------------|
| 1        | Tu       | <p><i>For MEETINGS OF SOCIETIES, see pp. 536-593.</i></p> |
| 2        | W        |                                                           |
| 3        | Th       |                                                           |
| 4        | F        |                                                           |
| 5        | S        |                                                           |
| 6        | S        |                                                           |
| 7        | M        |                                                           |
| 8        | Tu       |                                                           |
| 9        | W        |                                                           |
| 10       | Th       |                                                           |
| 11       | F        |                                                           |
| 12       | S        |                                                           |
| 13       | S        |                                                           |
| 14       | M        |                                                           |
| 15       | Tu       |                                                           |
| 16       | W        |                                                           |
| 17       | Th       |                                                           |
| 18       | F        |                                                           |
| 19       | S        |                                                           |
| 20       | S        |                                                           |
| 21       | M        |                                                           |
| 22       | Tu       |                                                           |
| 23       | W        |                                                           |
| 24       | Th       |                                                           |
| 25       | F        |                                                           |
| 26       | S        |                                                           |
| 27       | S        |                                                           |
| 28       | M        |                                                           |
| 29       | Tu       |                                                           |
| 30       | W        |                                                           |
| 31       | Th       |                                                           |

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## JUNE.

| D.<br>M. | D.<br>W. | REMARKABLE EVENTS.                         | SUN.            |                |                 | MOON.           |  |
|----------|----------|--------------------------------------------|-----------------|----------------|-----------------|-----------------|--|
|          |          |                                            | Rises.<br>H. M. | Sets.<br>H. M. | Rises.<br>Morn. | Sets.<br>After. |  |
| 1        | F        | [cesses, 1851                              | 3 51            | 8 4            | 2 6             | 5 20            |  |
| 2        | S        | Niepee pubsh. his <i>Heliochromic Pro-</i> | 3 50            | 8 6            | 2 23            | 6 51            |  |
| 3        | S        | 2nd Sun. aft. Trinity ● 10.56 A.           | 3 49            | 8 7            | 2 48            | 8 22            |  |
| 4        | M        | Tessié du Mothay d. 1880                   | 3 48            | 8 8            | 3 26            | 9 45            |  |
| 5        | Tu       |                                            | 3 47            | 8 9            | 4 23            | 10 48           |  |
| 6        | W        | Fordos d. 1878                             | 3 47            | 8 10           | 5 42            | 11 29           |  |
| 7        | Th       | Fraunhofer d. 1826                         | 3 46            | 8 10           | 7 13            | 11 55           |  |
| 8        | F        |                                            | 3 46            | 8 11           | 8 45            | Morn            |  |
| 9        | S        | Constant Delessert d. 1876                 | 3 45            | 8 12           | 10 14           | 0 14            |  |
| 10       | S        | 3rd Sun. aft. Trinity ) 1.14 A.            | 3 45            | 8 13           | 11 38           | 0 28            |  |
| 11       | M        | Cutting's American Bromide pat.            | 3 45            | 8 13           | After           | 0 40            |  |
| 12       | Tu       | [1853                                      | 3 45            | 8 14           | 2 15            | 0 51            |  |
| 13       | W        |                                            | 3 45            | 8 15           | 3 32            | 1 2             |  |
| 14       | Th       | Partnership between Daguerre and           | 3 45            | 8 16           | 4 50            | 1 15            |  |
| 15       | F        | [Niepee, 1837                              | 3 44            | 8 16           | 6 8             | 1 30            |  |
| 16       | S        | Chrysotype and Cyanotype Pro. com.         | 3 44            | 8 17           | 7 23            | 1 51            |  |
| 17       | S        | 4th S. aft. Trin. [to Roy. Soc. '42        | 3 44            | 8 17           | 8 30            | 2 19            |  |
| 18       | M        | ○ 7.6 M.                                   | 3 44            | 8 17           | 9 25            | 2 58            |  |
| 19       | Tu       | Abbé Laborde d. 1883                       | 3 44            | 8 17           | 10 8            | 3 50            |  |
| 20       | W        |                                            | 3 44            | 8 18           | 10 37           | 4 53            |  |
| 21       | Th       | Niepee Mem. uncov. at Chalons, '85.        | 3 45            | 8 18           | 10 58           | 6 5             |  |
| 22       | F        | [Dr. Diamond d. 1886                       | 3 45            | 8 18           | 11 15           | 7 19            |  |
| 23       | S        | [d. 1890                                   | 3 45            | 8 18           | 11 29           | 8 32            |  |
| 24       | S        | 5th Sun. aft. Trinity. Hardwich            | 3 45            | 8 19           | 11 39           | 9 46            |  |
| 25       | M        | [b. 1839. (10.3 M.                         | 3 46            | 8 19           | 11 48           | 10 59           |  |
| 26       | Tu       | W. B. Woodbury b. 1834. Liesegang          | 3 46            | 8 19           | 11 59           | After           |  |
| 27       | W        | Herr Wothly d. '73. G. Price d. '70        | 3 46            | 8 19           | Morn            | 1 30            |  |
| 28       | Th       |                                            | 3 46            | 8 19           | 0 11            | 2 51            |  |
| 29       | F        | Ferrous-oxalate Developer pub. 1877        | 3 47            | 8 19           | 0 25            | 4 19            |  |
| 30       | S        | Frank Howard d. 1866                       | 3 48            | 8 18           | 0 46            | 5 50            |  |

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## JUNE.

| D.<br>M. | D.<br>W. | MEMORANDA.                                         |
|----------|----------|----------------------------------------------------|
| 1        | F        | <i>For MEETINGS OF SOCIETIES, see pp. 536-593.</i> |
| 2        | S        |                                                    |
| 3        | S        |                                                    |
| 4        | M        |                                                    |
| 5        | Tu       |                                                    |
| 6        | W        |                                                    |
| 7        | Th       |                                                    |
| 8        | F        |                                                    |
| 9        | S        |                                                    |
| 10       | S        |                                                    |
| 11       | M        |                                                    |
| 12       | Tu       |                                                    |
| 13       | W        |                                                    |
| 14       | Th       |                                                    |
| 15       | F        |                                                    |
| 16       | S        |                                                    |
| 17       | S        |                                                    |
| 18       | M        |                                                    |
| 19       | Tu       |                                                    |
| 20       | W        |                                                    |
| 21       | Th       |                                                    |
| 22       | F        |                                                    |
| 23       | S        |                                                    |
| 24       | S        |                                                    |
| 25       | M        |                                                    |
| 26       | Tu       |                                                    |
| 27       | W        |                                                    |
| 28       | Th       |                                                    |
| 29       | F        |                                                    |
| 30       | S        |                                                    |

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## JULY.

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|----------|----------|---------------------------------------|-----------------|----------------|-----------------|-----------------|
|          |          |                                       | Rises.<br>H. M. | Sets.<br>H. M. | Rises.<br>Morn. | Sets.<br>After. |
| 1        | S        | 6th Sunday after Trinity              | 3 49            | 8 19           | 1 16            | 7 16            |
| 2        | M        |                                       | 3 49            | 8 18           | 2 3             | 8 29            |
| 3        | Tu       |                                       | 3 50            | 8 18           | 3 12            | 9 22            |
| 4        | W        | Philip Remele d. 1883 ● 5.46m.        | 3 51            | 8 17           | 4 39            | 9 55            |
| 5        | Th       | Nicephore Niepce d. 1833              | 3 52            | 8 17           | 6 13            | 10 17           |
| 6        | F        | Rev. W. J. Whiting d. 1885            | 3 52            | 8 16           | 7 48            | 10 34           |
| 7        | S        | Dr. Schnauss b. 1827 [d. 1892         | 3 53            | 8 16           | 9 18            | 10 46           |
| 8        | S        | 7th S. after Trin. C. V. Shadbolt     | 3 54            | 8 15           | 10 42           | 10 58           |
| 9        | M        | ) 10.15a.                             | 3 55            | 8 14           | After           | 11 10           |
| 10       | Tu       | Daguerre d. 1851                      | 3 56            | 8 13           | 1 22            | 11 22           |
| 11       | W        |                                       | 3 57            | 8 13           | 2 40            | 11 36           |
| 12       | Th       | Wedgwood b. 1730                      | 3 58            | 8 12           | 3 58            | 11 56           |
| 13       | F        | Abbé Moigno d. 1884                   | 3 59            | 8 11           | 5 13            | Morn            |
| 14       | S        | Dumas b. 1800                         | 4 0             | 8 10           | 6 22            | 0 20            |
| 15       | S        | 8th Sunday after Trinity              | 4 2             | 8 9            | 7 21            | 0 56            |
| 16       | M        | Claudet b. 1797                       | 4 3             | 8 8            | 8 8             | 1 44            |
| 17       | Tu       | ○ 10.3a.                              | 4 4             | 8 7            | 8 41            | 2 44            |
| 18       | W        | V. M. Griswold (Inv. Ferrotyp) d. '72 | 4 5             | 8 6            | 9 4             | 3 54            |
| 19       | Th       |                                       | 4 7             | 8 5            | 9 22            | 5 8             |
| 20       | F        | Collodion Pos. Process pub. 1852      | 4 8             | 8 3            | 9 36            | 6 22            |
| 21       | S        | Regnault b. 1810                      | 4 9             | 8 2            | 9 46            | 7 35            |
| 22       | S        | 9th Sun. after Trinity. Bessel b.     | 4 10            | 8 1            | 9 55            | 8 48            |
| 23       | M        | [1784                                 | 4 12            | 8 0            | 10 6            | 10 1            |
| 24       | Tu       | Captain Abney b. 1843                 | 4 13            | 7 58           | 10 17           | 11 16           |
| 25       | W        | (9.7a.                                | 4 14            | 7 57           | 10 30           | After           |
| 26       | Th       | Niepce de St. Victor b. 1806          | 4 15            | 7 56           | 10 46           | 1 56            |
| 27       | F        |                                       | 4 17            | 7 55           | 11 10           | 3 32            |
| 28       | S        |                                       | 4 18            | 7 53           | 11 48           | 4 49            |
| 29       | S        | 10th Sun. after Trinity. Secchi       | 4 20            | 7 52           | Morn            | 6 8             |
| 30       | M        | [b. 1818                              | 4 21            | 7 50           | 0 45            | 7 9             |
| 31       | Tu       | Wohler b. 1800                        | 4 23            | 7 48           | 2 5             | 7 51            |

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## JULY.

MEMORANDA.

| D.<br>M. | D.<br>W. |
|----------|----------|
| 1        | S        |
| 2        | M        |
| 3        | Tu       |
| 4        | W        |
| 5        | Th       |
| 6        | F        |
| 7        | S        |
| 8        | S        |
| 9        | M        |
| 10       | Tu       |
| 11       | W        |
| 12       | Th       |
| 13       | F        |
| 14       | S        |
| 15       | S        |
| 16       | M        |
| 17       | Tu       |
| 18       | W        |
| 19       | Th       |
| 20       | F        |
| 21       | S        |
| 22       | S        |
| 23       | M        |
| 24       | Tu       |
| 25       | W        |
| 26       | Th       |
| 27       | F        |
| 28       | S        |
| 29       | S        |
| 30       | M        |
| 31       | Tu       |

*For MEETINGS OF SOCIETIES, see pp. 536-593.*

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|----------|----------|--------------------------------------|-----------------|----------------|-----------------|-----------------|
|          |          |                                      | Rises.<br>H. M. | Sets.<br>H. M. | Rises.<br>Morn. | Sets.<br>After. |
| 1        | W        |                                      | 4 25            | 7 46           | 3 39            | 8 18            |
| 2        | Th       | Stromeyer b. 1776 ● 0.24 A.          | 4 26            | 7 45           | 5 15            | 8 37            |
| 3        | F        | Mungo Ponton d. 1880                 | 4 28            | 7 43           | 6 49            | 8 51            |
| 4        | S        |                                      | 4 29            | 7 41           | 8 17            | 9 4             |
| 5        | S        | 11th S. after Trinity. Wollaston     | 4 31            | 7 40           | 9 42            | 9 16            |
| 6        | M        | Rose b. 1795 [b. 1766                | 4 32            | 7 38           | 11 3            | 9 29            |
| 7        | Tu       | Berzelius d. 1848                    | 4 34            | 7 36           | After           | 9 42            |
| 8        | W        | Roger Fenton d. 1869 (10.5 m.        | 4 35            | 7 34           | 1 44            | 9 58            |
| 9        | Th       |                                      | 4 37            | 7 33           | 3 2             | 10 22           |
| 10       | F        | Jabez Hughes d. 1884                 | 4 38            | 7 31           | 4 15            | 10 54           |
| 11       | S        | E. A. Hadow d. 1866                  | 4 40            | 7 29           | 5 18            | 11 39           |
| 12       | S        | 12th S. after Trinity. J. H. Fitz-   | 4 41            | 7 27           | 6 7             | Morn            |
| 13       | M        | Prof. Stokes b. 1819 [gibbon d. 1882 | 4 43            | 7 25           | 6 44            | 0 35            |
| 14       | Tu       | Daguerreotype Process pat. 1839      | 4 44            | 7 23           | 7 9             | 1 43            |
| 15       | W        |                                      | 4 46            | 7 21           | 7 29            | 2 56            |
| 16       | Th       | Lavoisier b. 1743 ○ 1.17 A.          | 4 48            | 7 19           | 7 43            | 4 11            |
| 17       | F        |                                      | 4 50            | 7 17           | 7 55            | 5 24            |
| 18       | S        | Dr. Woodward (photo-microscopist)    | 4 51            | 7 15           | 8 5             | 6 38            |
| 19       | S        | 13th Sun. after Trinity [d. 1884     | 4 53            | 7 13           | 8 15            | 7 51            |
| 20       | M        | Prof. Tyndall b. 1820                | 4 54            | 7 11           | 8 26            | 9 5             |
| 21       | Tu       | Chevreul b. 1786                     | 4 56            | 7 9            | 8 37            | 10 21           |
| 22       | W        | Sir Fred. Pollock d. 1870            | 4 57            | 7 7            | 8 52            | 11 42           |
| 23       | Th       |                                      | 4 59            | 7 5            | 9 12            | After           |
| 24       | F        | Cutting (Intro. of Ambrotype) d. '67 | 5 0             | 7 3            | 9 43            | 2 30            |
| 25       | S        | Faraday d. 1867 [(5.40 m.            | 5 2             | 7 0            | 10 29           | 3 50            |
| 26       | S        | 14th S. af. Trin. Paul Pretsch d.    | 5 3             | 6 58           | 11 37           | 4 57            |
| 27       | M        | ['73. Daguerre Mem. uncovered, '83   | 5 5             | 6 56           | Morn            | 5 46            |
| 28       | Tu       |                                      | 5 7             | 6 54           | 1 4             | 6 19            |
| 29       | W        | Varrentrapp b. 1815                  | 5 9             | 6 52           | 2 39            | 6 40            |
| 30       | Th       | Oliver Sarony d. 1879 ● 8.5 A.       | 5 10            | 6 50           | 4 13            | 6 54            |
| 31       | F        | Helmholtz b. 1821                    | 5 12            | 6 47           | 5 44            | 7 8             |

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**AUGUST.**

| D.<br>M. | D.<br>W. | MEMORANDA.                                         |
|----------|----------|----------------------------------------------------|
| 1        | W        | <i>For MEETINGS OF SOCIETIES, see pp. 536-593.</i> |
| 2        | Th       |                                                    |
| 3        | F        |                                                    |
| 4        | S        |                                                    |
| 5        | S        |                                                    |
| 6        | M        |                                                    |
| 7        | Tu       |                                                    |
| 8        | W        |                                                    |
| 9        | Th       |                                                    |
| 10       | F        |                                                    |
| 11       | S        |                                                    |
| 12       | S        |                                                    |
| 13       | M        |                                                    |
| 14       | Tu       |                                                    |
| 15       | W        |                                                    |
| 16       | Th       |                                                    |
| 17       | F        |                                                    |
| 18       | S        |                                                    |
| 19       | S        |                                                    |
| 20       | M        |                                                    |
| 21       | Tu       |                                                    |
| 22       | W        |                                                    |
| 23       | Th       |                                                    |
| 24       | F        |                                                    |
| 25       | S        |                                                    |
| 26       | S        |                                                    |
| 27       | M'       |                                                    |
| 28       | Tu       |                                                    |
| 29       | W        |                                                    |
| 30       | Th       |                                                    |
| 31       | F        |                                                    |

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**S E P T E M B E R.**

| D.<br>M. | D.<br>W. | REMARKABLE EVENTS.                                                   | SUN.            |                |  | MOON.           |                 |
|----------|----------|----------------------------------------------------------------------|-----------------|----------------|--|-----------------|-----------------|
|          |          |                                                                      | Rises.<br>H. M. | Sets.<br>H. M. |  | Rises.<br>Morn. | Sets.<br>After. |
| 1        | S        | Norris's Dry-plate Process pat. 1856                                 | 5 13            | 6 45           |  | 7 11            | 7 21            |
| 2        | S        | 15th Sun. after Trinity. W. Blair                                    | 5 15            | 6 43           |  | 8 37            | 7 33            |
| 3        | M        | [drowned, 1871]                                                      | 5 17            | 6 41           |  | 10 0            | 7 46            |
| 4        | Tu       | Woodbury d. 1885                                                     | 5 18            | 6 39           |  | 11 23           | 8 2             |
| 5        | W        | Pantoscopic Camera pat. 1862                                         | 5 20            | 6 36           |  | After           | 8 23            |
| 6        | Th       | [D 1.3M.]                                                            | 5 21            | 6 34           |  | 2 2             | 8 52            |
| 7        | F        | Poitevin Memorial inaugurated, '85                                   | 5 23            | 6 32           |  | 3 10            | 9 32            |
| 8        | S        | Gel.-bro. Pro. pub. by Maddox, '71                                   | 5 24            | 6 30           |  | 4 5             | 10 25           |
| 9        | S        | 16th S. after Trinity. Collodio                                      | 5 26            | 6 27           |  | 4 45            | 11 30           |
| 10       | M        | [bromide Process pub. 1864]                                          | 5 27            | 6 25           |  | 5 14            | Morn            |
| 11       | Tu       |                                                                      | 5 29            | 6 22           |  | 5 36            | 0 41            |
| 12       | W        |                                                                      | 5 31            | 6 20           |  | 5 51            | 1 56            |
| 13       | Th       |                                                                      | 5 33            | 6 18           |  | 6 4             | 3 12            |
| 14       | F        | Humboldt b. 1769                                                     | 5 34            | 6 16           |  | 6 14            | 4 26            |
| 15       | S        | Petzval d. 1891 ○ 4.22 M.                                            | 5 36            | 6 13           |  | 6 23            | 5 39            |
| 16       | S        | 17th S. af. Trin. J. L. Gihon d. '78.                                | 5 37            | 6 11           |  | 6 34            | 6 54            |
| 17       | M        | Fox Talbot d. '77 [Prof. Graham d. '69]                              | 5 39            | 6 9            |  | 6 46            | 8 10            |
| 18       | Tu       | Leon Foucault b. 1819                                                | 5 40            | 6 7            |  | 6 59            | 9 30            |
| 19       | W        | T. Grubb d. 1878 [Wilde d. 1883]                                     | 5 42            | 6 4            |  | 7 18            | 10 52           |
| 20       | Th       | Talbot's Disc. of Develop. '40. F. A.                                | 5 43            | 6 2            |  | 7 45            | After           |
| 21       | F        | Stas b. 1813 [(0.32 A.)]                                             | 5 45            | 5 59           |  | 8 24            | 1 40            |
| 22       | S        | Faraday b. 1791. Thos. Sutton b. '19                                 | 5 47            | 5 57           |  | 9 23            | 2 52            |
| 23       | S        | 18th Sun. after Trin. Woodbury                                       | 5 49            | 5 55           |  | 10 41           | 3 43            |
| 24       | M        | J. G. Tunny d. '87 [Process p. '64]                                  | 5 50            | 5 53           |  | Morn            | 4 19            |
| 25       | Tu       | Dr. Van Monckhoven b. 1834, d. 1882                                  | 5 52            | 5 50           |  | 0 10            | 4 44            |
| 26       | W        |                                                                      | 5 53            | 5 48           |  | 1 43            | 5 2             |
| 27       | Th       | Kolbe b. 1818                                                        | 5 55            | 5 46           |  | 3 13            | 5 15            |
| 28       | F        | H. Negretti d. 1879. S. Fry d. 1890                                  | 5 56            | 5 44           |  | 4 41            | 5 28            |
| 29       | S        | Courtois (Disc. of Iodine) d. '38 ● 5.44 M.                          | 5 58            | 5 41           |  | 6 8             | 5 39            |
| 30       | S        | 19th Sun. after Trinity. Balard<br>[(Discoverer of Bromine) b. 1802] | 6 0             | 5 39           |  | 7 31            | 5 52            |

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SEPTEMBER.

| D.<br>M. | D.<br>W. | MEMORANDA.                                         |
|----------|----------|----------------------------------------------------|
| 1        | S        | <i>For MEETINGS OF SOCIETIES, see pp. 536-593.</i> |
| 2        | S        |                                                    |
| 3        | M        |                                                    |
| 4        | Tu       |                                                    |
| 5        | W        |                                                    |
| 6        | Th       |                                                    |
| 7        | F        |                                                    |
| 8        | S        |                                                    |
| 9        | S        |                                                    |
| 10       | M        |                                                    |
| 11       | Tu       |                                                    |
| 12       | W        |                                                    |
| 13       | Th       |                                                    |
| 14       | F        |                                                    |
| 15       | S        |                                                    |
| 16       | S        |                                                    |
| 17       | M        |                                                    |
| 18       | Tu       |                                                    |
| 19       | W        |                                                    |
| 20       | Th       |                                                    |
| 21       | F        |                                                    |
| 22       | S        |                                                    |
| 23       | S        |                                                    |
| 24       | M        |                                                    |
| 25       | Tu       |                                                    |
| 26       | W        |                                                    |
| 27       | Th       |                                                    |
| 28       | F        |                                                    |
| 29       | S        |                                                    |
| 30       | S        |                                                    |

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**OCTOBER.**

| D.<br>M. | D.<br>W. | REMARKABLE EVENTS.                   | SUN.         |                |           | MOON.           |                 |
|----------|----------|--------------------------------------|--------------|----------------|-----------|-----------------|-----------------|
|          |          |                                      | Rises.<br>H. | Sets.<br>H. M. | H. M.     | Rises.<br>Morn. | Sets.<br>After. |
| 1        | M        |                                      | 6 2          | 5 36           |           | 8 56            | 6 6             |
| 2        | Tu       | Arago d. 1853                        | 6 3          | 5 34           |           | 10 19           | 6 24            |
| 3        | W        |                                      | 6 5          | 5 32           |           | 11 41           | 6 50            |
| 4        | Th       |                                      | 6 6          | 5 30           |           | After           | 7 25            |
| 5        | F        |                                      | 6 8          | 5 27           |           | 1 56            | 8 14            |
| 6        | S        |                                      | 6 10         | 5 25           | ▷ 7.1 A.  | 2 43            | 9 15            |
| 7        | S        | 20th Sunday after Trinity            | 6 12         | 5 23           |           | 3 17            | 10 25           |
| 8        | M        | Fr. Bollman d. 1863                  | 6 13         | 5 21           |           | 3 41            | 11 38           |
| 9        | Tu       |                                      | 6 15         | 5 19           |           | 3 57            | Morn            |
| 10       | W        |                                      | 6 16         | 5 17           |           | 4 11            | 0 53            |
| 11       | Th       | H. T. Anthony d. 1884                | 6 18         | 5 14           |           | 4 24            | 2 7             |
| 12       | F        | Gmelin b. 1792                       | 6 20         | 5 12           |           | 4 33            | 3 21            |
| 13       | S        |                                      | 6 22         | 5 10           |           | 4 42            | 4 36            |
| 14       | S        | 21st Sun. after Trinity              | 6 23         | 5 8            | ○ 6.41 A. | 4 53            | 5 53            |
| 15       | M        | Kaulbach b. 1805                     | 6 25         | 5 6            |           | 5 6             | 7 12            |
| 16       | Tu       |                                      | 6 27         | 5 4            |           | 5 24            | 8 36            |
| 17       | W        | Reaumur d. 1757. Robert Hunt d. '87  | 6 29         | 5 1            |           | 5 47            | 10 3            |
| 18       | Th       | Schonbein b. 1799. Wheatstone d.     | 6 30         | 4 59           |           | 6 24            | 11 27           |
| 19       | F        | [1875                                | 6 32         | 4 57           |           | 7 16            | After           |
| 20       | S        |                                      | 6 34         | 4 55           |           | 8 29            | 1 40            |
| 21       | S        | 22nd Sun. after Trinity              | 6 36         | 4 53           | ◐ 6.56 A. | 9 55            | 2 22.           |
| 22       | M        |                                      | 6 37         | 4 51           |           | 11 24           | 2 48            |
| 23       | Tu       |                                      | 6 39         | 4 49           |           | Morn            | 3 7             |
| 24       | W        |                                      | 6 41         | 4 47           |           | 0 53            | 3 22            |
| 25       | Th       |                                      | 6 43         | 4 45           |           | 2 19            | 3 34            |
| 26       | F        |                                      | 6 44         | 4 43           |           | 3 43            | 3 46            |
| 27       | S        | [pub. 1864. ● 5 57 A.                | 6 46         | 4 41           |           | 5 6             | 3 58            |
| 28       | S        | 23rd S. af. Trin. Col.-chlo. of Sil. | 6 48         | 4 39           |           | 6 29            | 4 11            |
| 29       | M        | Talbot Photo-eng. Proc. pat. 1852    | 6 50         | 4 37           |           | 7 53            | 4 27            |
| 30       | Tu       | [d. 1890                             | 6 51         | 4 35           |           | 9 14            | 4 50            |
| 31       | W        | John Glover d. 1864. C. I. Burton    | 6 53         | 4 33           |           | 10 33           | 5 19            |

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| D.<br>M. | D.<br>W. | MEMORANDA.                                         |
|----------|----------|----------------------------------------------------|
| 1        | M        | <i>For MEETINGS OF SOCIETIES, see pp. 536-593.</i> |
| 2        | Tu       |                                                    |
| 3        | W        |                                                    |
| 4        | Th       |                                                    |
| 5        | F        |                                                    |
| 6        | S        |                                                    |
| 7        | S        |                                                    |
| 8        | M        |                                                    |
| 9        | Tu       |                                                    |
| 10       | W        |                                                    |
| 11       | Th       |                                                    |
| 12       | F        |                                                    |
| 13       | S        |                                                    |
| 14       | S        |                                                    |
| 15       | M        |                                                    |
| 16       | Tu       |                                                    |
| 17       | W        |                                                    |
| 18       | Th       |                                                    |
| 19       | F        |                                                    |
| 20       | S        |                                                    |
| 21       | S        |                                                    |
| 22       | M        |                                                    |
| 23       | Tu       |                                                    |
| 24       | W        |                                                    |
| 25       | Th       |                                                    |
| 26       | F        |                                                    |
| 27       | S        |                                                    |
| 28       | S        |                                                    |
| 29       | M        |                                                    |
| 30       | Tu       |                                                    |
| 31       | W        |                                                    |

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## NOVEMBER.

| D.<br>M. | D.<br>W. | REMARKABLE EVENTS.                    | SUN.         |                |                 |                 | MOON. |  |
|----------|----------|---------------------------------------|--------------|----------------|-----------------|-----------------|-------|--|
|          |          |                                       | Rises.<br>H. | Sets.<br>H. M. | Rises.<br>Morn. | Sets.<br>After. |       |  |
| 1        | Th       |                                       | 6 55         | 4 31           | 11 42           | 6 4             |       |  |
| 2        | F        | W. H. Rulofson d. 1878                | 6 57         | 4 30           | After           | 7 1             |       |  |
| 3        | S        |                                       | 6 59         | 4 28           | 1 16            | 8 8             |       |  |
| 4        | S        | 24th Sun. af. Trin. Mohr b. 1806      | 7 0          | 4 26           | 1 42            | 9 21            |       |  |
| 5        | M        | ) 3.16 A.                             | 7 2          | 4 25           | 2 2             | 10 35           |       |  |
| 6        | Tu       | Senefelder b. 1771                    | 7 4          | 4 23           | 2 16            | 11 49           |       |  |
| 7        | W        | Dubois Raymond b. 1818                | 7 6          | 4 22           | 2 28            | Morn            |       |  |
| 8        | Th       | F. Zollner b. 1834                    | 7 7          | 4 20           | 2 40            | 1 2             |       |  |
| 9        | F        | Pretsch's Photo-eng. Process pat. '54 | 7 9          | 4 18           | 2 49            | 2 15            |       |  |
| 10       | S        | Laroche d. 1886                       | 7 11         | 4 16           | 3 0             | 3 30            |       |  |
| 11       | S        | 25th Sun. after Trinity. Willis's     | 7 13         | 4 15           | 3 12            | 4 48            |       |  |
| 12       | M        | [Aniline Process pat. 1864            | 7 14         | 4 13           | 3 28            | 6 11            |       |  |
| 13       | Tu       | ○ 7.40 M.                             | 7 16         | 4 12           | 3 49            | 7 38            |       |  |
| 14       | W        |                                       | 7 18         | 4 10           | 4 20            | 9 6             |       |  |
| 15       | Th       |                                       | 7 20         | 4 9            | 5 9             | 10 28           |       |  |
| 16       | F        | Lavater d. 1741                       | 7 21         | 4 8            | 6 17            | 11 35           |       |  |
| 17       | S        | C. B. Vignoles d. 1875                | 7 23         | 4 7            | 7 41            | After           |       |  |
| 18       | S        | 26th Sun. after Trin. Daguerre        | 7 25         | 4 5            | 9 11            | 0 52            |       |  |
| 19       | M        | Thorwaldsen b. 1770 [b. 1787          | 7 27         | 4 4            | 10 40           | 1 14            |       |  |
| 20       | Tu       | Prof. Draper d. 1882 (2.8 M.          | 7 28         | 4 3            | Morn            | 1 30            |       |  |
| 21       | W        |                                       | 7 30         | 4 2            | 0 6             | 1 43            |       |  |
| 22       | Th       | Schlippe b. 1749                      | 7 31         | 4 1            | 1 29            | 1 54            |       |  |
| 23       | F        | Harrison (Inv. of Globe Lens) d. 1864 | 7 33         | 4 0            | 2 50            | 2 5             |       |  |
| 24       | S        | Prof. Silliman d. 1864                | 7 34         | 3 58           | 4 11            | 2 17            |       |  |
| 25       | S        | 27th Sun. af. Trin. J. B. Hoekin      | 7 36         | 3 57           | 5 33            | 2 33            |       |  |
| 26       | M        | [d. 1869. Gustav Re b. 1835           | 7 38         | 3 56           | 6 55            | 2 53            |       |  |
| 27       | Tu       | Celsius b. 1701 ● 8.54 M.             | 7 40         | 3 55           | 8 15            | 3 20            |       |  |
| 28       | W        | Sutton's Panoramic Camera pat. '59    | 7 41         | 3 55           | 9 26            | 3 58            |       |  |
| 29       | Th       | Window d. 1875                        | 7 43         | 3 54           | 10 26           | 4 49            |       |  |
| 30       | F        |                                       | 7 44         | 3 53           | 11 12           | 5 53            |       |  |

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## NOVEMBER.

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|----------|----------|----------------------------------------------------|
| 1        | Th       | <i>For MEETINGS OF SOCIETIES, see pp. 536-593.</i> |
| 2        | F        |                                                    |
| 3        | S        |                                                    |
| 4        | S        |                                                    |
| 5        | M        |                                                    |
| 6        | Tu       |                                                    |
| 7        | W        |                                                    |
| 8        | Th       |                                                    |
| 9        | F        |                                                    |
| 10       | S        |                                                    |
| 11       | S        |                                                    |
| 12       | M        |                                                    |
| 13       | Tu       |                                                    |
| 14       | W        |                                                    |
| 15       | Th       |                                                    |
| 16       | F        |                                                    |
| 17       | S        |                                                    |
| 18       | S        |                                                    |
| 19       | M        |                                                    |
| 20       | Tu       |                                                    |
| 21       | W        |                                                    |
| 22       | Th       |                                                    |
| 23       | F        |                                                    |
| 24       | S        |                                                    |
| 25       | S        |                                                    |
| 26       | M        |                                                    |
| 27       | Tu       |                                                    |
| 28       | W        |                                                    |
| 29       | Th       |                                                    |
| 30       | F        |                                                    |

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|----------|----------|----------------------------------------|-----------------|----------------|-----------------|-----------------|
|          |          |                                        | Rises.<br>H. M. | Sets.<br>H. M. | Rises.<br>Morn. | Sets.<br>After. |
| 1        | S        | Klaproth b. 1743                       | 7 46            | 3 53           | 11 43           | 7 5             |
| 2        | S        | 1st Sunday in Advent                   | 7 47            | 3 52           | After           | 8 19            |
| 3        | M        |                                        | 7 48            | 3 52           | 0 22            | 9 32            |
| 4        | Tu       | Galvani d. 1798                        | 7 50            | 3 51           | 0 35            | 10 44           |
| 5        | W        | ) 0.15A.                               | 7 51            | 3 51           | 0 46            | 11 56           |
| 6        | Th       | Obernetter's Chromo-photo. pat. '64.   | 7 52            | 3 50           | 0 55            | Morn            |
| 7        | F        | [Guy Lussac b. 1778                    | 7 53            | 3 50           | 1 6             | 1 8             |
| 8        | S        | E. Viles d. '91. Will (Chemist) b. '12 | 7 54            | 3 49           | 1 17            | 2 23            |
| 9        | S        | 2nd S. in Advent. Scheele b. 1742.     | 7 56            | 3 49           | 1 30            | 3 42            |
| 10       | M        | [Ducde Luynes d. '67. Grasshof d. '71  | 7 57            | 3 49           | 1 48            | 5 6             |
| 11       | Tu       | Sir D. Brewster b. 1781                | 7 58            | 3 49           | 2 14            | 6 34            |
| 12       | W        | Rev. J. B. Reade d. 1870 ○ 7.46A.      | 7 59            | 3 49           | 2 55            | 8 1             |
| 13       | Th       | First Photo-enamel Proc. pat. 1854     | 8 0             | 3 49           | 3 57            | 9 18            |
| 14       | F        | E. Anthony d. 1888                     | 8 1             | 3 49           | 5 18            | 10 14           |
| 15       | S        | [wood d. 1884. T. Ross d. 1870         | 8 2             | 3 49           | 6 50            | 10 53           |
| 16       | S        | 3rd Sunday in Advent. H. Green-        | 8 2             | 3 49           | 8 22            | 11 17           |
| 17       | M        | Sir Humphry Davy b. 1778               | 8 3             | 3 49           | 9 53            | 11 36           |
| 18       | Tu       |                                        | 8 4             | 3 50           | 11 17           | 11 49           |
| 19       | W        | Mawson k. 1867 (11.16M.                | 8 5             | 3 50           | Morn            | After           |
| 20       | Th       | Pyro. Acid intro. as a Developer by    | 8 5             | 3 50           | 0 39            | 0 13            |
| 21       | F        | W. Adcock d. 1890 [Archer, 1851        | 8 6             | 3 50           | 2 0             | 0 25            |
| 22       | S        | Wollaston d. 1828                      | 8 7             | 3 51           | 3 20            | 0 39            |
| 23       | S        | 4th Sunday in Advent                   | 8 7             | 3 51           | 4 41            | 0 58            |
| 24       | M        |                                        | 8 7             | 3 52           | 6 0             | 1 21            |
| 25       | Tu       | Christmas Day. Sir I. Newton b. 1642   | 8 8             | 3 53           | 7 14            | 1 55            |
| 26       | W        | [F.R.S. d. '89. ● 2.20M.               | 8 8             | 3 54           | 8 19            | 2 42            |
| 27       | Th       | A. Claudet d. '67. Rev. S. J. Perry,   | 8 8             | 3 54           | 9 8             | 3 42            |
| 28       | F        | J. T. Goddard d. 1866                  | 8 8             | 3 55           | 9 44            | 4 50            |
| 29       | S        | [Dallmeyer d. 1833                     | 8 8             | 3 56           | 10 9            | 6 4             |
| 30       | S        | Sunday after Christmas. J. H.          | 8 8             | 3 57           | 10 27           | 7 19            |
| 31       | M        | A. Braun d. 1877. C. Waldack d. 1882   | 8 9             | 3 58           | 10 41           | 8 31            |

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## DECEMBER.

| D.<br>M. | D.<br>W. | MEMORANDA.                                                |
|----------|----------|-----------------------------------------------------------|
| 1        | S        | <p><i>For MEETINGS OF SOCIETIES, see pp. 536-598.</i></p> |
| 2        | S        |                                                           |
| 3        | M        |                                                           |
| 4        | Tu       |                                                           |
| 5        | W        |                                                           |
| 6        | Th       |                                                           |
| 7        | F        |                                                           |
| 8        | S        |                                                           |
| 9        | S        |                                                           |
| 10       | M        |                                                           |
| 11       | Tu       |                                                           |
| 12       | W        |                                                           |
| 13       | Th       |                                                           |
| 14       | F        |                                                           |
| 15       | S        |                                                           |
| 16       | S        |                                                           |
| 17       | M        |                                                           |
| 18       | Tu       |                                                           |
| 19       | W        |                                                           |
| 20       | Th       |                                                           |
| 21       | F        |                                                           |
| 22       | S        |                                                           |
| 23       | S        |                                                           |
| 24       | M        |                                                           |
| 25       | Tu       |                                                           |
| 26       | W        |                                                           |
| 27       | Th       |                                                           |
| 28       | F        |                                                           |
| 29       | S        |                                                           |
| 30       | S        |                                                           |
| 31       | M        |                                                           |

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### PHOTOGRAPHIC SOCIETIES OF THE UNITED KINGDOM.

**Abney Camera Club.**—(ESTABLISHED 1889.)—Meetings held on the first Tuesday of each of the winter months at the houses of the members in rotation. *Secretary*—F. H. Leeds, F.I.C., F.C.S., 26 East Bank, Stamford Hill, N.

**Accrington and District Camera Club.**—(ESTABLISHED 1892.)—Meetings held at Munro's Studio, Burnley Road. *President*—Dr. Clayton. *Vice-Presidents*—Rev. J. R. Rendell, Dr. Geddis, Joseph Barnes, W. J. Cheney, T. Stanley. *Committee*—F. Bradshaw, W. L. Bunting, William Clayton, W. J. Clayton, James Oldham, B. T. Westwell. *Treasurer*—John Hanson. *Secretary*—Isaac Hanson, Rothwell Heights, Accrington.

**Aldenham Institute Camera Club.**—(ESTABLISHED 1889.)—Meetings are held every alternate Tuesday at the Aldenham Institute, Goldington Crescent, London, N.W. *President*—James Robertson. *Chairman*—W. V. Mingard. *Committee*—John Owen, H. J. Redfern, W. Pringle, J. Pringle. *Secretary*—G. E. Harris. *Assistant Secretary*—Edwin Pringle.

**Amateur Photographic Association.**—(ESTABLISHED 1861.)—Offices, 58 Pall Mall, London, S.W. (opposite Marlborough House). *President*—H.R.H. the Prince of Wales. *Vice-Presidents*—H.R.H. The Duke of Cambridge, K.G., H.H. the Duke of Teck, G.C.B., &c., General the Right Hon. the Lord de Ros, The Most Noble the Marquis of Drogheda, The Right Hon. the Earl of Rosse, F.R.S., James Glaisher, F.R.S., F.R.A.S., &c. *Council*—Sir J. Whittaker Ellis, Bart., M.P., Sir Spencer Maryon Wilson, Bart., Charles Stephens, M.A. (Oxon.), W. D. Howard, F.I.C., Walter Wood, F.R.G.S., W. S. Hobson, John Aird, M.P., R. O. Milne. *Hon. Secretary*—Arthur James Melhuish, F.R.A.S., F.R.Met.Soc. *Assistant Secretary*—A. Newton Melhuish.

**Amateur Photographic Field Club.**—(ESTABLISHED 1858.)—Monthly Outings during the summer. Indoor Meetings monthly during the winter. Annual Meeting in February. *President*—F. Cobb. *Secretary and Treasurer*—B. Gay Wilkinson, jun., 151 Bermondsey Street, London, S.E.

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**Arbroath Amateur Photographic Association.**—(ESTABLISHED 1890.)—*President*—Robert Moodie. *Vice-President*—George K. Reid. *Committee*—James McLeish, George Donaldson, Robert Davidson, William Webster, David Kyd. *Secretary and Treasurer*—Edward J. Ritchie, Chiffburn, Arbroath.

**Ashton-under-Lyne Photographic Society.**—(ESTABLISHED 1891.)—Headquarters, Henry Square, open daily from Nine a.m. until Ten p.m. *President*—Dr. A. Hamilton. *Vice-Presidents*—J. W. Kenworthy, Rev. H. J. Palmer, C. E. Redfern, Major Bradley. *Committee*—W. Chadwick, T. Glazebrook, W. Greenwood, W. Leigh, C. Lord, R. Matthews, G. Weald, S. Hutchinson. *Treasurer*—R. T. Morsland. *Secretary*—George H. Dean, 8 Egmont Terrace, Stalybridge.

**Aston Natural History and Photographic Society (Photographic Section).**—(ESTABLISHED 1891.)—Meetings held at Burlington Hall, High Street, Aston. *President*—John Edmonds. *Vice-Presidents*—Dr. Hill Norris and William Tylar. *Committee*—Councillor S. Fisher, George Priddin, A. C. Townsend, G. Johnson, C. P. Nevill, W. Woollaston, W. Allcott, W. S. Green. *Treasurer*—F. Wallis. *Secretary*—Frederick W. Pilditch (Photographic Section), 133 Wills Street, Lozells, Birmingham.

**Barrow-in-Furness Naturalist Field Club (Photographic Section).**—(ESTABLISHED 1890.)—Meetings held at the Cambridge Hall, Barrow. *President*—A. Blechynden. *Vice-Presidents*—W. Dunlop and C. J. Weston. *Treasurer*—F. W. Walton. *Secretary*—John Redhead, 9 Spring Street, Barrow-in-Furness.

**Bath Photographic Society.**—(ESTABLISHED 1888.)—Meetings held at the Royal Literary and Scientific Institution. *President*—Austin J. King. *Vice-Presidents*—Philip Braham, F.C.S., and Aug. F. Perren. *Committee*—E. J. Appleby, E. Lambert, Dr. G. Norman, George F. Powell, Rev. E. A. Purvis, D. Williams, the Very Rev. Monseigneur Williams, W. Pumphrey (permanent member of Committee). *Secretary and Treasurer*—W. Middleton Ashman, 12A Old Bond Street, Bath.

**Bedford and District Amateur Photographic Society.**—(ESTABLISHED 1890.)—*President*—Rev. H. Victor Macdona, M.A. *Council*—The President, Deputy Surgeon-General A. H. Beaman, H. W. Stewardson, Alex. Kirby, P. Hill, Montague Troup, the Secretary. *Secretary and Treasurer*—W. E. Ison, Hughenden, Bedford.

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**Belfast Y.M.C.A. Camera Club.**—(ESTABLISHED 1889.)—Meetings held at 14 Wellington Place, Belfast. *President*—William Swanston, F.G.S. *Vice-Presidents*—W. J. D. Walker and William Strain. *Committee*—T. F. Bell, J. E. Pim, T. B. Scott, J. A. Pollock, A. R. Hogg, A. George. *Secretary and Treasurer*—James McCleery, 14 Wellington Place, Belfast.

**Beverly Photographic and Sketching Society.**—(ESTABLISHED 1893.)—Meetings are held fortnightly in the Society's Room, Butcher Row. *President*—H. B. R. Hall-Watt. *Vice-Presidents*—Rev. F. J. Hall and Rev. B. C. Burton. *Hon. Secretaries*—A. W. Pickering (Financial) and T. J. Morley (General), Toll Gavel, Beverley.

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**Birmingham Photographic Society.**—(ESTABLISHED 1885.)—Club Room, Colonnade Hotel, New Street. *President*—Sir J. B. Stone, J.P., F.G.S., F.R.G.S. *Vice-Presidents*—J. J. Button, J. H. Pickard, J. T. Mousley, W. Jones. *Council*—F. S. Goode, E. Underwood, G. F. Lyndon, J.P., A. R. Longmore, A. J. Leeson, W. S. Horton (*Librarian*), Ernest Winn (*Assistant Secretary*), T. Taylor, E. C. Middleton, G. A. Thomson. *Treasurer*—William Rooke. *Secretary*—James Simkins, Brooklands, Solihull.

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**Bolton Photographic Society.**—(ESTABLISHED 1879.)—Meetings are held at 10 Rushton Street, Bolton. *President*—J. R. Bridson, J.P. *Vice-Presidents*—B. H. Abbott, E. N. Ashworth, W. Banks, J. Boothroyd, R. Harwood, W. Knowles, J. Taylor. *Council*—J. E. Austwick, W. Collier, T. Davies, R. Flintoff, W. Green, A. Harper, Dr. Johnston, J. Leach, J. S. Roscow. *Hon. Secretary and Treasurer*—C. K. Dalton, 50 Higher Bridge Street, Bolton.

**Border Amateur Photographic Association.**—(ESTABLISHED 1892.)—Meetings held at the Studio, High Street, Galashiels. *President*—Rev. W. Burnet Thomson, B.D. *Vice-President*—F. A. Blair, F.C.S. *Committee*—Robert Stewart, Henry Fleming, James Lewis, Thomas Ingrem, W. R. Morris, W. R. Jeffrey. *Secretary and Treasurer*—B. Cartwright, A.P.S., 50 High Street, Galashiels.

**Borough of Tynemouth Camera Club.**—(ESTABLISHED 1893.)—Place of Meeting, Bedford House, Bedford Street, North Shields. *President*—Frank Gray. *Vice-President*—J. Knowles Gordon. *Committee*—F. Gray, J. K. Gordon, E. Godfrey, J. Blyth, A. Surtees, J. A. Tait, William S. Irvin. *Hon. Secretary and Treasurer*—William S. Irvin, Bedford House, Bedford Street, North Shields.

**Bournemouth Scientific and Antiquarian Society (Photographic Section).**—(ESTABLISHED 1890.)—Meetings held at Athenæum Chambers, Town Hall Avenue. *President*—Rev. J. R. Husband, M.A. *Vice-Presidents*—Dr. Hyla Greves and Dr. H. Nankivell. *Committee*—Dr. R. Denman, Dr. Frazer, Dr. F. Cory, P. H. Price, E. Greenleaves, W. J. Fuller. *Treasurer*—S. Hardwick. *Secretary*—William Jones, 203 Old Christchurch Road, Bournemouth.

**Bradford Photographic Society.**—(ESTABLISHED 1882.)—Meetings every alternate Thursday, at the Chamber of Commerce, Exchange, Bradford. *President*—F. J. R. Sutcliffe. *Vice-Presidents*—Isidor Sonnenthal, W. H. Scott, W. Halstead, J. H. Binns. *Committee*—Rev. T. Mellodey, M.A., J. P. Burgess, George Firth, Walter Leach, F.C.A., W. Judson, Thomas Dalby, H. Wilson, J. E. Shaw, W. H. Greenwood, H. E. Sonnenthal. *Hon. Secretary*—F. B. Pickles, 15 Beech Grove, Pollard Lane, Bradford.

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**Brechin Photographic Association.**—(ESTABLISHED 1888.)—Meetings held at 14 St. Mary Street. *President*—William Shaw Adamson, of Careston. *Vice-Presidents*—J. Ireland and J. Buchanan. *Committee*—A. McLeod, A. Watson, W. Dakers. *Curator*—A. Brown. *Treasurer*—J. Mitchell. *Secretary*—James D. Ross, 6 High Street, Brechin, N.B.

**Brighton and Sussex Natural History and Philosophical Society (Photographic Section).**—(ESTABLISHED 1893.)—Meetings are held usually on the first Friday in the month in the Librarian's Room, Public Library, Royal Pavilion, Church Street, at Eight p.m. *Committee*—J. P. Slingsby Roberts (*Chairman*), D. E. Caush, W. Harrison, C. Job, W. W. Mitchell, H. V. Shaw, C. B. Stoner, A. H. Webbing. *Hon. Secretary*—G. Foxall, 'Woodlands,' Port Hall Road, Brighton.

**Bristol and West of England Amateur Photographic Association.**—(ESTABLISHED ABOUT 1866.)—Meetings held at the Literary and Philosophic Club, 20 Berkeley Square, Bristol. *President*—H. A. Hood Daniel, F.S.I. *Vice-Presidents*—Edward Brightman and Colonel Playfair. *Council*—J. Phillips, W. Norgrove, T. Davey, H. A. Hutchinson, and the Officers (*ex-officio*). *Treasurer*—William Moline. *Secretary*—Frederick Bligh Bond, 36 Corn Street, Bristol.

**British Association for the Advancement of Science.**—(ESTABLISHED 1831.)—The next meeting will be held at Oxford. *President*—Dr. Burdon Sanderson, F.R.S. *President-Elect*—The Marquess of Salisbury, K.G. *Treasurer*—Professor A. W. Rücker, F.R.S. *General Secretaries*—Sir Douglas Galton, K.C.B., and A. Vernon Harcourt, F.R.S. *Assistant General Secretary*—G. Griffith, M.A.

**Brixton and Clapham Camera Club.**—(ESTABLISHED 1889.)—Meetings are held at the Clarence Rooms, 376 Coldharbour Lane, Brixton, S.W. *President*—J. Reynolds, M.D., F.R.G.S. *Vice-Presidents*—J. W. Coade, F. Goldby, W. H. Harrison. *Committee*—T. J. Bartrop, J. A. Butler, E. Dockree, W. Thomas, F. W. Kent, F. W. Levett. *Treasurer*—R. G. F. Kidson. *Secretary*—B. E. Pinder, 7 McDowall Road, Camberwell, S.E.

**Burton-on-Trent Natural History and Archæological Society (Photographic Section).**—(ESTABLISHED 1889.)—Meetings held at 30 High Street, Burton-on-Trent, on the first Friday in each month. *Chairman*—R. Churchill. *Hon. Secretary*—John E. Nowers.

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**Burnley Photographic Society.**—(ESTABLISHED 1885, REORGANIZED 1889.)—Place of Meeting, Bank Chambers, Hargreaves Street, Burnley. *President*—J. Butterworth, J.P. *Vice-Presidents*—J. C. Brumwell, M.D., J.P., D. Drew, J.P., Councillor W. C. Hargreaves, J.P., T. Edmondson, J.P., John Rawcliffe. *Council*—J. J. Bell, J. Holgate, Rev. T. Leyland, J. L. Lee, V. Dunkerley, A. Howarth, W. H. Hoghton, T. Ormerod. *Treasurer*—A. H. Kellatt. *Secretary*—Jesse L. Altham, 157 Manchester Road, Burnley.

**Bury Photographic and Arts Club.**—(ESTABLISHED 1882.)—Meetings and Demonstrations every Wednesday evening during winter months. Monthly Meeting, third Wednesday in each month. Lantern Meeting, first Wednesday. Outdoor Meetings every ten days, March to October. Annual Meeting, fourth Wednesday in September. Club Rooms, 13 Agar Street, Bury. *President*—E. W. Mellor, J.P., F.R.G.S. *Vice-Presidents*—C. H. Openshaw and W. Booth. *Council*—T. M. Barbour, W. Mellor, A. F. Stanesby, T. Talbot, J. Ward. *Hon. Treasurer*—T. R. Bertwistle. *Hon. Secretaries*—Roger Wood and A. W. Dye, 11 Bolton Street, Bury, Lancashire.

**Camera Club.**—(ESTABLISHED 1885.)—The Camera Club Company, Limited, are the proprietors of the Camera Club, and the liability of each member of the Club is limited to the amount of his annual subscription. By the Articles of Association of the Company the application by or on behalf of every person to become a member of the Club shall be deemed to imply an application by such person for one ordinary share in the Company, and a request to appropriate 1*l.* of the prescribed entrance fee in full payment for such share, to which no liability therefore attaches; such share, however, is forfeited to the Company upon the holder ceasing to be a member of the Club.

**Cardiff Photographic Society.**—(ESTABLISHED 1886.)—Meetings held at Castle Arcade, Cardiff. *President*—Charles F. Gooch, J.P. *Vice-Presidents*—Jonas Watson, J.P., Walter Insole, S. W. Allen, M.I.M.E., T. Mansel Franken, E. H. Bruton, Alex. Kellar. *Council*—W. H. Kitchen, Frederick Heitzman, William Herbert, Alfred Freke, F. C. Webber, W. Foster, A. McKinnon, C. H. Murrell, D. B. McCallum, William Booth, Fred Cadd, W. J. Crews, Thomas Forrest. *Treasurer*—G. H. Wills, jun. *Hon. Secretaries*—G. H. Bedford and T. H. Faulks, 127 Bute Road.

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**Central Photographic Club.**—(ESTABLISHED 1893.)—Meetings are held at Coleman's Hotel, Henrietta Street, Covent Garden, W.C. *President*—George Mason. *Committee*—Birt Acres, R. Beckett, F. P. Cembrano, A. Cowan, T. Sebastian Davis, T. E. Freshwater, F. W. Hindley, A. Horsley Hinton, Dr. Lindsay Johnson, A. Pringle, J. S. Teape, H. Van der Weyde, R. Keene, Paul Lange, Lyddell Sawyer, I. Stuart, F. M. Sutcliffe, W. M. Warneuke. *Trustees*—Thomas Fall and George Mason. *Treasurer*—John Howson. *Secretaries*—W. Fenton Jones, 12 King Edward Road, Hackney, N.E., and Charles H. Oakden, 51 Melbourne Grove, East Dulwich.

**Cheltenham Amateur Photographic Society.**—(ESTABLISHED 1865.)—Place of Meeting, The College Pharmacy, Bath Road, Cheltenham. *President*—General F. Dawson, C.B. *Vice-President*—Lieut.-Colonel H. M. Saunders. *Committee*—W. Beetham, J. Bull, W. H. Bagnall, Dr. G. B. Ferguson, L. Winterbotham, the Secretary. *Secretary and Treasurer*—Philip Thomas, College Pharmacy, Cheltenham.

**Chester Society of Natural Science and Literature (Photographic Section).**—(ESTABLISHED 1887.)—Meetings held in the Grosvenor Museum, Chester. *Chairman of Section*—Henry Stolterfoth, M.D., M.A., J.P. *Committee*—Mrs. T. H. Hignett, A. G. Ayrton, E. G. Ballard, A.R.S.M., Frederick Evans, George Frater, John Frost, A. H. Hignett, C. W. Townshend. *Secretary and Treasurer*—J. H. Spencer, 36 Bridge Street, Chester.

**Chorley Polytechnic Photographic Society.**—(ESTABLISHED 1892.)—Place of Meeting, Fellery Street, Chorley. *President*—J. T. Brierley, F.C.S. *Committee*—H. R. Dorning, N. Alker, J. Wareing, President, Treasurer, Secretaries. *Treasurer*—R. Gill. *Secretaries*—James G. Welch, 76 Seymour Street, Chorley, and William Waring, Eaves Lane, Chorley.

**City and Guilds of London Institute Photographic Society.**—Affiliated to the Photographic Society of Great Britain; Delegates, A. J. Chapman and L. G. Upcott Gill. *Committee*—A. J. Chapman, H. Cubitt, L. H. Hughes, W. Staynes. *Treasurer*—T. Norris. *Hon. Secretary*—L. G. Upcott Gill.

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**City and Guilds of London Technical College, Finsbury, Photographic Society.**—(ESTABLISHED 1887.)—Meetings held at Technical College, Finsbury. *President*—Sylvanus P. Thompson, D.Sc., F.R.S. *Vice-Presidents*—R. Meldola, F.R.S., F.T.C., and J. Castell Evans, F.T.C. *Committee*—A. Campion, P. Gilford, C. H. Prichard, H. Staynes. *Treasurer*—T. H. Norris, A.T.C. *Secretary*—A. J. Chapman, Technical College, Finsbury, E.C.

**Cleveland Camera Club.**—(ESTABLISHED 1888.)—Meetings are held in the Cleveland Literary and Philosophical Society's Hall, Corporation Road, Middlesbrough. *President*—W. W. Stainthorpe, M.D. *Vice-Presidents*—Henry T. Allison and F. Herbert Marshall. *Council*—J. A. Hart, H. R. West, J. Victor, W. Wood, J. E. Stead. *Secretary and Treasurer*—J. J. Hallam, 11 Amber Street, Saltburn-by-the-Sea.

**Clydesdale Camera Club.**—(ESTABLISHED 1889.)—*President*—H. E. Gordon. *Hon. Secretary and Treasurer*—Miss Burns, Castle Wemyss, Wemyss Bay, N.B.

**Colne Camera Club.**—(ESTABLISHED 1893.)—Meetings held at the Cloth Hall. *President*—Rev. Thomas Leyland. *Vice-Presidents*—Henry Hewitt and Joshua Duckworth. *Committee*—Joshua Robinson, Jonas Ratcliffe, Fred Nixon, Thomas Grimshaw. *Treasurer*—Jonas Ratcliffe. *Secretary*—Fred Whittam, 9 Spring Lane, Colne.

**Coventry and Midland Photographic Society.**—(ESTABLISHED 1883.)—Meetings are held at the Y.M.C.A. Rooms, Coventry. *President*—Councillor Wm. Andrews. *Vice-Presidents*—H. W. Jones, W. R. Goate, F. W. Hardy, F. J. Harker. *Council*—H. Hawley, G. R. Heaviside, H. Sturmeay, E. J. Walker. *Treasurer*—W. L. J. Orton. *Hon. Secretaries*—H. Mountfort, and A. B. Clarke, Hampton House, Coventry.

**Craven Naturalists' and Scientific Association (Photographic Section).**—(ESTABLISHED 1893.)—Meetings are held at the Globe Coffee Tavern, Skipton (*pro tem.*), at Eight p.m., the first Friday in each month. *President*—R. H. Tiddeman, M.A. *Secretary and Treasurer*—T. Geldart, 18 Salisbury Street, Skipton.

**Crewe Locomotive Offices Photographic Excursion Society.**—*Chairman*—W. Henry Wharton. *Council*—A. H. Badger, R. H. Dutton, J. Ellam, J. Lyon, T. C. Mason, R. Lewin. *Hon. Secretary and Treasurer*—A. Powell, Ormonde House, Edleston Road, Crewe.

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**Crewe Scientific Society (Photographic Section).**—(ESTABLISHED 1891.)—Meetings are held at the Mechanics' Institute. *President*—A. H. Hignett. *Committee*—Rev. Dr. Rainsford, D.D., W. Gibson, E. A. Crooke, F. S. Ransome, J. S. Hough, F. C. Tipler. *Treasurer*—J. Kendrick. *Secretary*—W. Bispham, 60 Samuel Street, Crewe. *Assistant Secretary*—J. Laing, 6 Victoria Street, Crewe.

**Cromwell Photographic Club.**—(ESTABLISHED 1891.)—Place of Meeting, Cromwell Hotel, Great Yarmouth, where a dark room is provided for the use of amateurs. The Monthly Meetings of the Club are held on the first Wednesday in every month, and during the months of November, December, January, February, and March an additional Meeting on the third Wednesday. *President*—R. H. Inglis Palgrave, F.R.S. *Vice-Presidents*—Miss V. Buxton, John Bately, M.D., F. Burton, C. S. Watson, John Starling. *Committee*—H. Palmer, E. Wright, H. Pechey, T. Goate, A. Price, G. Rumbold, J. R. Ellis, G. Waller, jun., E. G. Leech. *Treasurer*—T. W. Swindell. *Secretary*—Charles Rumbold, 4 Dene Side, Great Yarmouth.

**Croydon Camera Club.**—(ESTABLISHED 1890.)—Club Rooms, 56 George Street, Croydon. Annual Meeting in February. *President*—Hector Maclean, F.G.S. *Vice-Presidents*—F. Foss, J.P., Hon. Sydney Herbert, M.P., F. T. Edridge, J.P., B. Gay Wilkinson. *Council*—G. Carden, W. F. Frost, A. W. Hirst, A. E. Isaac, C. F. Oakley, J. Packham, S. Wratten. *Treasurer*—A. J. Sargeant. *Secretary*—G. R. White, 55 Albert Road. *Hon. Assistant Secretary and Librarian*—H. E. Holland, 69 Langdown Road.

**Croydon Microscopical and Natural History Club (Photographic Section).**—(ESTABLISHED 1870.)—Meetings are held at the Public Hall, George Street, Croydon. Dark room open to members at all times. *President*—H. Franklin Parsons, M.D., F.G.S. *Vice-President*—Edward Lovett. *Committee*—J. Weir Brown, C. F. Oakley, A. H. Carter (*Recorder*), W. Low Sarjeant. *Treasurer*—E. B. Sturge. *Secretary*—H. Douglas Gower, 16 Wandle Road, Croydon, Surrey.

**Cyclists' Photographic Portfolio Club.**—(ESTABLISHED 1886.)—There are four portfolios in which members' prints are circulated for criticism, &c., prints being changed by each member on a portfolio reaching him. *Secretary*—W. L. J. Orton, 7 Bishop Street, Coventry.

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**Dartford and District Photographic Society.**—(ESTABLISHED 1893.)—Place of Meeting, Messrs. Horrell & Goff's, High Street, Dartford. *President*—Dr. J. Hamilton. *Vice-Presidents*—F. W. Gill, W. E. Goff, A. Waring, O. J. Ellis, A. R. Dresser. *Council*—H. W. Reynolds, W. J. Mitchell, G. Williams, J. Adams, J. Ralphs. *Treasurer*—W. E. Goff. *Secretary*—C. Moore, Spring Vale.

**Dartmouth Amateur Photographic Society.**—*President*—Roger Mostyn *Committee*—E. Anwyl, E. Bearcroft, B. Michelmore, C. Sims, J. H. Spanton, William Simpson, G. R. Whitaker, R. Whitaker. *Hon. Secretary and Treasurer*—George Barnston.

**Derby Photographic Society.**—(ESTABLISHED 1884.)—Meetings are held at Smith's Restaurant, Victoria Street, Derby. *President*—Captain W. de W. Abney, R.E., F.R.S. *Vice-President*—F. Keene. *Committee*—A. H. Bennett, C. Bourdin, C. B. Keene, T. Scotton, G. Walker, R. Woods. *Treasurer*—A. B. Hamilton. *Secretary*—T. A. Scotton, 9 Church Street, Derby.

**Devon and Cornwall Camera Club.**—(ESTABLISHED 1888.)—Club Rooms, The Athenæum, Plymouth. Ordinary Meetings on alternate Mondays at Eight p.m. Annual Meeting in September. *President*—Lieut.-Colonel R. Barrington Baker. *Vice-Presidents*—W. Gage Tweedy and R. Burnara. *Council*—C. Aldridge, M.D., J. S. Hawker, J.P., E. H. Micklewood, D. Roy, Captain Waye, R.N., Colonel Stewart, R.E., Miss Edith Keen, A. A. Carnell. *Hon. Auditor*—W. Luxon. *Hon. Treasurer*—C. Russel Rendle. *Hon. Secretary*—R. Hansford Worth, C.E., 42 George Street, Plymouth.

**Devonport Camera Club.**—(ESTABLISHED 1891.)—Place of Meeting, Odd Fellows' Hall, Ker Street, Devonport. Annual Meeting, first Monday in September. *Patron*—The Right Hon. Lord St. Levan. *President*—Colonel R. W. Stewart, R.E. *Vice-Presidents*—W. Waycott, Lieut.-Colonel J. Thacker, C. Croydon, E. J. Seymour. *Committee*—J. F. Coombes, R. Lamb, H. Pike, G. K. Short. *Treasurer*—J. Crook. *Secretary*—C. H. Moore, 18 George Street, Devonport.

**Dorset Amateur Photographic Association.**—(ESTABLISHED 1886.)—Place of Meeting, Dorchester. *President*—Rev. W. Miles Barnes, M.A. *Committee*—*President*, Hon. *Secretary*, C. C. Hughes D'Aeth, Rev. E. J. Pope, M.A. *Secretary and Treasurer*—Rev. T. Perkins, M.A., F.R.A.S., Turnworth Rectory, Blandford.

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**Dewsbury Amateur Photographic Society.**—(ESTABLISHED 1888.)—Meetings are held in the Library, Dewsbury Technical School, on the second Thursday in each month, at half-past Seven p.m. Annual Meeting held in January. Excursions during the summer months; papers, demonstrations, &c., during winter season. *President*—S. Mitchell, L.D.S. *Vice-President*—George Barker. *Council*—A. S. Marriott, C. Naylor, E. Scargill, J. Taylor, L.D.S. *Hon. Secretary and Treasurer*—George Kilburn, 8 Stonefield Street, Dewsbury.

**Dublin Y. M. C. A. Camera Club.**—(ESTABLISHED 1891.)—Meetings held at Christian Union Buildings, 14 Lower Abbey Street. *President*—Prof. C. R. C. Tichborne, LL.D. *Committee*—F. N. Binks, G. Cameron, S. Cochrane, J. G. Mackenzie, G. W. Riky, C. E. Stewart. *Treasurer*—George A. Parnell. *Secretaries*—L. Davidson, 32 Manor Street, Dublin, and G. A. Parnell, Botanic Gardens, Glasnevin, Dublin.

**Dukinfield Photographic Society.**—(ESTABLISHED 1888.)—Meetings held at the Co-operative Hall, Astley Street, Dukinfield. *President*—Samuel Woolley. *Vice-Presidents*—S. T. Ainsworth and John T. Lees. *Council*—T. Borsey, H. Broadbent, R. Deakin, J. W. Hadfield, W. Jenkinson, J. Leech, J. H. Snowden. *Treasurer*—John Winterbottom. *Secretary*—William H. Shirley, Commercial Buildings, King Street, Dukinfield.

**Dundee and East of Scotland Photographic Association.**—(ESTABLISHED 1879.)—Meetings held at Lamb's Hotel, Dundee. *President*—J. D. Cox. *Vice-Presidents*—W. Salmond and Dr. J. K. Tulloch. *Council*—J. W. Munro, A. Stewart, J. R. Stewart, J. R. Wilson, W. Baxter, P. Feathers, D. Ireland, Dr. McGillivray, D. Elder, J. H. Halley, G. G. Maclaren, R. C. Henderson. *Secretary and Treasurer*—V. C. Baird, Broughty Ferry, N.B.

**Durham City Camera Club.**—(ESTABLISHED 1892.)—Meetings are held at the Shakespeare Club Room, North Road, Durham. *President*—Rev. H. E. Fox, M.A. *Vice-Presidents*—Dr. Barron and Councillor E. White. *Council*—Messrs. Bater, Chapelow, Green, Morson. *Hon. Treasurer*—Councillor William Gray. *Hon. Secretary*—Robert Hauxwell, The Avenue, Durham.

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**Ealing Photographic Society.**—(ESTABLISHED 1890.)—Meetings are held at the Public Buildings, Ealing, *President*—H. W. Peal. *Vice-Presidents*—C. Jones, W. T. White, T. Simpson, H. C. Draper. *Council*—Messrs. Wakefield, Belt, Gregory, C. Whiting, Drs. Gibbons and Phillpotts. *Hon. Librarian and Custodian of Dark Room*—B. E. Peal. *Hon. Treasurer*—A. F. Taylor. *Hon. Secretary*—Mr. Murphy.

**Eastbourne Photographic Society.**—Place of Meeting, Natural History Rooms, Lismore Road. *President*—H. Habgood, M.D. *Vice-Presidents*—H. Mitchell Whitley and Rev. H. G. Jameson. *Treasurer*—T. Hollway. *Secretary*—E. Burnham, 60 Terminus Road, Eastbourne.

**East London Photographic Society.**—(ESTABLISHED 1891.)—Meetings held at the Town Hall, Shoreditch. *President*—G. S. Pasco, A.P.S. *Vice-Presidents*—C. Stone, C. Tyler, M. A. Wilkinson. *Council*—M. Bukford, G. F. Eeles, S. Markheim, C. N. Mead, E. M. Minns, R. J. Tyler, F. Uffendell, H. G. Walliss. *Librarian*—S. Aldridge. *Lanternist*—J. E. Wrenn. *Treasurer*—H. G. Cook. *Secretary*—Walter R. Gould, 61 Gibraltar Walk, Bethnal Green, London, E.

**Edinburgh Photographic Club.**—(ESTABLISHED 1881.)—Meetings on the third Wednesday of each month during the session in the Photographic Hall, 38 Castle Street. *Board of Management*—James Crichton (*Convener*), Thomas Wardale (*Treasurer*), G. G. Mitchell (*Secretary*).

**Edinburgh Photographic Society.**—(ESTABLISHED 1861.)—Meetings, first Wednesday in the month, from October to June inclusive, at Eight p.m., at 38 Castle Street. Society's Rooms always open. *President*—John Moffatt, sen. *Vice-Presidents*—Alexander Ayton, jun., J. C. Oliphant, M.A. *Council*—Hugh Auld, J. C. H. Balmain, A. A. Inglis, J. R. Roddick, H. W. Bibbs, Hippolyte J. Blanc, R. W. Hawks, J. Patrick, W. T. Bashford, S. Keith, A. W. McGregor, T. Wardale. *Librarian*—Charles Fraser. *Treasurer*—James McGlashan. *Secretary*—F. Barclay, 180 Dalkeith Road, Edinburgh.

**Edinburgh Viewfinders' Club.**—(ESTABLISHED 1890.)—Meeting, first Monday of each month at Eight p.m., at 31 Chambers Street. Annual Meeting, October. *Secretary and Convener*—Thomas W. Drinkwater, Ph.D., L.R.C.P.Ed., 31 Chambers Street, Edinburgh.

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**Edinburgh University Photographic Society.**—(ESTABLISHED 1890.)—The Society's Rooms are at 3 Bristo Place. Meetings held monthly in the winter, Excursions fortnightly in the summer. *Hon. President*—Prof. Crum Brown. *President*—Dr. Drinkwater. *Vice-President*—Dr. Logan Turner. *Committee*—Dr. Whait, Dr. Pearce, S. T. Aarons, E. R. S. Hale, R. Harrison, A. W. McGregor. *Secretary and Treasurer*—H. Overton Hobson, The Union, Edinburgh.

**Elizabethan Photographic Society, Barnet.**—(ESTABLISHED 1887.)—Ordinary Meetings for practical work held in the Science and Art Room of Queen Elizabeth's Grammar School, at Eight p.m., on the first Wednesday of each month from October to March. Public Lantern demonstrations, third Thursday in the month from October to March, at Eight p.m., in the School Hall. Outdoor Meetings, monthly during the summer. *President*—Rev. J. Bond Lee, M.A. *Vice-Presidents*—T. Samuels, L. Matthews, H. Milne. *Committee*—W. Baddeley, H. Imray, L. Medland, W. H. Ottaway. *Treasurer*—G. W. N. Harrison, M.A. *Secretary*—H. E. G. Kingsford, Grammar School, Barnet.

**Eton College Photographic Society.**—(ESTABLISHED 1889.)—Place of Meeting, Eton College. *President*—Rev. Thomas Cunningham Porter. *Treasurer*—Hugn Bant Cole. *Secretary*—C. A. M. Howard, South Lawn, Eton College, Bucks.

**Exeter Amateur Photographic Society.**—(ESTABLISHED 1890.)—Ordinary Meetings, first and third Tuesday in the month from October to March, other months first Tuesday only, at eight p.m. Headquarters, City Chambers, Gandy Street, Exeter. *President*—Dr. James Cheese. *Vice-President*—W. P. Wall. *Council*—Messrs. Holden, Dudley, Berrie, Cole, Lloyd-Jones. *Treasurer*—J. Hinton Lake. *Secretary*—Rev. John Sparshatt, Fairfield House, St. Thomas, Exeter.

**Fakenham District Camera Club.**—(ESTABLISHED 1892.)—Meetings held at the Club Room, Temperance Hotel, Bridge Street, Fakenham. *President*—Algernon Digby, M.A. *Vice-Presidents*—Rev. A. E. Hunphreys, M.A., Rev. W. Martin, B.A., Thomas Charlton. *Committee*—H. H. Charlton, H. R. C. Davis, C. W. Horsley, F. W. Miller. *Secretary and Treasurer*—Henry Newson, The Square, Fakenham, Norfolk.

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**Fairfield Camera Club.**—(ESTABLISHED 1891.)—Rooms, The Lecture Hall, Primitive Methodist's Chapel, Jubilee Drive. Meetings are held on the second Friday in each month during the summer, and fortnightly during the winter. *Hon. Secretary*—A. S. Allender, 71 Canning Street, Liverpool.

**Faversham Institute Photographic Society.**—(ESTABLISHED 1890.)—Meetings held at the Faversham Institute. *President*—Right Hon. Viscount Throwley. *Vice-Presidents*—W. C. Stunt, Captain C. F. Hooper, C. J. Evers, M.D. *Committee*—C. Cremer, F. Crosoer, A. N. Filmer, M. Laxon, S. N. Smith. *Secretary and Treasurer*—Charles H. Semark, Stone Street, Faversham.

**Orfshire International Photographic Exhibition.**—(ESTABLISHED 1892.) *Hon. President*—Alexander Robertson. *Hon. Vice-President*—Robert Whyte. *Chairman of Committee*—Gilbert W. Don. *Treasurer*—Robert Bruce. *Local Secretaries*—James Watson Craik, Forfar; James D. Ross, 6 High Street, Brechin; A. Davidson, Montrose. *General Secretary*—W. J. Anckorn, Westport, Arbroath, N.B.

**Friends' Photographic Society.**—(ESTABLISHED 1888.)—Place of Meeting, Stoke Newington. *Secretary*—Arthur J. Ransome, Audley Lodge, Uplands Park, Enfield.

**Glasgow and West of Scotland Amateur Photographic Association.**—(ESTABLISHED 1883.)—Rooms, 180 West Regent Street, Glasgow. Dark room at disposal of members of other Societies. *President*—William J. B. Halley. *Vice-President*—Stewart Smith. *Council*—Thomas Taylor, R. H. Elder, John Morison, jun., William Miller, Andrew Brown, P. Falconer. *Treasurer*—J. Robertson Miller. *Secretaries*—William Goodwin, 3 Lynedoch Street, Glasgow, and J. C. Oliver, 2 Royal Terrace, Glasgow.

**Glasgow Photographic Association.**—(ESTABLISHED 1862.)—Ordinary Meetings are held on the first Thursday of the month from November to May, both inclusive. *President*—William Lang, jun., F.C.S. *Vice-Presidents*—Archibald Watson and J. Craig Annan. *Council*—John Annan, William Brown, James Gardner, W. J. McIlwrick, Andrew Mactear, George Mason. *Treasurer*—George Bell. *Secretary*—Frederick Mackenzie, 122 Wellington Street, Glasgow.

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**Glenalmond Photographic Club.**—(ESTABLISHED 1890.)—Meetings held at Trinity College, Glenalmond. *President*—Arthur S. Reid, M.A., F.G.S. *Vice-Presidents*—The Warden of Glenalmond (Rev. J. H. Skrine) and G. Caldwell. *Committee*—The Officers of the Club. *Librarian*—R. F. Hutchison. *Treasurer*—J. V. Kitto. *Secretary*—H. de Putron, Trinity College, Glenalmond, Perthshire.

**Glossop Dale Photographic Society.**—(ESTABLISHED 1888.)—Meetings held at Norfolk Square, Glossop. *President*—Captain E. Partington, J.P. *Vice-Presidents*—Lieut.-Colonel W. Sidebottom, M.P., J. Sidebottom, Lieutenant S. H. Wood. *Council*—S. Bamforth (Chairman), J. Merry (Vice-Chairman), J. Walkden, H. Broadhurst. *Treasurer*—J. Hardman. *Secretary*—T. W. Sharpe, Mersey Bank, Hadfield, near Manchester.

**Goole Photographic Society.**—(ESTABLISHED 1891.)—Meetings held at the Exchange, Goole. *President*—R. Blair, J.P. *Vice-Presidents*—J. T. Hynes and T. C. Turton. *Committee*—W. H. Buck, E. Kettle, A. Midgley, T. W. Millard, J. Simpson, T. J. Turton. *Secretary and Treasurer*—Samuel Wells, Airmyn, Goole.

**Gordon Camera Club.**—(ESTABLISHED 1890.)—Meetings held at the Gordon Club, Braintree. *President*—H. J. Cunningham. *Hon. Secretary*—W. Clark, Coggeshall Road, Braintree.

**Gosport Photographic Society.**—(ESTABLISHED 1892.)—Meetings are held at 46 High Street, Gosport. *President*—R. E. Froude. *Vice-Presidents*—Rev. L. J. Matthews, George Churcher, T. E. Williams, R.N. *Council*—S. W. Furze-Morrish, H. Fisher, A. Fisher, E. Tucker, V. W. Misselbrook, W. Moss. *Treasurer*—W. B. Smith. *Hon. Secretary*—Reginald E. Green, 8 Chapel Row, Portsea, Portsmouth.

**Graphic Society.**—(ESTABLISHED 1885.)—*Chairman*—S. Kerswill. *Council*—Mr. Micklewood, Mrs. Allen, Mr. Treleaven, Miss Picken, the Chairman, Treasurer, Secretary. *Treasurer*—G. F. Watson. *Secretary*—J. S. Hawker, J.P., Mutley House, Plymouth.

**Great Yarmouth Amateur Photographic Association.**—(ESTABLISHED 1893.)—Meetings held at the Two Bears Hotel, Southtown, Great Yarmouth. *President*—H. R. Harmer. *Hon. Secretary and Treasurer*—George T. Davis, 4 Market Place, Great Yarmouth.

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**Greenock Camera Club.**—(ESTABLISHED 1888.)—Meetings are held at the Museum, Kelly Street, Greenock. *President*—James Graham. *Vice-President*—Alexander Robb. *Council*—H. W. Walker, James Wright, Matthew Blake. *Treasurer*—Duncan Nicol. *Secretary*—William Blair, 40 Brisbane Street, Greenock.

**Greenwich Photographic Society.**—(ESTABLISHED 1892.)—*President*—Rev. Brooke Lambert, M.A., B.C.L. *Vice-Presidents*—H. H. Turner, M.A., F.R.A.S., and A. Haddon. *Committee*—J. Q. Braidwood, C.E., G. S. Criswick, F.R.A.S., W. Ellis, F.R.A.S., R. Lewis, T. Lewis, F.R.A.S., Arthur Martin, E. W. Maunder, F.R.A.S., J. W. W. Waghorn, D.Sc. *Hon. Treasurer*—Charles Churchill. *Hon. Secretary*—Leonard J. Atkinson, 193 Greenwich Road, Greenwich, S.E.

**Guildford Photographic Society.**—(ESTABLISHED 1890.)—Meetings held at 36 High Street, Guildford. *President*—The Right Hon. the Earl of Onslow, G.C.M.G. *Vice-Presidents*—J. F. Leese, Q.C., M.P., G. J. Jacobs, F.R.A.S., J. Russell. *Council*—A. W. Bullen, T. L. Inman, A. J. Moon, G. C. Williamson, D.L. *Treasurer*—J. H. Nunn. *Secretary*—A. E. Moon, 36 High Street, Guildford.

**Hackney Photographic Society.**—(ESTABLISHED 1889.)—Meetings held at 206 Mare Street, Hackney, every Tuesday. *President*—F. Houghton. *Council*—G. J. Avent, W. L. Barker, R. Beckett, F. W. Gosling, G. Hankins, W. A. Hensler, E. Puttock, Dr. Roland Smith. *Hon. Treasurer*—J. O. Grant. *Hon. Secretary*—W. Fenton-Jones, 12 King Edward Road, Hackney. *Hon. Assistant Secretary*—A. Dean, 57 Southborough Road, South Hackney.

**Halifax Camera Club.**—(ESTABLISHED 1891.)—Meetings held at the Club Rooms, 12A Crossley Street. *President*—J. Ingram Learoyd. *Vice-Presidents*—T. Illingworth and B. Bingley. *Council*—J. E. Fry, W. G. Thomson, C. Holt, E. Booth, W. B. Watson, A. T. Gray, H. A. Gaunt, J. Frobisher, A. M. W. Stewart, G. Walsh. *Treasurer*—J. Ingham Learoyd. *Secretary*—H. Walsh, Chornleigh, Halifax.

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**Halifax Photographic Club.**—(ESTABLISHED 1881.)—Meets the last Thursday in each month in the Mechanics' Hall at half-past Seven, p.m. *President*—B. Rowley. *Vice-Presidents*—T. Illingworth and E. J. Smith. *Council*—B. B. Bingley, Major Holroyde, H. Mossman, Councillor S. Smith, Joseph Whiteley, together with the Officers. *Auditor*—S. Goodman. *Treasurer*—E. H. Child. *Hon. Secretary*—W. Clement Williams, 13 Aked's Road, Halifax.

**Haltwhistle and District Photographic Association.**—(ESTABLISHED 1889.)—*President*—Dr. W. R. Spiers. *Vice-President*—George Clark. *Committee*—Major Anne, Rev. A. B. Baldwin, Miss Maud Dixon-Brown, Edward Joicey. *Secretary and Treasurer*—David Macadam, Carlisle City and District Bank, Haltwhistle.

**Hampstead Photographic Club.**—(ESTABLISHED 1887.)—Meetings held at the residences of members. *Treasurer*—C. A. Watkins. *Secretary*—A. L. Stuart, 2 Arkwright Road, Hampstead.

**Harringay Photographic Society.**—(ESTABLISHED 1893.)—Place of Meeting, Endymion Refreshment Rooms, Green Lanes, Harringay, N. Meetings, second and fourth Thursdays in the month. *President*—Dudley Towers. *Vice-President*—Frederick T. Bennett. *Council*—F. Bailey, F. Dowsett, J. D. Simmons, C. Watson. *Treasurer and Secretary*—C. N. Frith, 8 Cavendish Road, Harringay.

**Hastings and St. Leonards Photographic Society.**—(ESTABLISHED 1888.)—Meetings, third Tuesday in each month, at Eight p.m. *President*—Wilson Noble, M.P. *Vice-Presidents*—Lord Brassey, K.C.B., J. H. Blomfield, Rev. A. M. Macdona, J. H. Mayor, A. C. Routh, M.D., W. Shuter, W. Stubbs, Macer Wright. *Council*—H. J. Godbold, H. E. Habershon, Rev. A. M. Macdona, J. H. Mayor, W. M. Simpson, J. Smith. *Hon. Treasurer*—Rev. A. B. Cotton. *Hon. Secretaries*—A. Brooker, Memorial Buildings, Hastings, and J. H. Gibson, 4 St. James's Villas, Hastings.

**Helios Postal Photographic Club.**—(ESTABLISHED 1887.)—A Private Postal Photographic Club, which circulates a case amongst its members for the insertion of photographs, and the mutual criticism of each other's work in a notebook, which accompanies the case. *Hon. Secretary and Treasurer*—W. Cooper, 18 High Street, Marlborough, Wilts.

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**Herefordshire Photographic Society.**—(ESTABLISHED 1888.)—Meetings held at the Mansion House, Hereford. *President*—Alderman Blake. *Vice-Presidents*—Alfred Watkins, T. J. Salwey, J. Parker. *Council*—E. Pilley, E. W. H. Chave, R. Clarke, H. J. Wilson, B. C. Kinsey, A. C. Edwards, jun., W. C. Gethen, C. H. Woodhouse. *Treasurer*—W. E. Haines. *Secretary*—John Parker, C. E., Nelson Street, Hereford.

**Hexham Photographic Society.**—(ESTABLISHED 1892.)—Meetings held at the Waverley Temperance Hotel, Hexham. *President*—C. E. Straker. *Vice-Presidents*—Major L. C. Lockhart and Captain Jas. Gibson. *Council*—Rev. Arthur Cross, Stanley A. Bowman, T. H. McAllan, T. W. Milburn. *Treasurer*—John Crozier. *Secretary*—J. Fred Russell, Hexham.

**Holborn Camera Club.**—(ESTABLISHED 1889.)—Place of Meeting, 100 High Holborn, London, W.C. *President*—A. Horsley Hinton. *Vice-Presidents*—Frederick Brocas, S. T. Chang, D. R. Lowe. *Committee*—J. T. Stevens, J. H. Avery, J. Bush, A. T. Ebsworth, H. C. Gay, Edric G. Daw, J. Brittain, E. Benest. *Treasurer*—Albert Bell. *Secretary*—Frederick J. Cobb, 100 High Holborn, London, W.C.

**Holmfirth Amateur Photographic Association.**—(ESTABLISHED 1885.)—Meetings are held at the members' houses. *President*—Arthur Preston. *Secretary*—David Bilson, Birchin House, Holmfirth.

**Hove Camera Club.**—(ESTABLISHED 1892.)—Meetings held in the Town Hall. *President*—G. B. Woodruff, J.P. *Vice-Presidents*—R. Dawson, M.D., W. A. Hollis, M.D., H. H. Taylor, F.R.C.S., W. Jago, F.I.C., F.C.S., Charles Job. *Committee*—Miss Fuller, A. H. C. Corder, A. H. Webling, W. A. Watts, G. Emery, G. Foxall, W. A. Ford. *Secretary and Treasurer*—J. Williamson, 144 Church Road.

**Huddersfield Naturalist and Photographic Society.**—(The Photographic Society amalgamated with Naturalist Society, January, 1893.)—Meetings held at the Y.M.C.A. Rooms, King Street, Huddersfield. *President*—Councillor Fred Crossland. *Vice-Presidents*—Dr. J. E. Foster and T. W. Woodhead. *Committee*—T. H. Bartlam, C. H. Bould, H. G. Brierley, J. Field, Thomas Jenkinson, J. B. Littlewood, S. L. Mosley, F.E.S., A. W. Sykes. *Treasurer*—A. W. Whiteley. *Secretary*—A. Clarke, St. Andrew's Road, Huddersfield.

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**Hull Photographic Society.**—(ESTABLISHED 1884.)—Club Rooms, 71 Prospect Street, Hull. *President*—C. D. Holmes, C.E. *Vice-President*—John Pybus. *Council*—E. H. Howlett, D. W. Sissons, T. Rose, C. F. Amos, — Lyth. G. J. Boville, Rev. W. Hay-Fea, Rev. George Coleman, J. E. Sharpe, Sidney Lidiard, W. Hollingworth, J. H. Allcott. *Hon. Lanternist*—J. Walker. *Hon. Librarian*—B. M. Stokes. *Hon. Treasurer*—A. N. Jameson. *Hon. Secretaries*—A. H. White E. E. Cohen, 127 Beverley Road, Hull.

**Ilkeston Photographic Society.**—(ESTABLISHED 1891.)—*President*—Dr. Carroll. *Treasurer*—G. Woolliscroft. *Secretary*—W. Shakspeare, Arden Villas, Gregory Street, Ilkeston.

**Ipswich and Suffolk Photographic Society.**—(ESTABLISHED 1888.)—Meetings held at the Fine Art Gallery, Ipswich. *President*—J. Dixon Piper. *Vice-President*—E. R. Pringle. *Committee*—J. Bond, B. Corder, J. E. Curtis, E. R. Fry, J. C. Wiggin, F. Woolmough. *Hon. Secretary and Treasurer*—Allan F. Penraven, 10 St. Matthew's Street, Ipswich.

**Isle of Man Photographic Society.**—(ESTABLISHED 1890.)—Meetings held at Britannia House, Douglas. *President*—W. Thomson. *Vice-President*—J. M. Nicholson. *Committee*—Messrs. Lomas, Craine, and the Officers. *Treasurer*—W. Harrison. *Secretary*—S. Lomas, Royal Hotel, Douglas.

**Isle of Thanet Photographic Society.**—(ESTABLISHED 1888.)—Meetings held on first and third Wednesdays in each month, at the Club Room, Broad Street, Ramsgate. *President*—Rev. Harry Bartram, M.A. *Vice-Presidents*—R. Hicks, W. Saunders, Rev. C. E. Eastgate, M.A. *Committee*—E. Deacon, H. Holloway, J. Roe, A. Vigar, E. E. Wastall, G. Wellden. *Secretaries and Treasurers*—Edw. Baily, 9 Queen Street, Ramsgate, and G. F. Blower, Memel Villa, Ramsgate.

**Keighley and District Photographic Association.**—(ESTABLISHED 1889.)—Meetings held at Mechanics' Institute, North Street, Keighley. Annual Meeting held September 27th. *President*—Samuel Bairstow. *Vice-Presidents*—John W. Laycock and Thomas Heaps. *Committee*—John Beaver, Alex. Keighley, J. G. Dickinson, E. Myers, James Waters, Charles Smith, Thomas Nesbitt, William Gott. *Treasurer*—Walter Mitchell. *Secretary*—John Gill, 27 Highfield Lane, Keighley.

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**Kendal Literary and Scientific Institution (Photographic Section).**—(ESTABLISHED 1886.)—Meetings held in the Museum Library. *Chairman*—Isaac Braithwaite. *Committee*—C. E. Greenall, Samuel Rhodes, Frank Wilson, Chairman, Secretary of the Institution (*ex officio*), Treasurer, Secretary of the Section. *Treasurer*—T. N. Ritson. *Secretary*—Mrs. A. Mary Wilson, Castle Lodge, Kendal.

**Kensington and Bayswater Photographic Society.**—(ESTABLISHED 1892.)—Meetings held at Horbury Rooms, Kensington Park Road. *President*—Hon. L. M. St. Clair. *Council*—R. Frogbrook, H. G. Hannaford, J. E. Hodd, R. A. Hodd, S. C. Mote, W. F. Robinson. *Treasurer*—F. A. Hahn. *Secretary*—C. W. Brumwell, 7 Lower Terrace, Notting Hill, W.

**Killadysert Lantern Society.**—(ESTABLISHED 1892.)—Place of Meeting, Killadysert, West Clare. *President*—John P. Moloney. *Committee*—T. C. Hebir, J. Meehan, P. J. M'Mahon, Mrs. Hebir, Patrick M'Namara, Thomas Crowe, Patrick Clancy, P. G. Ginnars. *Treasurer*—Daniel J. Moloney. *Secretary*—Fred J. M'Namara, Killadysert.

**Kilmarnock Amateur Photographic Society.**—(ESTABLISHED 1887.)—Meetings are held on the third Wednesday of every month. *President*—Thomas Ferguson. *Vice-President*—D. Boyd. *Council*—David Craig, George Paxton, James Thomson. *Treasurer*—J. S. Bain. *Secretary*—William Paterson, 50 St. Andrew's Street, Kilmarnock.

**King's Lynn Y. M. C. A. Photographic Club.**—(ESTABLISHED 1891.)—Meetings held at the Y.M.C.A. Rooms, St. James's Street. *President*—G. M. Bridges. *Vice-President*—W. E. Daw. *Secretary and Treasurer*—William Winch, St. James's Street, King's Lynn.

**Lancaster Photographic Society.**—(ESTABLISHED 1889.)—Meetings held at the Society's Rooms, Stonewell, Lancaster. *President*—Alan Garnett. *Vice-Presidents*—J. W. Pickard and H. J. J. Thompson. *Committee*—H. A. Paley, R. W. Wearing, A. R. D. MacDonald, N. Holden. *Treasurer*—J. Atkinson. *Secretary*—W. Briggs, 21 Cheapside, Lancaster.

**Lantern Slide Exchange Club.**—(ESTABLISHED 1889.)—Limited to twenty-two members. A box starts on the 15th of each month, and the slides are distributed amongst the members at the close of each season. *Hon. Critic*—Frank Howard. *Hon. Treasurer and Secretary*—A. J. Richardson, Summerville, Dore, Sheffield.

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**Lantern Slide Exchange Society.**—(ESTABLISHED 1892.)—This is a Postal Photographic Society, limited to twelve members. *Treasurer and Secretary*—Rev. J. B. Mackenzie, Manse, Kenmore, Aberfeldy, N.B.

**Lantern Society.**—(ESTABLISHED 1890.)—Meetings are held at 20 Hanover Square, W. *President*—The Hon. Slingsby Bethell, C.B. *Vice-President*—T. H. Holding. *Council*—E. M. Nelson, F.R.M.S. (Chairman), W. Clemence, G. G. Baker Cresswell, A. R. Dresser, F. H. Evans, E. K. Hall, W. H. Maw, A. R. Sheppee, J. J. Vezey. *Secretary*—Commander C. E. Gladstone, R.N., 13 Arlington Street, S.W.

**Leamington Amateur Photographic Society.**—(ESTABLISHED 1887.)—Meetings held at the Pump Room, Leamington. *Patron*—Lord Brooke. *President*—Surgeon-General Ranking. *Council*—Messrs. Magrath, Green, Vinning, Aspa, Dr. Harold Mason. *Professional Adviser*—H. Sawyer. *Treasurer*—B. Magrath. *Secretary*—Signor Aspa, Priory House, Leamington.

**Leeds Camera Club.**—Headquarters, Fogg's New Waverley Hotel, Call Lane, Leeds. Meeting night: Thursday, at Eight o'clock. *President*—Dr. Thomas Thresh, Ph.D., L.R.C.P. *Vice-President*—W. R. Irwin. *Committee*—C. C. Vevers, P. Little, W. J. Wilson, H. Eastwood, J. W. Westmorland. *Treasurer*—T. R. Thompson. *Secretary*—Charles B. Hutchinson, Highfield House, Lady Pit Lane, Beeston Hill, or 8 Bedford Street, Leeds.

**Leeds Photographic Society.**—(ESTABLISHED 1852.)—Meetings held at the Mechanics' Institute. *President*—John H. Walker. *Vice-Presidents*—E. H. Jacob, M.A., M.D., and S. A. Warburton. *Committee*—H. P. Atkinson, Godfrey Bingley, B. A. Burrell, T. Butterworth, Herbert Denison, E. H. Jacob, Robert Steele, Thomas W. Thornton, John H. Walker, S. A. Warburton. *Treasurer*—Thomas W. Thornton. *Secretaries*—Herbert Denison and Robert Steele, 12 East Parade, Leeds.

**Leicester and Leicestershire Photographic Society.**—(ESTABLISHED 1885.)—Meetings held in the Mayor's Parlour, Old Town Hall, on the second Thursday in each month from October to May. Excursions, June to September. *President*—Joshua Porritt. *Vice-President*—A. W. Wilson. *Committee*—George Bankart, S. S. Partridge, F. Joliffe, S. Squire. *Treasurer*—A. W. Wilson. *Secretary*—H. Pickering, High Cross Street, Leicester.

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**Leigh Photographic Society.**—(ESTABLISHED 1892.)—Meetings are held in the Old Grammar School, Leigh. *President*—James Ward, B.A. *Vice-Presidents*—R. B. Mawson, T. V. Syms. M. F. Burrows, T. Peters. *Council*—J. Berry, J. Battersby, W. Crouchley, R. Leigh, T. G. Hirst, W. Hampson, P. Seddon. *Treasurer*—T. Haddock. *Secretary*—W. R. Moore, Wilkinson Street, Leigh, Lancashire.

**Leith Amateur Photographic Association.**—(ESTABLISHED 1888.)—Meetings held at 165 Constitution Street. *President*—William Dougall. *Vice-President*—William M. Smith. *Council*—Messrs. Guthrie, Hunter, Ewart, Chapman, McCreddie, Dewar, H. W. Hislop, Lamb, J. Hislop. *Treasurer*—Murdoch Campbell. *Secretary*—Alexander Pitkethly, 8 Wilkie Place, Leith.

**Lewes Photographic Society.**—(ESTABLISHED 1888.)—Meetings held at the Fitzroy Library, Lewes. *President*—Councillor G. J. Wightman. *Vice-President*—J. Tunks. *Committee*—E. J. Bedford, W. J. Young, G. Carpenter, T. H. Lyell, C. A. Wells. All communications should be sent to G. Carpenter, 81 High Street, Lewes.

**Lewisham Camera Club.**—(ESTABLISHED 1890.)—*President*—Rev. J. Morley Wright. *Vice-President*—Alfred H. Miles. *Committee*—W. C. Chaffey, C. Churchill, B. Davidson, E. Eastwood, Prof. Lambert, M.A., M. Stodart. *Hon. Treasurer*—E. B. Eastwood. *Hon. Secretary*—H. M. C. Sprunt, 192 New Cross Road, S.E. *Hon. Assistant Secretary*—H. L. Davis, 95 Cranfield Road, Brockley.

**Leytonstone Camera Club.**—(ESTABLISHED 1891.)—Hall and Studio, Assembly Rooms, High Road, Leytonstone. *President*—Dr. W. Pickett Turner, E.C.C. *Vice-Presidents*—E. Widdrington Byrne, M.P., W. B. Whittingham, J.P., D. J. Morgan, A. Horsley Hinton, T. F. Sanderson. *Council*—F. W. Wates, D. G. Reddick, H. E. Farmer, G. H. Ericks, A. Frost, A. J. Newton, A. P. Wire, A. T. Cufley. *Treasurer*—Tom Symmons. *Secretary*—Albert E. Bailey, Rose Bank, South-West Road, Leytonstone. *Assistant Secretary and Librarian*—C. A. Russell.

**Literary Photographic Club.**—(ESTABLISHED 1887.)—Founded for the circulation and exchange, among the members, of photographs of literary or historical interest. *Hon. Secretary and Treasurer*—R. A. R. Bennett, M.A., Walton Manor Lodge, Oxford.

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**Light and Truth Postal Photographic Club.**—(ESTABLISHED 1890.)—A Postal Photographic Club formed for the mutual instruction and recreation of its members, by the circulation through the post of photographs produced by them, for criticism, exchange, &c., and also the discussion of photographic subjects, and occasional competitions. This society is not limited in its membership. Application must be made in writing to the Secretary. *Hon. Secretary*—Henry E. Trew, A.P.S., 56 Market Street, Poole, Dorset.

**Lincoln Camera Club.**—(ESTABLISHED 1892.)—Meetings on the first and third Wednesdays in each of the winter months. Excursions once or twice a month during the summer. The Club is affiliated to the School of Science and Art, and to the Photographic Society of Great Britain. Annual Meeting, March 12th. *President*—Rev. Dr. Stott. *Vice-President*—H. Mantle. *Committee*—Rev. Canon Fowler, J. W. Horton, C. P. Hayward, J. T. Birkbeck, W. E. Asquith, R. Slingsby, C. C. Smith, H. Death, J. Markham, J. Stuart. *Hon. Librarian*—J. E. Dickinson. *Hon. Treasurer*—Capt. J. M. Warren. *Hon. Secretary*—G. Wade, 22 Danes Terrace, Lincoln.

**Liverpool Amateur Photographic Association.**—(ESTABLISHED 1863.)—Club Rooms, Percy Buildings, Eberle Street, Liverpool. *President*—A. J. Cleaver. *Vice-Presidents*—A. Tyrer and A. F. Stanistreet. *Council*—H. Lupton, G. A. Kenyon, A. Bradbury, H. Holt, H. B. Millar, F. Anyon, F. K. Glazebrook, Paul Lange, J. Woolfall, W. P. Christian, William Tomkinson, E. V. Swinden, J. S. Brown, G. B. Newton. *Treasurer*—P. H. Phillips. *Secretary*—John H. Welch, Percy Buildings, Eberle Street, Liverpool.

**Liverpool Camera Club.**—(ESTABLISHED 1891.)—Meetings held at 128A Mount Pleasant. *President*—J. Hawkins. *Vice-Presidents*—A. C. Yule and T. Edwards. *Council*—J. Pride, J. H. Jones, J. Penn, W. A. Brown, J. Smith, Dr. Webb, R. C. Robbins, W. Haywood, C. J. Whitehead. *Librarian*—C. H. Freeman. *Treasurer*—W. Tansley. *Secretary*—W. A. Stuart, 8 Elliot Street.

**Liverpool Central Y.M.C.A. Camera Club.**—(ESTABLISHED 1889.)—Meetings held at the Y.M.C.A., Mount Pleasant. *President*—William P. Christian. *Vice-Presidents*—J. Fowler Shone and John C. Lee. *Secretary and Treasurer*—Herbert Hannah, 104 Moss Grove, Sefton Park, Liverpool.

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**Llandudno Camera Club and Lantern Society.**—(ESTABLISHED 1892.)—Meetings held at the Club House, Bodhyfryd Road, Llandudno. *President*—Right Hon. Lord Mostyn. *Vice-Presidents*—W. A. Whiston (Camera Section), and Rev. John Morgan, B.A. (Lantern Section). *Committee*—J. Dean, R. Hughes Jones, W. Owen, H. H. Watterson. *Hon. Secretaries and Treasurers*—A. Campbell, Anneddle, Llandudno and A. H. Hughes, Rochester House, Llandudno.

**Llanelly Amateur Photographic Society.**—(ESTABLISHED 1891.)—Meetings held at Frederick Street. *President*—C. W. Mansel Lewis, J.P. *Vice-Presidents*—J. H. Rogers, J.P. and Dr. Roderick. *Hon. Treasurer*—William Thomas. *Hon. Secretary*—John Daniell, Dovedale House, Llanelly.

**London and Provincial Photographic Association.**—(ESTABLISHED 1882.)—*Trustees*—J. Traill Taylor and J. B. B. Wellington. *Committee*—G. W. Atkins, Thomas Bedding, J. Weir Brown, C. H. Cooke, C. H. Oakden, J. S. Teape, W. D. Weltford. *Curator*—A. Haddon. *Librarian*—F. W. Pask. *Hon. Secretary and Treasurer*—T. E. Freshwater, F.R.M.S., 45 Torriano Avenue, N.W.

**London Social Camera Club.**—(ESTABLISHED 1886.)—Meetings are held at 265 Strand, W.C. A Section of and under the management of the Executive of the London Social Cycling Club. *Treasurer*—G. Wheeler. *Secretary*—William H. Cornell, Elsia Lodge, 1 Eresby Road, Kilburn, N.W.

**Louth and District Photographic Society.**—(ESTABLISHED 1890.)—Meetings held at 8 Ugate, Louth, Lincolnshire. *President*—Rev. J. M. Coates. *Treasurer*—H. S. Forman. *Secretaries*—S. F. Clarke and Herbert C. Bentley, Louth, Lincolnshire.

**Lyonsdown Amateur Photographic Association.**—(ESTABLISHED 1886.)—*President*—Frank Crosbie. *Secretary and Treasurer*—Harold Imray, The Grange, Underhill, New Barnet, Herts.

**Maidstone Amateur Photographic Society.**—ESTABLISHED 1888.—Meetings held every Friday evening at 'The Palace,' at Eight p.m. Annual Meeting in February. *President*—J. E. Austin. *Committee*—P. Adams, H. Bear, W. Day, F. Laurence, L. Green, H. W. Morfett, H. A. Potvine, A. Clout, C. E. Wright. *Treasurer*—R. P. Grant. *Secretary*—L. Stansell, F.C.S., Bydews, Holland Road, Maidstone.

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**Manchester Amateur Photographic Society.**—(ESTABLISHED 1885.)—Meetings held at the Manchester Athenæum. *President*—J. T. Lees. *Vice-Presidents*—J. Bathe, J. G. Jones, Rev. H. J. Palmer, M.A., H. Smith. *General Committee*—E. Ashman, F. W. Burton, S. L. Coulthurst, J. Davenport, J. Drinkwater, T. Glazebrook, E. F. Prince, W. H. Shirley, H. Sykes, J. W. Wade, George Wheeler, T. Widdop. *Sub-Committees*—Record: F. W. Burton, S. L. Coulthurst, W. H. Shirley, G. Wheeler, J. W. Wade (Hon. Secretary); Dark Room and Demonstrations: E. Ashman, J. Bathe, F. W. Burton, T. Glazebrook, E. F. Prince, G. Wheeler (Hon. Secretary); Survey: C. Dawson, J. Drinkwater, H. Smith, S. L. Coulthurst (Hon. Secretary). *Librarian*—F. W. Burton. *Editor of Magazine*—George Wheeler. *Hon. Treasurer*—C. Dawson. *Hon. Secretary*—Randolph Gilmore, 1B Cooper Street. *Assistant Secretary*—F. W. Parrott.

**Manchester Camera Club.**—(ESTABLISHED 1885.)—Meetings held at the Victoria Hotel (Room 77), Manchester. *Committee*—J. Bathe, J. Drinkwater, J. T. Foster, W. Hepburn, J. W. Wade. *Treasurer*—J. Davenport. *Secretary*—C. Dawson, 66 Peter Street, Manchester.

**Manchester Photographic Society.**—(ESTABLISHED 1855.)—Meetings held at 36 George Street. *President*—J. Wood. *Vice-Presidents*—A. Brothers, F.R.A.S., T. Chilton, T. R. Coble, A. Heywood, H. M. Whitefield. *Council*—W. Blakeley, J. Brier, C. H. Coote, S. L. Coulthurst, F. Edwards, H. V. Lawes, J. Peddie, W. Tomlinson, J. Warburton, J. Whittaker. *Hon. Librarians*—C. H. Coote and H. V. Lawes. *Hon. Curator*—H. V. Lawes. *Lantern Committee*—Messrs. Coulthurst, Edwards, Lawes, Whittaker. *Hon. Treasurer*—W. G. Coote. *Hon. Secretary*—W. H. Farrow.

**Manchester Y.M.C.A. Photographic Club.**—(ESTABLISHED 1890.)—Headquarters, 56 Peter Street, Manchester. *President*—W. H. Cheetham. *Vice-President*—W. H. Newett. *Committee*—A. C. Harrison, W. H. Machin, A. E. Cheetham, G. B. Swann, A. W. Pearson. *Treasurer*—G. T. White. *Secretary*—John Irvine, 32 Demesne Road, Alexandra Park.

**Marlborough Photographic Society.**—(ESTABLISHED 1892.)—*President*—T. S. Reddrop. *Vice-President*—F. J. Bennett, F.G.S. *Committee*—S. A. Brockway, W. Cooper, President, Vice-President, and Officials. *Treasurer*—T. A. Dring. *Secretary*—H. H. Copnall, 5 Barn Street, Marlborough, Wilts.

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**Midland Camera Club.**—(ESTABLISHED 1891.)—Meetings are held on the first and third Fridays in the month, and informal smoking evenings every Monday. Club Rooms, Medical Institute, Edmund Street, Birmingham. *President*—Hall Edwards, L.R.C.P. *Vice-President*—Rev. J. Henry, F.R.G.S. *Council*—R. J. Bailey, W. H. Gent, Frederick Iles, H. R. Leech, M.R.C.S., A. H. Slade, Mrs. Welford, W. D. Welford, H. Rowland White. *Hon. Treasurer*—Sam G. Mason. *Hon. Secretaries*—C. Jevons Fowler, 4 Woodstock Road, Moseley, and Frank H. Mason, Wake Green Road, Moseley.

**Midlothian Camera Club.**—(ESTABLISHED 1889.)—Place of Meeting, Edinburgh. Meetings, first Tuesday of every month, October to June. Annual Meeting in November. *President*—Sidney J. G. Williams. *Vice-President*—W. A. Scott-Wallace. *Treasurer*—G. M. Denholm. *Secretary*—A. D. Guthrie, Bonnington, Edinburgh.

**Monklands Photographic Society.**—(ESTABLISHED 1893.)—Meetings held at Airdrie and Coatbridge alternately. *President*—Robert Dunlop. *Vice-President*—Frank Robertson. *Committee*—John W. Eadie, W. B. Hossack, Walter Brown, jun., James Hamilton, Thomas G. Ferguson. *Treasurer*—Samuel H. Wood. *Secretary*—William Dixon Gray, 16 Bank Street, Airdrie.

**Munster Camera Club.**—(ESTABLISHED 1891.)—Ordinary Meetings held on second Wednesday in each month, at Eight o'clock p.m. Annual Meeting in October. Rooms, School of Art, Cork. *President*—Major J. Douglas Lysaght, A.P.D. *Vice-Presidents*—Ringrose Atkins, M.A., M.D., Denny Lane, M.A., Henry S. Noblett. *Committee*—John Bennett, James Bradshaw, John Day, Richard Foley, Patrick Hallinan, Denham Franklin, J.P., William B. Harrington, Hardaker Lund, Gerald Percival, Kingsmill B. Williams. *Hon. Treasurer*—William R. Atkins, F.C.A. *Hon. Secretary*—Richard S. Baker, 48 Patrick Street, Cork.

**Newcastle-on-Tyne and Northern Counties' Photographic Association.**—(ESTABLISHED 1881.)—*President*—J. Pattison Gibson. *Vice-Presidents*—M. Auty, W. Parry, J. H. Robinson, Lyd. Sawyer. *Council*—J. Arnott, J. S. B. Bell, W. E. Cowan, G. Hall, J. J. Kirkwood, Edgar G. Lee, T. O. Mawson, G. L. Snowball, L. Williamson, John Watson. *Treasurer*—Frederick Park. *Secretary*—James Brown, 31 Market Street, Newcastle-on-Tyne. *Assistant Secretary*—W. P. Brewis.

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**National Association of Professional Photographers of Great Britain and Ireland.**—(ESTABLISHED 1891.)—Annual Meeting in February at Birmingham. Other occasional meetings, as arranged, during the year. It is proposed to hold the London meetings at the Photographic Club, Coleman's Hotel, Covent Garden. *President*—Thomas Fall. *Vice-Presidents*—W. Barry, C. Lafosse, R. Slingsby, H. J. Whitlock. *Committee*—T. Birtles, Thomas Bromwich, W. J. Byrne, Chancellor & Son, William Cobb, T. Storey Davies, J. E. Eddison, J. J. Elliott, J. Fergus, Thomas Forrest, William Gill, R. P. Gregson, Guy & Co., G. Higginson, Jno. Martyn, Donald McIver, H. J. Mendelssöhn, John Moffat, Frank Sutcliffe, Van der Weyde, F. Whaley, G. V. Yates. *Hon. Treasurer*—John Crosby. *Hon. Secretary*—W. Brookes. *Secretary*—D. J. O'Neill, 47 Charlotte Road, Birmingham.

**Newport Camera Club.**—(ESTABLISHED 1891.)—*President*—E. H. Watts, F.R.G.S. *Vice-President*—Ven. W. Conybere Bruce, M.A., F.R.A.S. *Council*—W. Bush, R. H. Beavan, W. J. Charles, E. C. Lewis, G. H. Llewellyn, L. Lockyear, G. R. Thompson, P. A. F. Villiers. *Treasurer*—E. J. Smith. *Hon. Secretary*—Henry Crease, 'Hillcrest,' Caerleon, Mon.

**Newport Sketching and Photographic Society.**—(ESTABLISHED 1887.)—Meetings are held on the first Monday in every month. *Chairman*—F. J. Heybyrne. *Hon. Secretaries*—Charles J. Fox and W. E. Heybyrne, Guildhall Chambers, Newport, Mon.

**Norfolk and Norwich Camera Club.**—(ESTABLISHED 1886.)—Meetings held at the Bell Hotel, Norwich. *President*—D. D. Day. *Vice-Presidents*—Messrs. Algar and Harvey-George. *Committee*—Messrs. Latham, Fison, Mirham, Dr. Thompson, Dr. Bensley, LL.D. *Secretary and Treasurer*—Colonel H. Wood, C.B., 95 Thorpe Road, Norwich.

**Northamptonshire Natural History Society and Field Club (Photographic Section).**—(ESTABLISHED 1876.)—Meetings are held at the Town Museum and Grammar School. *President*—Henry Manfield. *Secretary*—Joseph J. Wetherell, Billing Road, Northampton.

**Northern Photographic and Scientific Association.**—(ESTABLISHED 1893.)—Meetings are held at the Public Hall, Canning Crescent, Wood Green, N., on Thursday evenings at Eight p.m. Annual Meeting in July. *President*—J. G. Robins. *Vice-President*—F. K. Beagley. *Council*—Plant Coldrey, Charles Coulter, J. Roland Fitt, J. R. H. Finch, W. T. Goodhew, J. C. S. Mummery, E. Shelbourn, F. W. Teversham, W. O. Welsford. *Curator*—J. B. Simmons. *Treasurer*—A. S. Murrow. *Secretary*—P. D. Coghill, 252 Wightman Road, Hornsey, N.

**North Middlesex Photographic Society.**—(ESTABLISHED 1888.)—Meetings held at Jubilee House, Hornsey Road, London, N. *President*—James W. Marchant. *Vice-Presidents*—Charles Beadle and Frank Cherry. *Council*—Messrs. Cox, Gill, Golding, Gregory, Lathbridge, Mummery, Pither, Treadway, Taylor, Wall, Walker, Wynne. *Treasurer*—H. Smith. *Secretary*—George Gosling, 13 Lausanne Road, Hornsey, N.

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**North Kent Amateur Photographic Society.**—(ESTABLISHED 1887.)—The Society is affiliated to the Photographic Society of Great Britain; Delegates, E. W. Field and S. Hodsoll. Meetings are held at Gravesend on the first and third Fridays in each month at Eight p.m. *President*—I. C. Johnson, J.P. *Vice-President*—E. J. Wall. *Council*—E. W. Field, C.E., S. Hodsoll, A.C.A., A. A. Larnder, S. R. Macartney, J. H. Morris, A.Ph.S. *Treasurer*—George R. Cobham, F.S.I. *Secretary*—G. W. Cobham, P.A.S.I., 3 Edwin Street, Gravesend.

**North London Photographic Society.**—(ESTABLISHED 1885.)—Meetings are held at Canonbury Tower, N. *President*—J. Traill Taylor. *Council*—W. Bishop, J. Brewer, J. Douglas, W. Few, Rev. E. Healy, E. W. Parfitt. *Secretary and Treasurer*—W. T. Coventon, 50 Highbury Park, N.

**North Surrey Photographic Society.**—(ESTABLISHED 1887.)—Meetings are held at the Institute, Knight's Hill Road, West Norwood. *President*—J. J. Morrish. *Vice-President*—Lewis Wolff. *Committee*—T. J. Bright, F. Chambers, J. G. Dalzell, F. Fitzpayne, J. Larcombe, H. Senior. *Secretary and Treasurer*—R. W. Wilson, 42 Norwood Road, Herne Hill

**Nottingham Mechanics' Institution Camera Club.**—(ESTABLISHED 1892.)—Meetings held at the Mechanics' Institution, Nottingham. *President*—Duke of Newcastle. *Vice-Presidents*—Colonel Seely, M.P., W. J. Abel, S. Bourne, J. A. H. Green, J. Harrison, A. Pyatt, G. H. Wallis, C. B. Wright. *Committee*—Mrs. Cowen, Mrs. Fraser, Mrs. Richardson, E. Gordon, R. G. Holbrook, R. L. Warham, W. H. Warsop. *Treasurer*—H. Derry. *Secretary*—John T. Radford, 3 Colville Villas, Nottingham.

**Oban Amateur Photographic Society.**—(ESTABLISHED 1892.)—Place of Meeting, Oban. *Hon. President*—B. B. Hagen. *President*—M. A. Scott. *Hon. Vice-President*—J. B. Atkinson. *Vice-President*—William Richards. *Committee*—President, Vice-President, Treasurer, Secretary, and two members. *Secretary and Treasurer*—Samuel Lawrence, Chemist, Oban.

**Oldham Photographic Society.**—(ESTABLISHED 1867.)—All Meetings are held at the Lyceum, Union Street, Oldham. Weekly Meetings every Thursday evening, in the Society's Room, from Seven to Ten. The Annual Meeting is held on the last Thursday in October. *President*—J. Chadwick. *Vice-President*—W. Thompson. *Committee*—S. Ashton, J. Dawson, J. S. Dronsfield, J.P., J. Greaves, jun., T. Heywood, W. Jackson. *Librarian*—T. Birch. *Treasurer*—W. Schofield. *Hon. Secretary*—T. Widdop. *Assistant Secretary*—J. H. Ashton.

**Oxford University Photographic Club.**—(ESTABLISHED 1882.)—Meetings held at Friars Entry. *Hon. President*—A. McMullen (Balliol). *Committee*—A. H. C. James (Merton), H. E. Cartwright (University College), F. J. Varley (Oriol). *Treasurer*—J. Walker, M.A. (Christchurch). *Secretary*—Hon. G. L. Parsons (Balliol College, Oxford).

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**Oxford Photographic Society.**—(ESTABLISHED 1889.)—Ordinary Meetings are held on the first Tuesday in each month, and Conversational Meetings on the third Thursday in each month, at Eight p.m., usually in the Society's Rooms, 136 High Street. The Annual Meeting is held on the first Tuesday in October. The Society's Rooms are open from ten a.m. to ten p.m. on week days. *President*—E. A. Ryman-Hall. *Vice-Presidents*—C. C. Cole, W. W. Fisher, M.A. (Corpus Christi College), A. F. Kerry, M.A. (Exeter College), Councillor T. H. Salter. *Committee*—The Officers, T. E. Foort, C. A. Jenkins, F.R.A.S., W. T. King, G. W. Norton, A. Robinson, G. Smith, Dr. M. D. Stark. *Hon. Treasurer*—R. A. R. Bennett, M.A. (Magdalen College). *Hon. Secretaries*—F. A. Bellamy, F.R. Met. Soc., 4 St. John's Road, Oxford, and T. H. H. Minn, 104 Walton Street, Oxford. Secretaries' official address, 136 High Street, Oxford.

**Paisley Photographic Society.**—(ESTABLISHED 1857, REORGANIZED 1885.)—Society's Rooms, 9 Gauze Street, Paisley. Meetings are held monthly from September to March. Annual Meeting in April. Conversation Meetings are held every Tuesday evening throughout the year. *President*—Rev. John Crouch. *Vice-President*—Thomas H. Taylor. *Council*—Alexander M. Kilpatrick, Robert Ferrier, Edward Cook, Morris M. Wright, Robert M. Easton, Matthew Morrison, Andrew F. M'Callum. *Treasurer*—Richard N. W. Thomson. *Secretary*—David B. Jack, Glencairn, Paisley.

**Perthshire Society of Natural Science (Photographic Section).**—(ESTABLISHED 1889.)—Meetings are held in Natural Science Hall, South Tay Street. *President*—Andrew Thomson, M.A., D.Sc., F.R.S.E. *Committee*—A. Hodge, R. C. Ferguson, J. Stewart, D. Ferrier, F.C.S. *Secretary and Treasurer*—William Ellison, 2 Balhousie Street, Perth.

**Peterborough Photographic Society.**—(ESTABLISHED 1887.)—Meetings held at the Bedford Coffee House, Peterborough. *President*—Dr. G. Kirkwood. *Vice-Presidents*—Dr. T. J. Walker, J.P., J. H. Hetley, H. M. Townsend, E. Worthington, G. W. Leigh. *Committee*—T. J. Calcutt, W. H. Pentney, J. F. Perkins, J. Scotney, A. C. Taylor. *Treasurer*—W. Atkinson. *Secretary*—A. W. Nicholls, 11 Cromwell Road, Peterborough.

**Photographic Convention of the United Kingdom.**—(ESTABLISHED 1886.)—Meets at Dublin in 1894. *President*—George Mason. *President-elect*—Sir Howard Grubb. *Council*—E. Appleby, C. H. Bothamley, F. A. Bridge, J. J. Briginshaw, A. A. Carnell, A. Cowan, R. P. Drage, J. Fergus, J. P. Gibson, M. J. Harding, H. M. Hastings, A. L. Henderson, T. C. Hepworth, E. G. Humphery, R. Keene, R. S. Kidd, J. Austin King, W. Lang, jun., Paul Lange, A. Levy, C. Phipps Lucas, J. L. Lyell, Major J. D. Lysagt, A. Mackie, T. Mayne, W. W. Naunton, J. Porritt, A. Pringle, J. B. Sayce, A. Seaman, H. M. Smith, J. Stuart, H. Sturmeay, A. Tate, J. Traill Taylor, W. Taylor, L. Warnerke, G. W. Webster, J. B. B. Wellington, A. Werner, R. Hansford Worth. *Secretary and Treasurer*—F. P. Cembrano, jun., 10 Cambridge Gardens, Richmond Hill, Surrey.

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# PERMANENT BROMIDE PAPER.

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**Photographers' Benevolent Association.**—(ESTABLISHED 1873.)—Meetings held at the Rooms of the Photographic Society of Great Britain, by courtesy of the Council. *President*—George Mason. *Trustees*—Captain W. de W. Abney, C.B., R.E., F.R.S., &c., and W. S. Bird. *Committee*—R. Child Bayley, F. H. Berry, Robert Beckett, R. P. Drage, T. E. Freshwater, G. T. Harris, T. C. Hepworth, F. W. Hindley, H. R. Hume, P. G. Hunt, A. Mackie, E. W. Parfitt, J. S. Rolph, W. J. Tabrum. *Treasurer*—John Spiller, F.I.C., F.C.S. *Secretary*—H. Snowden Ward, Memorial Hall, E.C.

**Photographic Club.**—(ESTABLISHED 1879.)—Meetings, every Wednesday evening, at Eight o'clock, at Anderton's Hotel, Fleet Street, E.C. Annual Meeting, first Wednesday in November. *Trustees*—Frank Haes and Alexander Cowan. *Committee*—J. Weir Brown, F. P. Cembrano, E. Clifton, E. W. Foxlee, S. H. Fry, A. Mackie, E. W. Parfitt, H. Wilmer. *Curator*—Thomas Bedding. *Recorder*—H. W. Sanford. *Librarian*—E. A. Newell. *Secretary and Treasurer*—F. A. Bridge, East Lodge, Dalston Lane, London, N.E.

**Photographic Print Postal Society.**—(ESTABLISHED 1892.)—*Hon. Secretary*—John T. Collins, Chalfont St. Peter, Slough, Bucks.

**Photographic Society of Great Britain.**—(ESTABLISHED 1853.)—Annual General Meeting, second Tuesday in February. Ordinary Meetings, second Tuesday in each month, from October to June inclusive. Technical Meetings, fourth Tuesday in every month except December. Library and Laboratory, at 50 Great Russell Street, open on every weekday except Saturday, from Two p.m. to Eight p.m. (Saturday, Two p.m. to Five p.m.). The Society's premises are closed during the interval between the July and August Technical Meetings, and for about a week at the end of the year. *President*—Captain W. de W. Abney, C.B., R.E., D.C.L., F.R.S., F.C.S. *Vice-Presidents*—J. Glaisher, F.R.S., F.R.A.S., A. Pringle, J. Spiller, F.I.C., F.C.S., Sir H. Trueman Wood, M.A. *Council*—W. Ackland, G. L. Addenbrooke, T. Bolas, F.I.C., F.C.S., J. Cadett, F. P. Cembrano, jun., A. Cowan, T. R. Dallmeyer, T. Sebastian Davis, F.C.S., W. E. Debenham, P. H. Emerson, B.A., W. England, T. E. Freshwater, F.R.M.S., Colonel J. Gale, F. Hollyer, G. Lindsay Johnson, M.A., M.D., B.Sc., H. A. Lawrance, F.I.C., F.C.S., A. Mackie, J. W. Swan, M.A., F.I.C., F.C.S., J. Traill Taylor, Leon Warnerke. *Librarian*—E. Clifton. *Treasurer*—G. Scamell. *Hon. Secretary*—Chapman Jones, F.I.C., F.C.S. *Assistant Secretary*—R. Child Bayley, 50 Great Russell Street, Bloomsbury, W.C.

**Photographic Survey of Warwickshire.**—(ESTABLISHED 1890.)—Meetings held at the Colonnade Hotel, Birmingham. *President*—Sir J. Benjamin Stone. *Vice-President*—Jethro A. Cossins. *Treasurer*—S. F. Lyndon. *Secretary*—J. H. Pickard, Southfield, Priory Road, Edgbaston, Birmingham.

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**Photographic Society of Ireland.**—(ESTABLISHED 1854, RE-ORGANIZED 1879.) Regular Meetings, second Friday and fourth Thursday in each month, from October to May inclusive, at 35 Dawson Street, Dublin. *President*—J. Alfred Scott, M.A., M.D., F.R.C.S.I. *Past Presidents*—Sir Howard Grubb, F.R.S., and George Mansfield, J.P. *Vice-Presidents*—James Carson, C.E., and M. Hedley, F.R.C.V.S. *Council*—E. McDowel Cosgrave, M.D., F.K.Q.C.P., A. M. Geddis, J. H. Hargrave, B.A., A.M.I.C.E.I., R. M. Inglis, F. H. Orr, F. J. Richardson, V. E. Smyth, L. R. Strangways, M.A., Alfred Werner, J. H. Woodworth. *Hon. Treasurer*—W. Bewley, B.A. *Hon. Secretary*—J. A. C. Ruthven, A.M.I.C.E.I., 40 Lower Sackville Street, Dublin. *Assistant Secretary*—W. F. Cooper, Drumcondra.

**Polytechnic Photographic Society.**—Ordinary Meetings are held at 309 Regent Street, W., on the first and third Fridays in each month, at Eight p.m. The Annual General Meeting in September. *President*—Quintin Hogg. *Vice-Presidents*—W. E. Debenham and Robert Mitchell. *Committee*—A. Crossley, John H. Gear, F. W. Jackson, A. E. Morton, C. W. Rintoul. *Assistant Hon. Secretary and Treasurer*—Frederick R. Tissington. *Hon. Secretary*—Albert B. Moss, 64 Wood Lane, Uxbridge Road, W.

**Postal Photographic Club.**—(ESTABLISHED 1886.)—For the circulation, criticism, and exchange of prints taken by members, and discussions on various topics by means of a note-book. *Secretary and Treasurer*—R. A. R. Bennett, M.A., Walton Manor Lodge, Oxford.

**Postal Photographic Club.**—(ESTABLISHED 1890.)—*Secretary and Treasurer*—George D. Nickels, 13 Vale Terrace, Torquay.

**Preston Camera Club.**—(ESTABLISHED 1890.)—Meetings held at Hill Place, Fishergate. *President*—Colonel Oliver, J.P. *Vice-Presidents*—John Healey, J.P., M. B. Copland, J.P., T. Whitehead, C. E. Grierson. *Committee*—James Atherton, W. Newton, James Mackintosh, W. J. T. Jackson, H. Jackson, Thomas Patterson. *Secretary and Treasurer*—Frank Ketton, Oak Cottage, Fulwood, Preston.

**Pudsey and District Photographic Society.**—(ESTABLISHED 1891.)—Meetings held at the Mechanics' Institute, Pudsey. *President*—Dr. W. L. Hunter. *Vice-Presidents*—H. Crossley and — Crothwaite. *Treasurer*—J. Goodman. *Secretary*—W. H. Hinings, Manor House Street, Pudsey, Yorkshire.

**Putney Photographic Society.**—(ESTABLISHED 1890.)—Meetings are held at the Boys' Gymnasium, Charlwood Road, Putney, S.W. *President*—Hon. Baron Pollock. *Vice-Presidents*—Henry Kimber, M.P., and Dr. W. J. Sheppard. *Council*—Dr. J. F. Farrar, Henry Faulkner, W. Rising Few, Thomas Gilbert, Walter F. Gorin, William Martin, jun., L. S. Zacharia sen. *Hon. Treasurer*—William Martin, jun. *Joint Hon. Secretaries*—Walter F. Gorin, 3 Montserrat Road, Putney, S.W., and L. S. Zachariasen, Alfred Villa, Putney Bridge Road, Putney, S.W.

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**Redruth Photographic Club.**—(ESTABLISHED 1893.)—Meetings held at the Club Room, Redruth. *President*—T. C. Peter. *Committee*—S. Jones, A. E. Coryn, W. M. Martin, J. E. Harvey. *Treasurer and Secretary*—Ernest Beringer, Highway, Illogan, Redruth.

**Richmond Camera Club.**—(ESTABLISHED 1890.)—Meetings every Monday at Eight p.m., at the Greyhound Hotel, George Street, Richmond, Surrey. *Patron*—H. H. the Duke of Teck, G.C.B. *President*—F. P. Cembrano, jun. *Committee*—J. H. Alabaster (Lanternist), G. Ardaser (Librarian), C. H. Davis (Treasurer), J. D. Gibson, J. B. Huddy, F. Neville, J. H. Williams. *Hon. Secretary*—P. Ennis, 28 Halford Road, Richmond, Surrey.

**R. N. E. College Photographic Club.**—(ESTABLISHED 1891.)—Meetings held at the R. N. E. College, Devonport, Devon. *President*—W. B. Hall, R.N. *Vice-President*—F. J. Charlton, R.N. *Committee*—P. Stocker, R.N., J. C. Pearson, R.N., T. H. Soper, R.N., L. W. S. Reid, R.N. *Secretary and Treasurer*—F. J. Charlton, R.N., R. N. E. College, Devonport, Devon.

**Rochester Naturalists' Club (Photographic Section).**—(ESTABLISHED 1891.)—Meetings held at the Mathematical School, Rochester. *President*—Charles Bird, B.A., F.G.S. *Vice-President*—J. H. Whitfield. *Council*—J. C. Boon, J. Hepworth, J. S. Hewitt, P. J. Neate, T. F. Tannahill, M.B., C.M., D.P.H., R. Watts. *Treasurer*—R. Lines. *Secretary*—John L. Allen, Clover House, Chatham.

**Rotherham Photographic Society.**—ESTABLISHED 1889.—Meetings are held at 5 Frederick Street, Rotherham. *President*—Dr. F. B. Judge Baldwin. *Vice-Presidents*—E. Isle Hubbard, W. H. Haywood, G. T. M. Rackstraw. *Council*—J. Leadbeater, W. Mason, J. W. Whittington, I. Wright, W. Firth, and Officers. *Hon. Financial Secretary*—W. H. Shepherd. *Hon. Secretary*—H. C. Hemmingway, 6 Stanley Street, Rotherham.

**Royal College of Science Photographic Society.**—(ESTABLISHED 1888.)—*President*—Captain W. de W. Abney, C.B., F.R.S. *Vice-Presidents*—Chapman Jones, F.I.C., F.C.S., &c., and W. Kirman, A.R.C.S. *Committee*—L. M. Jones, B.Sc., J. A. Harrison, J. E. Sneius, A. D. Saunders, C. E. Martineau. *Hon. Secretary*—C. J. S. Makin, Royal College of Science, Exhibition Road, London, S.W.

**Scarborough and District Photographic Society.**—(ESTABLISHED 1892.)—Meetings held at the Albermarle Hotel. *President*—Rev. W. T. Reeder, M.A. *Committee*—Miss Woodall, Miss McCallum, Dr. Monk, —Northorp, Henry Hill, —Whitfield. *Hon. Treasurer*—J. H. Rowntree. *Hon. Secretary*—Nathan Todds, 18 Victoria Road, Scarborough.

**Selby Camera Club.**—(ESTABLISHED 1890.)—Meetings every Thursday at seven during winter months; fortnightly Excursions during summer. Meeting-place, the Club Rooms, Park Street. *President*—Rev. A. G. Tweedie, M.A. *Vice-Presidents*—W. Rawling and J. C. Thompson. *Committee*—J. H. Bantoft, T. R. Cooper, E. Swain. *Secretary and Treasurer*—W. N. Cheesman, The Crescent, Selby.

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**Settle Photographic and Lantern Society.**—(ESTABLISHED 1893.)—Meetings held at the Adult Schoolhouse, Settle. *President*—D. R. Smith, M.A. *Treasurer*—C. W. Buck, M.R.C.S. *Secretary*—H. Vaughan Walker, Settle.

**Shaw Church Institute Photographic and Art Society.**—(ESTABLISHED 1888.)—Meetings held at the Shaw Church Institute. *President*—J. Hilton Ashton. *Vice-President*—James Broadbelt. *Committee*—T. Swithenbank, H. Buckley, J. Watson. *Secretary and Treasurer*—John Maiden, 91 Rochdale Road, Shaw, near Oldham.

**Sheffield Optical Lantern Society.**—(ESTABLISHED 1890.)—Monthly Meetings at St. Paul's Schools, Cambridge Street, on the third Thursday in each month. *President*—E. G. Draper. *Vice-Presidents*—Dr. Manton and H. Staniforth. *Committee*—J. Clowes, T. G. Allen, J. W. Wilshaw, T. Baker, J. Maclaurin, F. Mottershaw, J. Stacey, J. W. Whittington, S. Hughes. *Hon. Treasurer*—E. Copley. *Hon. Secretary*—J. S. Stephens, 6 Sheaf Gardens Terrace, Sheffield. *Assistant Secretary*—J. T. Frith.

**Sheffield Photographic Society.**—(ESTABLISHED 1876.)—Meetings are held at the Masonic Hall, Surrey Street. *President*—Ernest Beck. *Vice-Presidents*—B. J. Taylor, Bradley Nowill, George Bromley. *Council*—Joseph Smith, W. T. Furness, T. G. Hibbert, Thomas Firth, D. C. Brooke. *Treasurer*—William M. Toplis. *Secretary*—Sparham Camp, 276 Shoreham Street, Sheffield.

**Shropshire Camera Club.**—(ESTABLISHED 1886.)—Ordinary Meetings, second Wednesday in each month during winter session, at Seven p.m., at 9 The Square, Shrewsbury. Annual Meeting held in January. *President*—M. J. Harding. *Vice-Presidents*—W. S. Buddicom, G. Bidlake, J. R. Greatorex. *Council*—W. Alltree, W. Bowdler, W. Burson, J. Della Porta, W. Heath, Dr. E. Cureton, R. J. Irwin, F. W. Williams. *Treasurer*—M. J. Harding. *Secretary*—W. W. Naunton, 9 The Square, Shrewsbury.

**South London Photographic Society.**—(ESTABLISHED 1889.)—The Society is affiliated to the Photographic Society of Great Britain. Meetings held at Hanover Hall, Hanover Park, Rye Lane, Peckham, S.E. *President*—F. W. Edwards. *Vice-Presidents*—H. G. Banks, Maurice Howell, Dr. T. G. Munyard, W. Rice. *Committee*—M. Boxall, F. F. Buckle, C. Eldridge, Howard Esler, A. Fellows, L. Greaves, E. J. Lester, B. Lyon, J. Miller. *Curator*—G. H. Moss. *Hon. Treasurer*—E. A. Whitby. *Hon. Secretary*—C. H. Oakden, 51 Melbourne Grove, East Dulwich, S.E. *Hon. Assistant and Excursion Secretary*—W. F. Slater, 169 Southampton Street, Camberwell, S.E.

**South Manchester Photographic and Lantern Society.**—(ESTABLISHED 1892.)—Meetings held at the Longford Lecture Hall, Stretford. *President*—W. I. Chadwick. *Vice-President*—W. Linnell. *Hon. Treasurer*—E. N. Bowden. *Hon. Secretary*—M. W. Thompstone, Beaufort House, Brooklands, near Manchester.

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**Southport Social Photographic Club.**—(ESTABLISHED 1890.)—Meetings held at The Studio, 15 Cambridge Arcade. *President*—C. F. Depree. *Vice-Presidents*—W. P. Brown and J. C. Smith. *Committee*—Miss Unsworth, Miss Dunmore, H. J. Heaton, A. W. Kiddie, S. C. Williams. *Librarian*—George Cross. *Hon. Secretary and Treasurer*—J. R. Cave, 52 Nevill Street, Southport.

**Southsea Amateur Photographic Society.**—(ESTABLISHED 1889.)—Meetings held at 3 King's Road, Southsea. *President*—J. J. Thornton. *Vice-President*—Dr. F. Lord. *Council*—C. H. Grant, J. Shawyer, A. Fisher, A. H. Wood. *Treasurer*—J. J. Thornton. *Secretaries*—Major Banno, H. M. Gun Wharf, Portsmouth, and George Whitefield, 61 King's Road, Southsea.

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**Spen Valley Photographic Society.**—(ESTABLISHED 1890.)—Meetings held at Coffee Tavern, Cleckheaton. *President*—Dr. Farrow. *Vice-Presidents*—Dr. Sutherland, Dr. Sykes, B. H. Goldthorpe, F. Law, S. Mortimer. *Council*—Messrs. Armytage, Burnhill, Hirst, Knowles, Phelon, Potts, Smith, Wright, Rothesay. *Treasurer*—E. Smith. *Secretary*—J. H. Jackson, 66 Butts Terrace, Westgate, Cleckheaton.

**Staff College Photographic Club.**—(ESTABLISHED 1889.)—*Hon. Secretary and Treasurer*—Captain Montgomery, R.A., Staff College, Camberley, Surrey.

**Staffordshire Photographic Survey Society.**—(ESTABLISHED 1891.)—Place of Meeting, Free Library, Stoke-upon-Trent. *President*—Bishop of Lichfield. *Vice-Presidents*—Bishop of Shrewsbury, Earl of Dartmouth, Alexander Scrivener. *Committee*—E. H. Barker, E. J. Daniels, George Lynam, W. A. Meigh, F. Mountford, E. W. Wain, H. E. Whythead. *Treasurer and Secretary*—A. J. Caddie, Free Library, Stoke-upon-Trent.

**Staffordshire Potteries Amateur Photographic Society.**—(ESTABLISHED 1890.)—Meetings held at the Town Hall, Burslem. *President*—Edward B. Wain. *Vice-Presidents*—R. S. Burgess, A. Shorter, F. C. Powall. *Committee*—R. W. Guy, A. E. Hils, J. W. Myatt, J. Porter, W. Savage, W. Slater. *Treasurer*—S. Crosse. *Secretaries*—J. F. Hewitt, 35 Market Place, Burslem, and W. H. Walley, Queen Street, Burslem.

**Stereoscopic Club.**—(ESTABLISHED 1891.)—Meetings at the Brooklands Hotel, Brooklands, near Manchester. *President*—James Whitelegg. *Committee*—*President, Treasurer, Hon. Secretary.* *Treasurer*—J. Vos. *Secretary*—W. I. Chadwick, Brooklands, near Manchester.

**Stockport Photographic Society.**—(ESTABLISHED 1889.)—Meetings on the second Wednesday of each month, and on the fourth during November, December, January, and February at the Mechanics' Institute. Annual Meeting, September. *President*—Thomas Kay, J.P. *Vice-Presidents*—Col. Turner, J.P., Alderman Harrison, W. B. Leigh. *Committee*—B. N. Cooper, B. S. Harlow, Oliver Coppock, Louis Hyde, G. H. Broome, H. J. Robinson, G. Hidderley, W. T. Scott, E. F. Ward, A. M. Gourley. *Treasurer*—Thomas Bedford. *Secretary*—Thomas Gould, 104 Chestergate, Stockport.

**Stockton Photographic Society.**—(ESTABLISHED 1887.)—Meetings held at Mason's Court, High Street. *President*—J. H. Draper. *Vice-Presidents*—J. H. Jackson and W. W. Stainthorpe, M.D. *Council*—J. Bowron, H. Bradley, W. Downs, W. S. Fothergill, W. Hodgson, W. Mouet. *Treasurer*—J. H. Rhodes. *Secretary*—J. E. Ellam, Yarm.

**Sunderland Photographic Association.**—(ESTABLISHED 1888.)—*President*—W. Milburn. *Vice-Presidents*—J. Lynn and W. Pratt. *Council*—W. Bartram, W. J. Broderick, A. G. Boulton, E. R. Kirkley, Dr. Legat, A. Peddie, W. J. Pope, R. Stafford. *Treasurer*—T. Walton. *Secretary*—Charles E. Cowper, Thornhill Gardens, Sunderland.

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**Sunderland Y.M.C.A. Camera Club.**—(ESTABLISHED 1892.)—Place of Meeting, Y.M.C.A., John Street, Sunderland. *President*—W. Milburn. *Committee*—R. Richardson, J. Deans, R. G. Posgate, A. S. Greig, Walter Armstrong (Chairman). *Secretary and Treasurer*—H. Armstrong Brown, 3 Holmeside, Sunderland.

**Sun & Company.**—(ESTABLISHED 1886.)—A Postal Photographic Society, limited to forty amateurs, for the monthly circulation and criticism of photographs, entirely the work of members, and for a general interchange of ideas, with a view to mutual advancement in the science and art of photography. *Committee*—F. de Paula, Wallace Heath, F. W. Williams, and the Hon. Secretary. Application for vacancies should be made to the Hon. Secretary, Martin J. Harding, 4 Lexden Gardens, Shrewsbury.

**Sutton Coldfield Camera Club (formerly Wyde Green Camera Club.)**—(ESTABLISHED 1889.)—Meetings are held at the Town Hall, Sutton Coldfield, on the last Friday of each month (or upon the second and fourth Fridays of the winter months) at Eight p.m. Annual General Meeting in September. *President*—H. Duncalfe, M.R.C.S., J.P.—*Past Presidents*—Sir J. B. Stone, F.L.S., F.G.S., J.P., and A. H. Evans, M.R.C.S., J.P. *Vice-Presidents*—H. H. Plante, J.P., S. A. Taylor, J.P., G. H. Dugard. *Committee*—H. Billson, G. Parker, T. Purden, H. Rabue t, G. M. Stubbs. *Hon. Treasurer*—T. S. Hooper. *Hon. Secretary*—C. J. Fowler, Court Mount, Erdington.

**Sutton (Surrey) Scientific Society (Photographic Section).**—(ESTABLISHED 1886.)—Meetings, first Tuesday in each month in the Society's Rooms. *President*—E. de Clifford. *Treasurer*—E. Culverhouse, Heathfield, Wallington, Surrey.

**Swansea Amateur Photographic Association.**—(ESTABLISHED 1888.)—*President*—B. H. Morgan. *Vice-Presidents*—T. F. Thompson and W. Terrill, F.C.S. *Committee*—A. Sinclair, H. J. Naysmith, James Glass, and the Officers of the Association. *Secretary and Treasurer*—E. Ernest Morgan, Bryn-Nant, Swansea.

**Sydenham District Camera Club.**—(ESTABLISHED 1889.)—Meetings held at the Vestry Hall, Anerley. *President*—George Austin. *Vice-President*—Walter Piggott. *Council*—T. C. Cole, S. S. Chapman, W. Low Sargeant, G. Zimmer. *Secretary and Treasurer*—H. H. Gray, 9 Thicket Road, Anerley, S.E.

**Talbot Album Club.**—(ESTABLISHED 1886.)—Established for the monthly circulation and criticism of members' work. One album is sent out on the first of every month, and at the end of the year the albums are divided among the members. *Secretary*—Frederick H. Davies, 265 Coventry Road, Birmingham.

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**Tooting Camera Club.**—(ESTABLISHED 1890.)—Meetings held at Totterdown, High Street, Tooting, *President*—A. H. Anderson. *Vice-President*—J. H. Beckett. *Committee*—W. Irwin, H. Berger, R. Simmonds, G. H. Dollery. *Treasurer*—C. D'E. Stowell. *Secretary*—J. F. Child, Harzville, Leigham Valley Road, Streatham, S.W.

**Toynbee Camera Club.**—(ESTABLISHED 1890.)—Meetings are held at Toynbee Hall, 28 Commercial Street, E. *President*—K. Jameson, M.A. *Vice-Presidents*—F. E. Bartholomew, Dr. Fison, A. Price. *Committee*—W. H. Jennings, G. West, T. W. Hull, — Emary. *Treasurer*—J. E. Monk, *Secretaries*—Thomas W. Glare, 13 Stanhope Road, Walthamstow, and A. E. Birch, 35 Heathland Road, Stoke Newington.

**Tunbridge Wells Amateur Photographic Association.**—(ESTABLISHED 1887.)—Ordinary Meetings, first Thursday in the month at the Mechanics' Institute, at quarter-past Eight p.m. Excursions during the summer. Annual Meeting in January. Exhibition in November. Members of recognised Clubs and Societies are welcome to attend the ordinary meetings as visitors upon giving notice in writing to the Hon. Secretary. *Patron*—Sir David Salomons, Bart. *President*—Francis G. Smart, M.A. *Vice-Presidents*—Rev. A. T. Scott, Ernest R. Ashton, George Lewis. *Committee*—J. W. Morgan, A. W. Pierson, E. Catchpole. *Hon. Treasurer*—B. Whitrow. *Hon. Secretary*—Joseph Chamberlain, 14 Calverley Park Gardens.

**Tyneside Camera Club.**—(ESTABLISHED 1891.)—Meetings held at the Clarence Street Schools, Newcastle-on-Tyne. *President*—J. F. McKie. *Vice-President*—W. Bell. *Council*—T. Lawson, J. Angus, J. G. Elliot, T. Simpson, J. Birkett. *Treasurer*—J. Simpson. *Secretary*—T. Ord-Birkett, Clarence Street Schools, Newcastle-on-Tyne.

**Ulster Amateur Photographic Society.**—(ESTABLISHED 1886.)—Meets in the Belfast Museum. *President*—William Swanston, F.C.S. *Vice-Presidents*—John Brown and Edward Braddell. *Committee*—J. J. Andrew, Q. J. Brownrigg, C.I., S. B. Coates, M.D., R. J. Evans, William Gray, M.R.I.A., James Leslie, J. M'Cleery, J. Stelfox. *Treasurer*—R. E. Workman. *Secretary*—Cecil Shaw, M.D., &c., 14 College Square East, Belfast.

**Upper Holloway Cycling Club (Camera Division).**—(ESTABLISHED 1891.)—Place of Meeting, Royal Oak Hotel, Upper Holloway. *President*—F. W. Trew. *Vice-President*—J. S. Cross. *Committee*—F. Dean, A. Gentle, W. Pilcher, W. Dew, F. Drury, G. Wackerbarth. *Hon. Secretary*—F. W. Timms, 5 Abercorn Terrace, Upper Holloway, N.

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**Uttoxeter Amateur Photographic Society.**—(ESTABLISHED 1889.)—Meetings held at the Club Room, Carter Street. *President*—Rev. F. C. L. Barnwell. *Committee*—Rev. F. C. L. Barnwell, R. T. A. Hardy, S. B. Bamford G. C. Wallis, A. Parker, F. Udale, R. T. Walker. *Treasurer*—R. T. A. Hardy. *Secretary*—Robert T. Walker, Balance Street, Uttoxeter.

**Wakefield Photographic Society.**—(ESTABLISHED 1891.)—Meetings held at the Cocoa Tavern, Wakefield. *President*—Captain Norwood. *Vice-Presidents*—A. W. Stanfield, J.P., and Isaac Briggs, J.P. *Committee*—H. Crutchley, J. H. Chaplin, G. F. Firth, H. Parkin, W. Wrigley, H. R. Haigh. *Treasurer*—W. Townend. *Secretary*—C. W. Richardson, St. John's Grove, Wakefield.

**Walsall Amateur Photographic Society.**—(ESTABLISHED 1892.)—Meetings held at the Young Men's Christian Association, Freer Street, second and fourth Thursday in the month at Eight p.m. *President*—Rev. W. S. Swayne. *Vice-Presidents*—W. H. Brookes, J.P., F. Brown, W. J. Corbett, Rev. W. T. Corfield, W. H. Duignan, A. C. Greatrex, H. N. Grove, M. H. Highway, F. James, J.P., G. Lavender, J. A. Leckie, C. A. Loxton, S. Loxton, J. Moseley, J.P., S. A. Newman, W. Oliver, G. G. Potter, John Smith, Roland Smith, F. W. Willmore, J. S. Wilson, C. J. Windle. *Committee*—W. H. Bullock, Rev. W. T. Corfield, Rev. Peter Dean, W. Meikle, H. B. Smith, J. S. Wilson. *Hon. Secretary and Treasurer*—E. A. Day, 1 St. Paul's Terrace, Walsall.

**Walton Photographic Society.**—(ESTABLISHED 1889.)—Place of Meeting Arnot Street Schools, Walton. *President*—Henry Sharrock. *Council*—John Kennedy, Henry E. Burn, John Parke, W. Beaton, George Latimer, Fred Murphy. *Secretary and Treasurer*—W. A. Brown, 20 Richmond Terrace, Breck Road, Liverpool.

**Warrington Amateur Photographic Society.**—(ESTABLISHED 1886.)—Meetings are held in the Committee Room of the Museum, Bold Street, on the last Tuesday in each month, at Eight p.m. *President*—T. J. Down. *Vice-Presidents*—H. N. Houghton and W. Pierpoint, J.P. *Committee*—J. Harding (Eustace Street), J. Harding (Liverpool Road), J. Hallows, G. Kirby, Thomas Welsby, C. Aylword, A. Paul, Thomas Hesketh. *Librarian*—John Skelton. *Auditor*—J. Fairhurst. *Treasurer*—P. Dalton. *Secretary*—Harry Pritchard, 162 Orford Lane, Warrington.

**West Kent Amateur Photographic Society.**—(ESTABLISHED 1888.)—Meetings are held at the Institute, Bexley. *President*—Andrew Pringle. *Vice-President*—A. R. Dresser. *Council*—Messrs. Grant, Wiseman, Jones, Taylor, Clark, Pickell. *Hon. Secretary and Treasurer*—Edward Hawkins, Manor Estate, Sidcup, Kent.

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**West Surrey Photographic Society.**—(ESTABLISHED 1887.)—Meetings held on alternate Wednesdays at Eight p.m. *President*—Lieut.-Colonel J. Gale. *Vice-Presidents*—George Davison, W. Winsford, J. L. Lyell. *Committee*—Messrs. Bull, James, Graham, Martin, Agars, Wilshere, Swingler, Seward. *Secretary and Treasurer*—F. H. Smith, 107 Falcon Road, S.W.

**Widnes Photographic Society.**—(ESTABLISHED 1893.)—Meetings held at Bedford Chambers, Victoria Road, Widnes. *President*—V. C. Driffield. *Vice-President*—G. I. Warner. *Committee*—J. S. Sinclair, A. Wareing, W. Priestnall, O. White. *Secretary and Treasurer*—George Rae, Bold, near Widnes.

**Wigan Photographic Society.**—(ESTABLISHED 1890.)—Meetings held at the Y.M.C.A., Rodney Street, Wigan. *President*—J. A. E. Lowe. *Vice-Presidents*—Rev. J. S. Barnes, M.A., R. Wardman, G. R. Newman. *Council*—J. H. Atherton, J. Smith, B. B. Hartley, S. Richardson, H. Hill, P. Clark, C. R. S. Kirkpatrick. *Hon. Secretary and Treasurer*—Frederick Betley, 10 Ashland Avenue, Wigan.

**Wolverhampton Photographic Society.**—(ESTABLISHED 1888.)—Headquarters, Blind Institute, Victoria Street. Meetings, first Tuesday in each month, at Eight p.m. *President*—H. Holcroft. *Vice-President*—H. E. Perry. *Committee*—T. Ironmonger, J. Stokes, E. A. White, W. E. Oakley, W. G. Orme, F. W. Whitehouse, J. M. Taylor. *Hon. Treasurer*—F. J. Gibson. *Hon. Secretary*—S. R. Rhodes, 53 Queen Street, Wolverhampton.

**Woodford Photographic Society.**—Meetings first and third Thursdays in each month. *President*—H. Wilmer. *Council*—Edward B. Caird, H. Crouch, H. T. Malby. *Hon. Secretary and Treasurer*—Henry W. Bennet Dacre House, Arundel Street, London, W.C.

**Woolwich Photographic Society.**—Meetings are held on the second and fourth Thursdays in every month from October to April inclusive. During the summer, excursions are frequently arranged. *President*—Rev. S. E. Chettoe, M.A. *Vice-President*—Major C. D. Davies. *Council*—Messrs. Maskell, Penson, J. Calder, W. H. Dawson, P. Hobson, E. G. Kember. *Treasurer*—H. Barker. *Hon. Secretary*—J. Borthwick Panting, 3 Friars Villas, Old Charlton, S.E.

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**Woolwich Polytechnic Photographic Society.**—(ESTABLISHED 1892.)—Meetings held at the Polytechnic, Willam Street. *President*—A. R. Dresser. *Vice-Presidents*—Right Hon. Viscount Maitland and Rev. E. J. Doherty. *Committee*—Messrs. Kemp, Allen, Taylor, Brazier, Machen, Daniels. *Secretary and Treasurer*—W. Dawes, 145 Chesnut Road, Plumstead.

**Worcestershire Camera Club.**—(ESTABLISHED 1888.)—Meetings held in the School of Science, Kidderminster, and are variable in date. We issue a programme of fixtures. *President*—Michael Tomkinson. *Vice-Presidents*—Albert Cowell and Arthur Comber. *Committee*—Miss C. Badland, Miss E. Cowell, C. J. Carter, J. S. Hussey, R. Varney, C. Walker. *Treasurer*—Benjamin Hepworth. *Secretary*—William Ray, F.C.S., F.I.C., School of Science, Kidderminster.

**Worcester Tricycle Club (Camera Section).**—(ESTABLISHED 1892.)—Meeting held at the Bell Hotel, Worcester. *President*—A. Gyngell. *Committee*—J. Cam, W. Cam, F. E. Hill, S. Hill, T. James, J. P. Sautonna. *Treasurer*—F. E. Hill. *Secretary*—Thomas J. Hobson, Laurel Villa, Boughton Street, St. John's, Worcester.

**Wycombe District Amateur Photographic Society.**—(ESTABLISHED 1892.)—Meetings are held at the South Bucks Auction Mart. *President*—L. Broughton. *Committee*—Messrs. Howell, Baker, Strange, Howe, Norton. *Secretary*—J. Wilford, 7 High Street, High Wycombe.

**Y. M. C. A. (Clapham Branch) Photographic Club.**—(ESTABLISHED 1892.)—Meetings held at 49 High Street, Clapham. *President*—H. Gibbs. *Secretary*—G. I. Nines, 57 Montholme Road, New Wandsworth, S.W., or 49 High Street, Clapham.

**Y. M. C. A. Photographic Club.**—(ESTABLISHED 1889.)—Rooms, 56 Peter Street, Manchester. *President*—J. A. Beith, J.P. *Vice-President*—W. H. Newett. *Chairman*—A. C. Harrison. *Committee*—S. H. Tottle, A. W. Pearson, W. H. Machin, W. H. Cheetham, G. B. Swann. *Hon. Treasurer*—G. T. White. *Hon. Secretary*—John Irvine, 56 Peter Street, Manchester.

**York Photographic Society.**—(ESTABLISHED 1887.)—Meetings are held at the Victoria Hall, Goodramgate, York. *President*—H. C. Swailes, M.B. *Vice-President*—J. Saville. *Council*—Rev. F. W. Stubbs, F. Vincent, Watson Hirst, T. Brown, J. Hill, R. Redpath. *Treasurer*—R. Bainbridge. *Secretary*—F. G. Benson, 50 Scott Street, York.

**Yorkshire Philosophical Society (Photographic Section).**—(ESTABLISHED 1888.)—Meeting at the Museum, York. *President*—Tempest Anderson, M.D., B.Sc. *Vice-Presidents*—W. Monkhouse and John N. Kitching. *Committee*—Henry R. Moiser, F.G.S. and three other members. *Secretary and Treasurer*—H. Dennis Taylor, F.R.A.S., 20 Bootham Terrace, York.

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## COLONIAL PHOTOGRAPHIC SOCIETIES.

**Montreal Camera Club.**—(ESTABLISHED 1889.)—Meetings on the first Monday in each month. Annual Meeting, first Monday in April. Place of Meeting, Club Rooms, Y.M.C.A. Building, Dominion Square, Montreal. *President*—Alexander Henderson. *Vice-President*—J. B. Abbott. *Committee*—L. O. Armstrong, Albert Holden, Frederick M. Cole, George R. Prowse, J. J. Mackintosh. *Secretary and Treasurer*—Charles F. Dawson, 233 St. James's Street, Montreal, Canada.

**Photographic Association of Canada.**—(ESTABLISHED 1884.)—Place of meeting, Toronto. *President*—J. C. Walker. *Vice-Presidents*—A. M. Cunningham (Hamilton), F. Cooper (London), S. J. Jarvis (Ottawa). *Executive Committee*—The Officers. *Secretary and Treasurer*—E. Poole, St. Catharine's, Ontario.

**Quebec Camera Club.**—(ESTABLISHED 1887.)—Meetings are held at Captain Imlah's Quarters, Citadel. *Vice-President*—J. George Garneau. *Committee*—Captain W. E. Imlah, J. B. Amyot. *Treasurer*—James Brodie. *Secretary*—Ernest F. Würtele, P.O. Box, 1117, Quebec.

**Toronto Camera Club.**—(ESTABLISHED 1887, INCORPORATED 1893.)—Meetings are held on the Second Floor, corner of Yonge and Gerrard Streets, Toronto, Canada. Annual Exhibitions in February or March. Lantern Slides, first Monday in each month from October 1st to April 30th. *President*—E. Havelock Walsh. *Vice-Presidents*—A. W. Croil and W. H. Moss. *Committee*—Hugh Neilson, N. A. Powell, M.D., Professor W. H. Ellis, M.D., George H. Gooderham, J. G. Ramsey, G. Townsend. *Treasurer*—R. G. Muntz. *Secretary*—Ernest M. Lake, 17 Jordan Street, Toronto, Canada.

**Amateur Photographic Association of Victoria, Melbourne.**—The Association meets on the second Tuesday in each month at the Royal Society's Hall, Victoria Street, Melbourne. Visitors from British, American, or Continental Societies will be made welcome at any of the Meetings. *President*—E. C. Bell. *Vice-Presidents*—F. A. Kernot and John Lang. *Committee*—J. H. Mulvany, H. C. Ward, J. McEwan, A. M. Henderson, E. J. Hughes. *Hon. Librarian*—E. A. Walker. *Scientific Custodian*—R. W. Harvie. *Hon. Treasurer*—J. J. Fenton. *Hon. Secretary*—J. H. Harvey, 278 Victoria Parade, East Melbourne.

**Auckland Photographic Club.**—General Meetings, the second Friday in each month. Annual Meeting in October. Club Rooms, Australian Mutual Provident Society's Buildings, Queen Street, Auckland. *President*—His Excellency the Earl of Onslow. *Vice-Presidents*—H. B. Morton and R. B. Walrond. *Committee*—R. L. Caldwell, H. J. Carson, T. Humphries, A. J. Hunter. *Hon. Treasurer*—G. R. Boulton. *Hon. Secretary*—J. P. E. Francis, Box 22, G.P.O., Auckland.

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**Auckland Camera Club.**—*President*—Mr. Sturtevant. *Secretary*—Robert B. Walrond, St. Stephen's Avenue, Parnell, Auckland.

**Ballarat Amateur Photographic Association, Victoria, Australia.**—Meetings are held at the School of Mines, Lydiard Street, on the fourth Tuesday in each month, and are called by advertisement in the local papers. *President*—R. J. Miller. *Vice-President*—W. H. Wooster. *Executive Committee*—The Officers, with the Misses Oddie and Baker. *Hon. Treasurer*—J. J. Young. *Hon. Sec.*—F. Foster, 146 Lydiard Street.

**Dunedin Photographic Society.**—Meetings third Wednesday in each month, in Union Chambers. *Secretary*—W. Livingstone, Royal Terrace, Dunedin, New Zealand.

**Ipswich and West Moreton Amateur Photographic Society, Queensland, Australia.**—(ESTABLISHED 1893.)—Meetings on the second Thursday and last Wednesday of each month. Annual Meeting on the second Thursday in the month of July of each year. *President*—Dr. Lightoller. *Vice-President*—Mr. Bostock. *Committee*—Messrs. Carey, Ward, Edwards, and the Officers. *Treasurer*—Mr. Durno. *Secretary*—T. A. Darker, c/o R. T. Darker, Locomotive Superintendent, Government Railway Works, Ipswich, Queensland, Australia.

**Nelson Camera Club.**—Meetings are held on the third Wednesday of each Month. Visitors are invited and will receive notice of Meetings on application to the Secretary. *Patron*—His Excellency the Right Hon. the Earl of Onslow. *President*—Charles Y. Fell. *Hon. Secretary*—F. W. MacLean, A. M. Inst., C.E.

**Queensland Amateur Photographic Society.**—(ESTABLISHED 1887.)—General Meetings are held on the first Friday in each month at the Contractors' Exchange, Courier Buildings, Queen Street, Brisbane. *President*—Dr. J. Wheeler. *Vice-Presidents*—T. Bertenshaw, J. J. Campbell, D. R. Eden. *Committee*—Dr. D. Hardie, E. H. Alder, J. M. Fraser. *Curator*—Dr. J. Thomson. *Treasurer*—F. R. Hall. *Hon. Secretary*—A. R. L. Wright, 182 Queen Street, Brisbane.

**South Australian Photographic Society.**—Meetings are held in the Chamber of Manufactures, North Terrace, Adelaide, on the second Thursday in each month at half-past Seven p.m. Annual Meeting in July. *Patrons*—His Excellency the Right Hon. the Earl of Kintore, P.C., G.C.M.G., Sir E. T. Smith, K.C.M.G., Sir Charles Todd, K.C.M.G., Hon. Dr. J. A. Cockburn, M.P., Professor E. H. Rennie, M.A., D.Sc., Professor W. H. Bragg, M.A., J. J. Green. *Past Presidents*—S. J. Dailey and G. Stace. *President*—C. F. Clough, Assoc. M. Inst. C.E. *Vice-President*—E. W. Belcher. *Committee*—The Executive Officers, G. Stace, S. J. Dailey, A. W. Dobbie. *Hon. Librarian*—J. D. Dixon. *Hon. Treasurer*—R. B. Adamson, Belgrave Terrace, College Town. *Hon. Secretary*—A. H. Kingsborough, Childers Street, North Adelaide.

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**162 WARDOUR STREET, LONDON, W.**

- Sydney Amateur Photographic Society.**—Meetings on the second Thursday in each month. *President*—E. L. Montefiore. *Vice-Presidents*—H. Paterson and J. H. Simpson. *Hon. Secretary*—Henry Chapman, 143 King Street, Sydney.
- Tasmanian Photographic, Science, and Art Association, Hobart.**—(ESTABLISHED 1887.)—Meetings are held at the Royal Society's Museum on the second Friday in each month. *Patron*—His Excellency Lord Gormanston. *Vice-Patrons*—His Honour Sir Lambert Dobson and Hon. Dr. Agnew. *President*—Robert Henry. *Committee*—A. Morton, C. Allport, Russell Young, H. Downing, E. Scott, D. Allport, W. K. Morris, R. McGuffie, E. R. Ash, H. J. Buckland, C. L. Hodgman. *Treasurer*—F. J. Paterson. *Secretary*—Nathaniel Oldham, 79 Barrack Street, Hobart.
- Victoria Camera Club.**—(ESTABLISHED 1887.)—Meetings on the first Monday in each month. Field Meetings every three weeks in summer. *President*—Hon. F. S. Dobson, LL.D. *Vice-President*—A. M. Henderson. *Committee*—James Pettigrew, A. Harper, H. B. Clutton. *Secretary and Treasurer*—Alfred Henry Farmer, 54 Elizabeth Street, Melbourne.
- Kimberley Camera Club.**—(ESTABLISHED 1890.)—*President*—James Lawrence. *Vice-President*—John Henry. *Council*—C. A. Chappell, W. Gasson, F. H. Hancox. *Secretary and Treasurer*—Malcolm Macfarlane, Kimberley.
- Amateur Photographic Society of Madras.**—(ESTABLISHED 1888.)—Meetings held at the Masonic Hall, Mount Road, Madras. *President*—C. Michie-Smith, B.Sc. *Vice-Presidents*—C. Slater, E. W. Stoney, M.I.C.E. *Committee*—Surgeon-Lieut.-Colonel S. L. Dobie, W. M. Gerrard, A. E. Lawson, V. G. Lynn, A. L. H. Palmer, Surgeon-Major J. L. Van Geyzel. *Secretary and Treasurer*—F. Dunsterville, Royapuram, Madras.
- Photographic Society of India.**—(ESTABLISHED 1886.)—Meetings are held at 57 Park Street, Calcutta. *President*—Hon. Sir Comer Petheram, Q.C. *Vice-Presidents*—J. G. Apcar and J. S. Gladstone. *Committee*—P. Donaldson, N. Giannacopulo, W. H. Jobbins, E. E. A. Kuster, Maharaj Kuwar P. K. Tagore, Colonel M. W. Rogers, R.E., E. M. Showers, A. Tocher, T. H. Wilson. *Treasurer*—George Ewing. *Secretary*—T. Archdale Pope, 57 Park Street, Calcutta.
- Singapore Amateur Photographic Society.**—*President*—H. M. Simons. *Committee*—Hon. A. L. Donaldson, William Gutcher, and the Officers. *Treasurer*—T. F. S. Quin. *Hon. Secretary*—E. J. Robertson.
- Photographic Society of Japan.**—(ESTABLISHED June, 1889.)—*President*—Viscount Enomoto, Minister of Education for Japan. *Vice-Presidents*—Professor D. Kikuchi, M.A. (Cantab.), and Dr. W. S. Bigelow. *Treasurer*—T. Asanuma. *Secretaries*—Professor H. Ishikawa and Professor W. K. Burton.

## CONTINENTAL PHOTOGRAPHIC SOCIETIES.

**AMATEUR FOTOGRAFEN VEREENIGING TE AMSTERDAM.**—Huiro, 'Pinksen.' Established September 1, 1837. H. van der Masch Spakler, President. Joh. Huysser, Librarian. Geo. Peck, Commissary. Igu. Bispinck, Treasurer. Michel Ameschoot, Weteringplantsoen, 4, Amsterdam, Secretary.

**ASSOCIATION BELGE DE PHOTOGRAPHIE.**—Bruxelles. Established 1874. Jos. Maes, President. Alex. de Blochouse and Massange de Louvrex, Vice-Presidents. Canfyn, Casier, Colard, Lasureux, Lunden, Nyst, Oury, Rutot, Sell, Stappers, and Vassal, Committee. E. Moulin, Treasurer. Ch. Puttemans, Rue du Moulin, 59, Bruxelles, Secretary.

**CERCLE DES EFFIGISTES (AMIS PHOTOGRAPHES) GENÈVE.**—Café Delaigne, Rue du Stand, 9. Fondé le 1er Juillet, 1889. Edouard May, Président. Francis Mazuy, Vice-Président. Amédée Barral, Trésorier. Eugène Dovaz, Secrétaire.

**DANSK FOTOGRAFISK FORENING.**—Established 1879. Monsieur J. Petersen, Photograph de la Cour (R. Officier d'Académie Française), President. Fr. Rüse, cand. phil. Photograph, Vice-President. E. Möller, Photograph, Mdll. Mary Steen, Photograph de la Cour, Monsieur C. F. Pechüle, Astronom. (R. St. A. 3), Conseil. F. P. Steenbro, Fabricant, Treasurer. Chr. Christensen, Photograph, 31, Amagertow, Copenhagen, Secretary. Ordinary Meeting the last Wednesday in every month from September to April.

**DEUTSCHE GESELLSCHAFT VON FREUNDEN DER PHOTOGRAPHIE IN BERLIN.**—Meldungen zum Beitritt für die Deutsche Gesellschaft von Freunden der Photographie nehmen die Mitglieder des Vorstandes entgegen und versenden dieselben auf Wunsch die 'Satzungen' der Gesellschaft. Näheres durch den Schriftführer Herrn Direktor Schultz-Hencke, Lette-Institut, Berlin S.W., Königgrätzer-strasse 90. Der Jahresbeitrag beträgt M.20,00. für Auswärtige jährlich M.14.

**DEUTSCHER PHOTOGRAPHEN VEREIN.**—Established 29 December, 1876. K. Schwier Weimar, President. Fr. Müller, Hofphotograph, München, Vice-President. Cour Kindermann (Fr. Benque & Kindermann), Hofphot., Hamburg, Karl F. Wunder, Phot., Hanover, Committee. L. E. Gottheil, Hofphot., Königsberg a. Pr., Treasurer Otto Gebhardt, Photogr., Halle, d. S., Secretary. Address of the Society, K. Schwier, President, Weimar. The Annual Meeting (Wanderversammlung) for 1892 is at Wiesbaden, the end of August.

**GRÖNINGER AMATEUR PHOTOGRAPHEN VEREENIGING 'DAGUERRE.'**—Established 1891. W. H. de Witt, President. C. A. M. van Riet, Treasurer. L. A. Dokkum, Member of the Committee. R. Roelfsema Pzu, Steenhouderskade, Greningen, Secretary.

**HAARLEMSCHE AMATEUR FOTOGRAFEN CLUB.**—Established 1891. F. Y. M. Huysser, President. W. Y. C. Wismuller, jun., Treasurer. Y. Bes, 9 Wilsonsplein, Haarlem, Secretary.

**INTERNATIONALER PHOTOGRAPHEN VEREIN, 'VICTORIA.'**—Established 1882. H. Dieterich, Guben, President. A. Schulz, Königswalde, Vice-President. Th. Weiss, Guben, E. Berger, Grünberg, R. Ochs, Frankfurt-on-Oder, H. Wegener, Freienwalde Committee. Carl Grall, Guben, Treasurer and Secretary.

**MÜNCHENER PHOTOGRAPHISCHE GESELLSCHAFT.**—Established 1879. Franz Werner, President. Otto Perutz, Treasurer. Paul Zschokke, Landwehr-strasse, 31.

**NEDERLANDSCHE VEREENIGING VAN DILETTANT PHOTOGRAPHEN 'HELIOS.'**—Established, 1888. P. Fraissinet, President. Prof. van Haren Nonan, Vice-President. J. G. C. Schlencker and Dr. Wertheim Salomonson, Committee. Dr. Westhoff, Treasurer. Dr. J. van Geuns, 627, Keizersgracht, Amsterdam, Secretary. Meetings every second Monday of the month (June, July, August, and September excepted), in Zeemanshoop.

CONTINENTAL PHOTOGRAPHIC SOCIETIES—*Continued.*

ONDERLINGE AMATEUR FOTOGRAFEN VEREENIGING 'WILLEN FS KUNNESS.'—Established 1890. P. Goedkoop, President. G. T. E. Rembouts, Treasurer. C. C. van der Heide, O.Z. Voorburgwal 171, Amsterdam, Secretary.

PHOTO-CLUB DE PARIS.—40 Rue des Mathurins, Paris. Established 1886. Maurice Bucquet, President. E. Mathieu, Vice-Président. Binder, Brémard, Guérin, Darnis, Doct. Tousselin, and Toutain, Committee. P. Gers, Trésorier. P. Bourgeois, 40 Rue des Mathurins, Paris, Secrétaire.

PHOTOGRAPHISCHE GESELLSCHAFT, HAMBURG, ALTONA.—Established November 4th, 1873. G. Wolf, Hamburg, President. Th. Petersen, St. Pauli, Vice-President. Herm. Boock, C. W. Lüders, Kunstschleifer, Committee. W. Köhnen, Altona, Treasurer. H. Boock, Bergstrasse, 26. Meets first Tuesday in the month, at 8 p.m., at Gerhafstrasse, 10, Hamburg.

PHOTOGRAPHISCHE GESELLSCHAFT IN WIEN.—Established 1861. Ottomar Volkmer, k.k. Regierungsrath, President. Dr. Carl Böhm, k.k. Universitäts-Professor, Vice-President. Carl Angerer, Victor Angerer, T. Blechinger, Dr. J. M. Eder, Adalbert Franz, Oscar Kramer, Josef Löwy, Dr. Wilhelm Freiherr von Schwarz-Seubern, Robert Sieger, Dr. Josef Székely, and Josef Ungar Committee: Ludwig Schrank, kais. Rath, Treasurer. Professor Fritz Luckhardt, kais. Rath, Wien II. Karmelitergasse, 7, Secretary.

PHOTOGRAPHISCHER VEREIN ZU BERLIN.—Established 1863. Dr. Fr. Stolze, President. Dr. F. Stinde and Carl Suck, Vice-Presidents. Paul Grundæer, F. Funk, C. Georgi, C. Brasch, and G. Braun, Committee. F. Schüler, F. Funk, Paul Grundner, Albert Schwartz, and Carl Suck, Technical Examination Commission. E. Martini, Treasurer. Albert Schwartz, Luisenstrasse, 23, Berlin, N.W. Meetings on the first and third Thursday in the month, at Kaiserhallen, u. den Linden, 27.

SOCIÉTÉ FRANÇAISE DE PHOTOGRAPHIE.—Established 1854. 76 Rue des Petits-Champs, Paris. M. Janssen (de l'Institut), President. M. A. Davanne, Vice-President. Comité d'administration, Committee. M. Andra, Treasurer. M. Perrot de Chaumeux, 18 Rue de Seine, Secretary.

SOCIÉTÉ NANTAISE DE PHOTOGRAPHIE.—Established 1881. M. du Hanlay, Lieut.-Colonel, President. M. Toublanc, Vice-President. Ch. Planté, H. Bureau, P. du Mineux, Committee. M. Tassain, Treasurer. Paul Crémant, Rue d'Alger, 13, Nantes, Secretary, and Pierre Courant, Assistant Secretary. Réunion le premier vendredi de chaque mois, au Cercle des Beaux-Arts.

SOCIÉTÉ VERSAILLAISE DE PHOTOGRAPHIE.—Established 1884. Séances de la Société les premiers Mardis de chaque mois à la Mairie à 8 heures et demie du soir. Maurice Bucquet, President. L. Ottenheim, Vice-President. Comité d'administration, Committee. M. Gavin, Treasurer. A. Hue, 28 Rue de Satory, Versailles, Secretary.

VEREIN FÜR FÖRDERUNG DER PHOTOGRAPHIE IN BERLIN.—Established 1869. Professor Dr. H. W. Vogel, President. Dr. W. Zenker, Vice-President. Professor Dr. H. W. Vogel, Dr. Zenker, Photochemiker Schultz-Hencke, L. Christmann, A. Bergmann, Hofphotograph H. Graf, A. Halwas, P. Loescher, and Maler Milster, Committee. A. Bergmann (Adresse F. Beyrich, Berlin N. Linien-strasse, 114), Treasurer. Photochemiker, Schultz-Hencke, Berlin-Charlottenburg, Kgl. Technische Hochschule, Secretary.

VEREIN PHOTOGRAPH MITARBEITER ZU BERLIN.—Vereinslocal, Stralauersstrasse, 57. H. Aschenbrenner, President. G. Kintzel, Vice-President. A. Judtenberg, Strelizer-strasse, 67, Treasurer. Eduard Günther, N., Zionskirch-strasse, 37II, Secretary.

VEREIN ZUR PFLEGE DER PHOTOGRAPHIE UND VERWANDTER KÜNSTE, FRANKFURT A. MAIN.—Established 1875. H. P. Hartmann, Frankfurt a. Main, Ehrenpräsident. T. H. Voigt, Homburg v. d. E., President. H. Maas, Frankfurt a. Main, Vice-President. Dr. C. Schleussner, Frankfurt a. Main, Dr. A. Trapp, Friedberg i. H., F. Pilarte, Kissingen, W. Pöllot, Darmstadt, C. Ruf, Freiberg, and F. Siebenerst, Würzburg, Committee. C. Büttcher, Frankfurt a. Main, Treasurer. Th. Haake, i. firma Haake & Albers, Frankfurt a. Main, Secretary.

## AMERICAN PHOTOGRAPHIC SOCIETIES.

*Adrian Camera Club (Adrian, Mich.)*.—Established February 17, 1890. Meetings, every Monday at Eight p.m. Frederick B. Stebbins, President William Barnum, Vice-President. W. H. Carrier, Secretary and Treasurer.

*Agassiz Association, Manhattan Chapter, New York.*—Established 1881. Meetings held at 141 East Fortieth Street. Christian F. Groth, President. Charles Kromm, Vice-President. E. Staubsandt, H. Breunich, H. T. Rowley, W. T. Demarest, and F. Kromm, Trustees. William S. Miller, Treasurer. Edward B. Miller, 141 East Fortieth Street, New York, Secretary.

*Albany Camera Club.*—Established October 21, 1887. Meetings held at 29 Steuben Street, Albany, N.Y. William W. Byington, President. Robert Lenox Banks, jun., Vice-President. T. C. Leutzé, Prof. M. Perkins, Charles S. Pease, M. H. Rochester, C. B. Tillinghast, J. S. Van Buren, Dr. S. B. Ward, and Dr. T. F. C. Van Allen, Directors. Karl J. Phisterer, Treasurer. John S. Paterson, 29 Steuben Street, Albany, N.Y., Secretary.

*Amateur Photographic Association (Selma, Alabama).*—Established Dec-29, 1887. Meetings held at Harrison's Studio. William S. Monk, President. S. Orlando Trippe Selma, Dallas Co., Alabama, Secretary.

*American Institute, N.Y. (Photographical Section).*—Established 1859. Ordinary Meetings are held at 111, 113, 115 West Thirty-eighth Street, New York City, at Eight p.m., on the first Tuesday of each month except July and August. Annual Meeting, first Thursday in February, at Eight p.m. Henry J. Newton, President. Cornelius Van Brunt, Vice-President. Committee on Chemistry and Optics, Committee. Edward Schell, Treasurer. Oscar G. Mason, Photographical Department, Bellevue Hospital, New York City, Secretary.

*American Lantern Slide Interchange (Cincinnati, O.)*.—Meetings held at 361 Broadway, New York; and from the end of November each year at 113 West Thirty-eighth Street, New York, for the testing of slides. The Clubs comprising the Interchange, season 1892-93, are:—The Society of Amateur Photographers of New York, Newark Camera Club, Orange Camera Club, Photographic Society of Philadelphia, Schuylkill Camera Club, Photographic Club of Baltimore City, Cincinnati Camera Club, New Orleans Camera Club, Oakland Camera Club, California Camera Club, St. Louis Camera Club, Minneapolis Camera Club, Rochford Camera Club, Chicago Lantern Slide Club, Detroit Lantern Club, Buffalo Camera Club, Syracuse Camera Club, Albany Camera Club, Portland Camera Club, and Pittsburg Amateur Photographers' Society. F. C. Beach, W. H. Rau, and William H. Olmsted, Committee. F. C. Beach, 361 Broadway, New York, Manager and Treasurer.

*Amherst College (Mass.) Camera Club.*—Established September, 1890. Meetings held on the second Monday in each month in North College. Robert B. Luddington, President. Edward P. Harris, Ph.D., Amhurst Mass., Secretary.

*Association of Operative Photographers of New York.*—Established 1880. Meetings first and third Wednesdays in each month. Annual Meeting, first Meeting in March, at Eight o'clock p.m. Meetings held at 392 Bowery. Thomas W. Power, President. Thomas C. Roche, Vice-President. D. Fields, O. Buehler, A. Mildenerger, Trustees. Emil Stoll, Treasurer. William Eddowes, Secretary, 770 Broadway, New York City. C. Sprotte, Financial Secretary. C. Faulkner, Librarian.

AMERICAN PHOTOGRAPHIC SOCIETIES—*Continued.*

*Atlanta Camera Club (Atlanta, Ga.)*—Established October 1, 1888. Meetings at 66½ Whitehall Street on the second Monday of each month. F. J. Paxon, President. Dr. O. F. Stockton, Treasurer. J. H. Sharp, 66½ Whitehall Street, Secretary.

*Baltimore Amateur Photographic Association.*—Meets on the first Thursday in each month. Executive and Annual Meetings in October. John P. Bigham, President. Philip Prado, Vice-President. Arthur W. Nyce, Secretary and Treasurer, 26 North Gay Street, Baltimore, Maryland.

*Baltimore (Md.) Amateur Photographic Society.*—Established April 3, 1885. Meetings at 106 North Charles Street on the third Friday in each month. Isaac T. Norris, President. Randall McKein, Treasurer. Harry D. Williar, P. O. Box 344, Baltimore, Md., or 9 and 11 East Camden Street, Secretary.

*Brooklyn (N. Y.) Academy of Photography.*—Established 1887. Social and dark rooms, 517 Fulton Street. Exhibition rooms and hall at the Hoagland Laboratory, Henry Street. Frank La. Manna, LL.D., President. W. T. Wintringham, William Arnold, and John Merritt, Vice-Presidents. Edward H. Quantin, Treasurer. Hermance Tremper, 54 Park Place, Brooklyn, New York State, Secretary.

*Brooklyn Academy of Science (Photographic Section).*—Organized March 26, 1888. J. W. Holbrook, jun., 462 Hart Street, Brooklyn, N. Y., Secretary.

*Brooklyn Camera Club.*—Established January 3, 1888. Meetings at 442 Fulton Street, on the first Thursday of each month, at Eight p.m. William F. Miller, President. M. E. Baker, Vice-President. M. L. Allen, Treasurer. H. C. Mettler, 442 Fulton Street, Brooklyn, Secretary.

*Brooklyn Institute of Arts and Sciences (Department of Photography).*—Established March 26, 1889. Meetings held at 201 Montague Street, Brooklyn, N. Y. J. Foster Flagg, President. Geo. W. Wundram, Vice-President. P. L. le Brunn, Treasurer. L. E. Meeker, Curator. Miss Anna Meeker, Corresponding Secretary. Gould W. Hart, 849 Munroe Street, Brooklyn, New York, Secretary.

*Brooklyn (N. Y.) Society of Amateur Photographers.*—Established March 22, 1889. Meetings at the Rooms of the Society, 412 Jay Street, corner of Fulton, on the first Thursday in every month. C. M. Trowbridge, President. H. Ladd, Vice-President. E. D. Litchfield, Treasurer. H. P. Sewall, 65 Pineapple Street, Secretary.

*Boston Camera Club.*—Established in 1881. Meetings held at 50 Bromfield Street, Boston, Mass. Annual Meeting, first Monday in January. Edward R. Andrews, President. George M. Morgan, William Sumner Briggs, and William O. Witherell, Vice-Presidents. The officers, and Rufus A. Bullock, William Garrison Reed, Charles H. Currier, Joseph T. Greene, David W. Lewis, and John C. Holman, Executive Committee. F. Alcott Pratt, Treasurer. J. Prince Loud, Librarian. Wilbur C. Brown, 50 Bromfield Street, Boston, Mass., U.S.A., Secretary.

*Bridgeton Camera Society.*—Organized January 28, 1890; incorporated March 21, 1893. Meetings, first Tuesday of each month. Annual Meeting, February. Club Rooms, 48-50 East Commerce Street. Henry A. Janvier, President. George Hampton, Vice-President. Hugh L. Reeves, Howard W. Fithion, and Emerson Tarrison, Managing Committee. Sydney E. Bower, Treasurer. Oscar F. Anderson, Recorder. Frank M. McTear, jun., 98 North Pearl Street, Bridgeton, N.J., Corresponding Secretary.

## AMERICAN PHOTOGRAPHIC SOCIETIES—Continued.

*Buffalo (N. Y.) Camera Club.*—Established October 10, 1888. Regular Meetings, second Tuesday, at Eight p.m., at Buffalo Medical College. Dr. M. D. Mann, President. A. G. Hauenstein, Vice-President. The Officers, Dr. G. Hunter Bartlett, Charles W. Hamlin, H. H. Boyce, and Dr. W. H. Bergtold, Directors. Charles E. Hayes, Treasurer. Willis O. Chapin, Corresponding Secretary. George J. Bailey, 18 West Genesee Street, Buffalo, N. Y., Secretary.

*California Camera Club.*—Incorporated April 5, 1890. Headquarters in the Academy of Sciences Building, 819 Market Street, San Francisco, California. Regular monthly Meetings are held on the first Tuesday after the first Monday of each month. The Annual Meeting is held on the first Tuesday in April. 'Club Talks' are held in the Club Rooms every Wednesday. E. P. Gray, President. Charles Albert Adams and A. G. McFarland, Vice-Presidents. F. H. McConnell, C. F. Mead, Thomas H. Jones, I. E. Thayer, and President, Vice-Presidents, Treasurer, Librarian, Secretary, and Corresponding Secretary, Directors. Auditing Committee: Morgan Backus (Chairman), Charles Albert Adams, I. E. Thayer; House Committee: Charles Albert Adams (Chairman), C. F. Cormack, H. C. Owens; Lantern Committee: A. G. McFarland (Chairman), C. F. Cormack, F. H. McConnell, H. C. Owens, C. F. Mead; Election Committee: C. F. Thierbach (Chairman), E. G. Eisen, G. A. W. Folkers, R. G. Mudge, J. C. Spencer, M.D.; Exhibition Committee: H. C. Tibbitts (Chairman), A. G. McFarland, and H. C. Owens, Standing Committees. H. C. Owens, Librarian. George W. Reed, Treasurer. James W. Duffy, 811 Market Street, San Francisco, California, Secretary. Morgan Backus, 408 Sacramento Street, San Francisco, California, Corresponding Secretary.

*Cambridge Camera Club (Cambridgeport, Mass.)*—Meetings at 2 William Street on the first Tuesday in each month. J. A. Darling, President. C. W. Wilson, Treasurer. H. Sumner Yates, Secretary.

*Camera Club of Hartford.*—Established February 18, 1885; incorporated 1892. Meetings held at 25 Pratt Street, Hartford, Connecticut, U.S.A. Herbert O. Warner, President. H. O. Warner, Charles R. Nason, R. A. Wadsworth, T. D. Berry, A. H. Pitkin, G. L. Parmele, and W. W. Walker, Committee. F. D. Berry, Treasurer. Charles R. Nason, Box 865, Hartford, Connecticut, Corresponding Secretary. R. A. Wadsworth, Box 480, Hartford, Connecticut, Secretary.

*Camera Club of Rochester (N. Y.)*—Established January 3rd, 1889. Place of Meeting, 62 State Street. L. A. Weigel, M.D., President. C. F. Hovey, First Vice-President. William E. Hoyt, Second Vice-President. L. A. Weigel, Jonathan G. Meyer, Frank W. Page, Frederick A. Frick, Henry W. Mathews, J. Lewis Willard, John C. Proctor, M.D., E. W. Horne, and A. L. Shaw, Directors. Frank W. Page, Treasurer. Jonathan G. Meyer, Post Office, Rochester, N. Y., Secretary.

*Camerads (New Brunswick, N. J.)*—Established 1888. Meetings in Rutgers' College Chemical Lecture Room. Professor Peter T. Austin, President. William D. Van Horn, Vice-President. George K. Parsell, J. Arthur Blish, and Frederick Ulrich, Committee. Charles V. Myers, Treasurer. Harvey Iredell, D.D.S., 34 Lock Box, New Brunswick, N. J., Secretary.

*Case School Camera Club (Cleveland, Ohio)*—Established December, 1888. Meetings at the Case School of Applied Science. Dr. C. F. Mabery, Hon. President. Professor A. W. Smith, Hon. Vice-President. William T. Rynard, President. George D. Marshall, Vice-President. Edward H. Williams, Secretary and Treasurer. Milton B. Punnett, Corresponding Secretary.

AMERICAN PHOTOGRAPHIC SOCIETIES—*Continued.*

*Chicago Camera Club.*—Established 1888. Meetings are held at 184 Wabash Avenue on the second Tuesday of each month at Eight o'clock. Annual Meeting in April. Rooms always open and in charge of competent attendant. Members of other societies from all parts of the world always welcome, and dark rooms and studio (completely equipped) at their disposal. Dr. C. F. Matteson, President. Gayton A. Douglass, Vice-President. Gayton A. Douglass, Charles Loughridge, T. B. Patterson, Mrs. Frank Douglass, and W. R. Brown, Executive Committee. T. B. Patterson, Treasurer. E. Burton Holmes, 184 Wabash Avenue, Chicago, Secretary.

*Chicago Lantern Slide Club.*—Established 1886. Meetings, second and fourth Wednesday evenings in the month, except July and August. Annual Meeting, January. Lieutenant Charles P. Stivers, President. The Office-bearers, Executive Committee. Ernest J. Wagner, Treasurer. Walter A. Morse, 20 Kemper Place, Chicago, Secretary.

*Chicago Photographic Society.*—Meetings at the Art Institute on the first Wednesday of each month. Judge James B. Bradwell, President. Dr. Matteson, J. Maul, G. D. Garrison, M.D., Committee. G. A. Douglas, Treasurer. C. Gentile, 134 Van Buren Street, Chicago, Secretary.

*Cincinnati Society of Natural History (Photographic Section).*—Established 1884. Regular Meetings, second and fourth Mondays of each month at Eight p.m. Annual Meeting, second Monday of April at Eight p.m. T. B. Collier, President. H. C. Fithian, Vice-President. The Officers, Board of Management. Dr. Arch. I. Carson, Librarian. George Peck, Treasurer. Thomas H. Kelley, Corresponding Secretary. Dr. James A. Henshall, 108 Broadway, Cincinnati, Ohio, Recording Secretary.

*Cleveland Amateur Photographic Association.*—Meets at the residences of the Members, twice in each month, on Monday evenings at half-past Seven o'clock. Wm. T. Higbee, President. A. H. Hough, 804 Case Avenue Secretary and Treasurer.

*Cleveland (Ohio) Camera Club.*—Established January 25, 1887. Meetings held at 5 Euclid Avenue on the first and third Tuesday evenings of each month at Eight p.m. The Annual Meeting is held on the first Tuesday evening in January, unless that Tuesday is the 1st of January, in which case it is deferred until the third Tuesday. Frank Dorn, President. Alfred Ogier, Vice-President. William Dorn, Treasurer. Dr. R. Dayton, 5 Euclid Avenue, Cleveland, Ohio, Secretary.

*Columbia College (N. Y.) Amateur Photographic Society.*—Established 1886. Meetings at Columbia College twice a month. J. T. Davies, jun. President. Henry R. Taylor, Treasurer. Dwight W. Taplor, 500 Madison Avenue, City, Secretary.

*Columbian College (Washington, D. C.) Camera Club.*—Established 1888. Ordinary Meetings at Columbian College, Washington, D. C., every Wednesday afternoon. Allan J. Houghton, President. Edwin W. Ashford, Vice-President. W. B. Asmussen, Librarian. A. J. Houghton, Treasurer. Charles P. Spooner Secretary.

*Cornell (Ithaca, N. Y.) Camera Club.*—Established 1888. Meetings at Ithaca, N. Y., by notice. William B. Hand, President. Lehman Levy, Vice-President. John H. Van Buskirk, Treasurer. James F. Barker, Secretary.

## AMERICAN PHOTOGRAPHIC SOCIETIES—Continued.

*Columbus (Ohio) Camera Club.*—Established October 6, 1884. Rooms Dunn Building, 88½ North High Street. Regular Meetings, third Thursday of each month except July and August at half-past Seven p.m. Annual Meeting, third Thursday of December. Frank H. Howe, President. Joseph N. Bradford, Vice-President. Frank H. Howe, Joseph N. Bradford, Frank J. Combs, Joseph C. Hull, and W. B. Kimball, Executive Committee. Joseph C. Hull, Treasurer. G. Y. Anderson, P. O. Box 64, Columbus, Ohio, Secretary.

*Cranford (N. J.) Camera Club.*—Established 1888. Meet every Saturday evening at the Club Room, Cranford, N. J. William Chamberlain, President. J. M. P. Joseph, Treasurer. A. H. Plummer, Cranford, Union Co., N. J., Secretary.

*Daguerre Camera Club.*—Established 1889. Meetings held at 185 Fortieth Street. Frank D. Blish, President. Wells B. Sizer, 189 State Street, Chicago, Ill., Treasurer and Secretary.

*Delaware Camera Club.*—Established 1891. Headquarters in its Club Rooms in the Equitable Building, Wilmington, Delaware. Regular Meetings are held on the first Thursday of each month. John M. Rogers, President. Miss Rachel S. Howland and Richard P. Pim, Vice-Presidents. Alfred D. Poole, Charles R. Jones, and John H. Danby, Executive Committee. Caleb M. Sheward, Treasurer. Ernest B. MacNair, Recording Secretary. Miss Eleanor G. Walton, 907 West Street, Wilmington, Corresponding Secretary.

*Detroit (Mich.) Amateur Photographic Society.*—Established October 1, 1889. Meetings at Society Rooms, 42 State Street, on the second Monday in each month. James Joy, President. D. Farrand Henry, Treasurer. Joseph E. Lockwood, Secretary.

*Detroit Photographic Association.*—Annual Meeting second Monday in January. Jex Bardwell, President. Albert M. Harris, Vice-President. Judge, J. J. Speed, D. Farran Henry, and Wm. Marratt, Council. William H. Allen, Treasurer. C. W. Earle, Secretary.

*Frankford Camera Club of Philadelphia (Photographic Section of Wright's Institute).*—Established October, 1889. Regular Meetings, first Friday in every month. Conversational Meetings, fourth Friday in every month. Annual Meeting, first Friday in April. The Meetings are held in the Club Rooms, Wright's Industrial and Beneficial Institute, Frankford, Philadelphia. George M. Taylor, President. William Ekwurzel, M. D., Vice-President. R. T. Taylor, R. B. Watmough, B. S. Thorp, Miss J. R. Ross, and Miss S. B. Cooper, Executive Committee. J. Howard Horrocks, Treasurer. John M. Justice, A. M., 1354 Orthodox Street, Frankford, Philadelphia, Pa., Secretary.

*German Photographic Society of New York.*—Established 1868. Ordinary Meetings at 62 East Fourth Street, New York City, on the second and fourth Wednesdays of every month at quarter-past Eight o'clock p.m. A. Mildenberger, President. H. Fruwirth, Vice-President. G. E. Pellnitz, Treasurer. L. Schill, Financial Secretary. H. G. Borgfeldt, 192 Washington Street Hoboken, N. J., Corresponding Secretary.

*Hawaiian (Honolulu, Sandwich Islands) Camera Club.*—C. Hedemann President. A. W. Richardson, Campbell's Block, corner of Front and Merchant Streets, Honolulu, S. I., Secretary.

AMERICAN PHOTOGRAPHIC SOCIETIES—*Continued.*

*Hoboken Camera Club.*—Established March 22, 1889. The Regular Meetings of the Club take place the first Tuesday of each month. The Board of Governors meet the third Friday of each month. The Annual Meeting of the Club takes place the first Tuesday in March, when the election of officers takes place for the ensuing year. All Meetings are held at the Camera Building. A. J. Thomas, President. George E. Mott, Vice-President. Three Trustees (W. Schrader, A. Beyer, and E. E. Wooley), all the Officers of the Club, the House Committee (F. A. Muench and L. R. Trichel), and the Entertainment Committee, Board of Governors. William Allen, Custodian. C. L. A. Beckers, Treasurer. George H. Steljes, c/o Camera Club, 380 Park Avenue, Hoboken, N. J., Recording Secretary. F. M. Child, c/o Camera Club, 380 Park Avenue, Hoboken, N. J., Financial and Corresponding Secretary.

*Indianapolis Camera Club.*—Established November 18, 1887. Charles McBride, President. H. C. Chandler, Vice-President. J. T. Harris, Rembrandt Steele, and Henry Kothe, Committee. Carl H. Lieber, 33 South Meridian Street, Indianapolis, Ind., Treasurer and Secretary.

*Jamestown (N. Y.) Camera Club.*—Williams Bailey, President. S. Winsor Baker, Vice-President. Lewis B. Kent, Treasurer. Clifton B. Gates, Secretary.

*Jersey City (N. J.) Camera Club.*—Established May, 1889.—Meetings at 4 Oakland Avenue, every Thursday. Emile W. Granert, President. Dr. J. P. Levering, Vice-President. Hugo L. Steidel, Treasurer. E. D. Bellows, Secretary.

*Kansas City Camera Club.*—Established March, 1890. Meetings on the third Saturday of each month. G. W. Pearson, President. W. W. Cloon, Vice-President. George W. Curtis, Theodore Stanley, and E. H. Allcutt, Executive Committee. W. H. Perine, Treasurer. Charles A. Young, Secretary.

*Louisville Camera Club.*—Established April 24, 1888. Meetings on the second and fourth Thursday of each month. Annual Meeting, second Thursday in February. Rooms of Club, N. E. Corner Fourth Avenue and Jefferson Street. Charles R. Peaslee, President. Alexander Griswold, Vice-President. Charles R. Peaslee, Alexander Griswold, and R. L. Stevens, Committee. R. L. Stevens 1100 West Main Street, Louisville, Ky., Treasurer and Secretary.

*Lowell Camera Club.*—Established January 1889. Incorporated 1892. Meetings are held at the Club Rooms, Runels' Building. Paul Butler, President. William P. Atwood and W. E. Badger, Vice-Presidents. George H. Stevens, Frederick T. Walsh, and Charles Runels, Directors. M. A. Taylor, Treasurer. George A. Nelson, 81 Appleton Street, Lowell, Massachusetts, Secretary.

*Lynn Camera Club.*—Established January 1, 1888. Incorporated December 20, 1889. Regular Meetings, first Tuesday in each month. Annual Meeting, first Tuesday in January. All Meetings held at the Club House, 42 Broad Street. William H. Drew, President. J. N. Smith, Vice-President. W. H. Drew, J. N. Smith, J. W. Gibboney, A. J. Purinton, E. F. Bacheller, A. H. Carsley, W. B. Gifford, and W. A. Pevear, Committee. E. F. Bacheller, Treasurer. J. W. Gibboney, Recording Secretary. A. J. Purinton, Club House, 42 Broad Street, Lynn, Mass., Corresponding Secretary.

## AMERICAN PHOTOGRAPHIC SOCIETIES—Continued.

*Marlboro (Mass.) Camera Club.*—Meetings at members' houses in rotation on the first Tuesday evening in each month. H. C. Russell, President. Dr. O. H. Stevens, Treasurer. George L. Stevens, Secretary.

*Mattapan Camera Club.*—Established 1890. Meetings held at Private Residences of Members. John A. Locklin, President. Alfred Karcher (in charge of affairs concerning Lantern-slide Exhibitions) and Henry N. Locklin (Lecturer), Committee. Alfred L. Karcher, Treasurer. Erdmann Sonnenbrodt, P. O. Box 83, Mattapan, Mass., Secretary.

*Millbury (Mass.) Camera Club.*—Meetings at Rooms of Millbury Natural History Society on the first Monday evening in each month. T. D. Bristol, M.D., President. T. A. Bottomly, Box 582, Millbury, Mass., Treasurer and Secretary.

*Milton and Mattapan Camera Club.*—Meetings at residence of the Secretary. John Locklin, President. Alfred Karcher, Treasurer. E. Sonnenbrodt, Mattapan, Mass., Secretary.

*Milwaukee (Wis.) Camera Club.*—Established October 13, 1889. Meetings at the Club Rooms, 115 Wisconsin Street, Room 21, on every other Wednesday. Thomas H. Spence, President. H. C. Tilton, Treasurer and Secretary.

*Minneapolis Camera Club.*—Established 1887. Incorporated 1892. Meetings are held at American Terrace, 13-15 North Fourth Street. The regular Meetings are held on the second Wednesday of each month. The Annual Meeting occurs on the evening of the regular April meeting. William M. Tenney, President. William Channing Whitney, Vice-President. William T. Rolph, F. E. Haynes, J. M. Greaves, Russell M. Bennett, R. D. Cleveland, and Wayland B. Angir, in addition to the four Officers, Board of Directors. Charles S. Fellows, Treasurer. A. L. Eidemiller, 306 Nicollet Avenue, Minneapolis, Minnesota; Secretary.

*Mobile (Ala.) Camera Club.*—Established April, 1890. Meetings at the North Side of St. Francis, Second West of St. Joseph Street. H. Pillans, President. Lyman Dorgan, jun., Secretary and Treasurer.

*Mystic Camera Club.*—Organized June 4, 1889. Incorporated March 17, 1891. Monthly Meetings, first Tuesday in each month, at a quarter past Eight, at the Odd Fellows' Hall, Medford. Annual Meeting, first Tuesday in January. Joseph H. Wheeler, President. Arthur F. Boardman, Vice-President. Joseph H. Wheeler, Arthur F. Boardman, Will C. Eddy, John F. Wade, George L. Stone, B. D. B. Bourne, and E. H. Balcom, Executive Board. John F. Wade, Treasurer. Will C. Eddy, 146 Boston Avenue, Medford, Mass., Secretary.

*Newark (N. J.) Camera Club.*—Established 1888. Meetings are held at 828 Broad Street, Newark, N. J. Annual Meeting in April. Thomas A. Hine, President. J. M. Foote, Vice-President. W. Archibald, H. W. Smith, Charles Leroy, F. S. Olds, A. C. Munn, H. C. McDougall, J. M. Foote, F. A. Scheutz, and Paul Sala, Executive Committee. C. G. Hine, Treasurer. David S. Plumb, 24 Bondinot Street, Newark New Jersey, Secretary.

AMERICAN PHOTOGRAPHIC SOCIETIES—*Continued.*

*New Orleans Camera Club.*—Established December 12, 1886. Meetings held at 12 Union Street, New Orleans, La. L. E. Bowman, President. Major James B. Quinn, U.S.A., Vice-President. L. E. Bowman, J. B. Quinn, R. S. Charles, jun., S. L. Mitchel, H. C. Delery, E. L. Pinac, W. W. Boulemet, P. S. Benedict, and E. M. Haskell, Board of Directors. S. L. Mitchel, Treasurer. R. S. Charles, jun., Care of Illinois Central R. R. Co., Howard Avenue and Rampart Street, New Orleans, La., Secretary.

*New York Camera Club.*—Established 1888. Meetings are held at 314 Fifth Avenue, New York City, U.S.A. William J. Cassard, President. Samuel W. Bridgham, Vice-President. Robert J. Devlin, M.D., Treasurer. Harry B. Reid, 314 Fifth Avenue, New York City, Secretary.

*Niagara Camera Club (Lockport, N. Y.)*—Established December 30, 1889. Rev. J. W. Sanborn, President. William H. Case, Vice-President. Charles N. Van Valkenburg, Treasurer. A. L. Davison, Outing Captain. G. Lewis Holmes, 174 Genesee Street, Secretary.

*Old Colony (Rockland, Mass.) Camera Club.*—Meetings at Smith Building, Liberty Street, on the first and third Fridays of every month. Daniel Smith, President. Frederick Ames, Vice-President. H. W. Studley, Box 210, Rockland, Mass., Treasurer and Secretary.

*Oregon Alpine Club, Portland, Oregon (formerly Oregon Camera Club), Photographic Department.*—Meetings at the Club Rooms, Third and Morrison Streets, on the third Friday of each month. W. W. Bretherton, President. Otto Switzlorberger, Vice-President. E. Morton, Portland, Oregon, Secretary and Treasurer.

*Pacific Coast Amateur Photographic Association.*—Established February 19, 1883. Meetings on the Tuesday following the first Monday of each month, at the Rooms, 603 Merchant Street, San Francisco. Annual Meeting in March. E. L. Woods, President. Major W. H. Heuer, Vice-President. F. R. Ziel, Treasurer. G. Knight White, 89 Flood Building, San Francisco, Secretary.

*Peekskill (N. Y.) Camera Club.*—Dr. P. H. Mason, President. Charles D. Shepard, Vice-President. Asbury Barker, William E. Flockton, H. B. Miller, and F. H. Southard, Governing Board. Edward F. Hill, Peekskill, N. Y., Secretary and Treasurer.

*Pennsylvania Photographic Association.*—Established 1870. Time of Meeting, second Tuesday evening of each month, at 1431 Ridge Avenue, Philadelphia, Pa. Hour of Meeting, half-past Seven o'clock. John C. Steinman, President. David Marston and Thomas McCollin, Vice-Presidents. J. G. Hood, J. G. Tyson, and F. Normast, Executive Committee. John R. Clemons, Treasurer. Thomas T. Mahan, 1912 Jefferson Street, Secretary.

*Pennsylvania University Camera Club.*—Meetings at the College Hall. Rooms open at all hours of the day. George D. Rosengarten, President. Phil. E. Howard, First Vice-President. William Loyd, Second Vice-President. Jos. M. Mitcheson, 90, Treasurer. Henry Delaplaine, 91, Secretary.

AMERICAN PHOTOGRAPHIC SOCIETIES—*Continued.*

*Philadelphia Amateur Photographic Club.*—Established December 21, 1883. Incorporated February 12, 1887. Meetings at 907 Filbert Street. Ordinary Meetings, third Monday, at Eight p.m. Annual Meeting, third Monday in December. Francis A. Cunningham President. P. S. Chase, Vice-President. W. S. Buchanan, Treasurer. Alfred Thompson, 1311 Butler Street, Secretary.

*Photographers' and Artists' Mutual Benefit Association.*—Abram Bogardus, New York, President. P. S. Ryder, Syracuse, N. Y., Treasurer. Judge Grank E. Cady, Syracuse, N. Y., Secretary.

*Photographers' Association of America.*—Established 1879. George H. Hastings, President. S. L. Stein, Vice-President. W. Stuber, Second Vice-President. G. M. Carlisle, Treasurer. W. A. Davis, 872 Broadway, New York, Secretary.

*Photographic Association of Brooklyn.*—Established March 20, 1888. Meetings, first and third Wednesday in each month at half-past Eight p.m. Charles M. Heid, President. E. Wagner, Vice-President. E. Wagner, H. Borgfeldt, and W. Heid, Committee. William F. Eberth, Treasurer. William Lang, jun., 826 Lexington Avenue, Brooklyn, Secretary.

*Photographic Club of Baltimore City (Md.).*—Established May, 1891. Meetings are held at 703 West Madison Street, Baltimore, Md. F. W. McAllister, President. A. L. Murray, Vice-President. F. W. McAllister, A. L. Murray, H. D. Williar, Charles Quartley, Alexander J. Godby, E. M. Barker, Dr. Frank Slothower, B. G. Buck, T. E. Sloane, John R. Duval, J. B. M'Kee, C. E. Needles, Directors. E. M. Barker, Treasurer. Charles E. Needles, 404 Cathedral Street, Baltimore, Md., Secretary. H. D. Williar, 9 East Camden Street, Baltimore, Md., Corresponding Secretary.

*Photographic Society of Kansas City, Mo.*—Established September 17, 1891. Meetings are held at the Studio, 1431 Walnut Street, Kansas City, Mo. J. P. Reymond, President. Dr. W. T. Stark, Vice-President. Dr. W. T. Stark, J. P. Reymond, and C. H. Clarke, Executive Committee. Carl K. Bowen, Treasurer. Charles H. Clarke, 613 Delaware Street, Kansas City, Mo., Secretary.

*Photographic Society of Philadelphia.*—Established 1862. Rooms of Society, 10 South Eighteenth Street, Philadelphia. Stated Meetings, second Wednesday evening of each month. Conversational Meetings, fourth Wednesday evening of each month. Annual Meeting, second Wednesday in April. Joseph H. Burroughs, President. Edmund Stirling, and Charles R. Pancoast, Vice-Presidents. The five Officers, John G. Bullock, John G. Browne, Samuel Sartain, John Carbutt, Charles L. Mitchell, George M. Taylor, William H. Rau, and Frederick E. Ives, Board of Directors. George Vaux, jun., Treasurer. Robert S. Redfield, 1601 Callowhill Street, Philadelphia, Secretary.

*Pittsburg (Pa.) Amateur Photographers' Society.*—Meetings at 59 Fourth Avenue on the second Monday of each month. W. S. Bell, President. A. R. Neeb, Treasurer. F. R. C. Perrin, Box 511, Pittsburg, Pa., Secretary.

AMERICAN PHOTOGRAPHIC SOCIETIES—*Continued.*

*Plainfield (N. J.) Camera Club.*—Established June 7th, 1888. Incorporated September 13th, 1890. Meetings held at the Club Rooms, 17 East Front Street. Oscar S. Teale, President. George H. Babcock, Vice-President. Oscar S. Teale, George H. Babcock, Harold Senell, Harry H. Coward, Otto Arens, and J. Hervey Doane, Board of Directors. Harrold Serrell, Treasurer. Harry H. Coward, 245 East Front Street, Plainfield, N. J., Secretary.

*Portland Camera Club.*—Frank Woolsey, President. W. F. Woodward, Secretary. W. W. Bretherton, Corresponding Secretary.

*Postal Photographic Club.*—Reorganized by Dr. J. Max Mueller in 1888. Randall Spaulding, President. Dr. J. Max Mueller, West Chester, Pennsylvania, Secretary and Treasurer.

*Providence Camera Club.*—Established 1883. Incorporated 1889. The Regular Meetings are held on the first Saturday and Tuesday after the third Saturday of each month. The first Regular Meeting in March is the Annual Meeting. Club Rooms open every Tuesday and Saturday evenings. R. Clinton Fuller, President. L. L. Anderstrom, Vice-President. R. E. Fuller, C. A. Stoddard, E. Q. Gladding, A. B. Ladd, H. J. Reynolds, H. B. Cottile, C. E. Hudson, H. B. Denning, and J. A. Miller, jun., Executive Committee. Arthur B. Ladd, Treasurer. Joseph A. Miller, jun., 87 Weybosset Street, Providence, R. I., Corresponding Secretary.

*Putnam (Conn.) Camera Club.*—Established January, 1888. Headquarters at its Club Rooms, Putnam, Connecticut. Regular Meetings are held on the first Friday in each month. The Annual Field Day occurs on the first Wednesday in June. George E. Dresser, President. Edward F. Whitmore, Treasurer. Eric H. Johnson, Putnam, Connecticut, Secretary.

*Richmond (Va.) Camera Club.*—Established April 1, 1890. Professor Charles H. Winston, President. R. A. Lancaster, jun., Vice-President. Professor Charles H. Winston, Dr. Philip Taylor, R. M. Blankenship, R. A. Lancaster, jun., and C. D. Habliston, Executive Committee. C. D. Habliston, Secretary and Treasurer.

*Ridgewood (N. J.) Camera Club.*—Established March, 1890. Peter O. Terhune, President. Henry W. Hales, Vice-President. Fred Lavien, Treasurer. Robert B. Walton, Ridgewood, N. J., U. S. A., Secretary.

*Rochester Photographic Association.*—Meets on the first and third Monday of each month at Eight o'clock. Election of Officers, first Meetings in May and November. S. D. Wardlaw, President. S. Miller, Vice-President. Fred. Stone, George Bacon, and Willis Bannister, Finance Committee. Frank Knapp and W. J. Lee, Executive Committee. J. M. Fox, Treasurer. W. H. Learned, Secretary.

*Schenectady (N. Y.) Camera Club.*—Meetings at Myers's Arcade on the first evening in the month. Professor M. L. Perkins, President. W. C. Vrooman, Vice-President. W. H. Peckham, Treasurer. W. E. Underhill, Secretary.

## AMERICAN PHOTOGRAPHIC SOCIETIES—Continued.

*Schuylkill Camera Club.*—Established July 5, 1889. Meetings are held at Second and Market Streets, Pottsville, Penn. A. W. Sheaffer, President. Miss Elena Roads, Vice-President. A. W. Sheaffer, Miss Elena Roads, W. L. Sheaffer, B. S. Simonds, and Officers, Committee. W. L. Sheaffer, Treasurer. Professor B. S. Simonds, 'The Orchard,' Pottsville, Penn., Secretary.

*Silver State Camera Club (Carson City, Nevada).*—Established September 16, 1890. Meetings on the second Tuesday after the first Monday of each month. Rev. J. L. Logan, President. C. A. Hoffer, Vice-President. C. H. Peters, Treasurer. P. H. Gordon, Carson City, Nevada, Secretary.

*Sociedad Fotografica Mexicana.*—Organized in the City of Mexico, July 6th, 1890. Place of meeting, City of Mexico. Ordinary meetings, two Sundays each month. Fernando Ferrari Perez, President. Manuel G. Prieto, Vice-President. Guilermo By Puga, Dr. Fernando Altamarino, Ignacio Molina, and Manuel Buen Abad, Executive Committee. Prof. Francisco Rio de la Loza, Librarian. Luis G. Ruiz, Treasurer. Engineer Vicente Vargas Galeana, Secretary.

*Society of Amateur Photographers of New York.*—Established March 28, 1884. Meetings are held at 111, 113, and 115 West Thirty-eighth Street. Annual Meeting, second Tuesday in April. Joint Annual Exhibition, April 16 and 28, 1894. R. A. B. Dayton, President. L. B. Schram, Vice-President. C. Van Brunt, R. L. Bracklow, H. Coutant, F. C. Elgar, E. Warrin, H. S. Mack, H. A. Smith, A. P. Schoen, Board of Directors. C. C. Roumage, Treasurer. T. J. Burton, 113 West Thirty-eighth Street, New York, Secretary.

*Southern Tier Photographic Association.*—Meetings at different galleries of the members quarterly, first Monday in March, June, and September. A. B. Stebbins, President. C. R. Carson, Vice-President. W. L. Sutton, Treasurer. H. M. Beeles, Hornellsville, N. Y., Secretary.

*Springfield (Mass.) Camera Club.*—Established 1886. Meetings are held on the third Wednesday in each month at the Club Rooms, corner of Main and Sanford Streets. Annual Meeting in October. L. J. Powers, jun., President. L. J. Powers, jun., C. C. McElwain, W. M. Lester, H. Smith, jun., and C. A. Emery, Committee. H. Smith, jun., Librarian. Wm. M. Lester, Treasurer. C. C. McElwain, P. O. Box 1528, Springfield, Mass., Secretary.

*Stevens (Hoboken, N. J.) Photographic Society.*—Meetings at the Stevens Institute, Hoboken, N. J. R. E. Hall, Stevens Institute, Hoboken, N. J., Secretary.

*St. Louis Camera Club.*—Organized 1885, and Incorporated 1889. Club Rooms, 911 North Vandeventer Avenue. Regular Meetings, at Eight p.m., first and third Tuesdays of each month. Annual Meeting, first Tuesday in April. Annual Field-day in May of each year. The Club Rooms are fully equipped with lanterns, two dark rooms, portrait and copying cameras, chemicals, and all the apparatus required for development. Visiting amateurs receive a hearty welcome. William M. Butler, President. John W. Dunn, Vice-President. The President, Vice-President, Walter A. Boeck (Chairman of House Committee), William Mulford (Chairmen of Lantern Slide Committee), and Dave B. Aloe (Chairmen of Membership Committee), Executive Committee. Charles M. Alexander, 221 Custom House Building, Secretary and Treasurer.

AMERICAN PHOTOGRAPHIC SOCIETIES—*Continued.*

*Syracuse Camera Club.*—Established 1886. Incorporated 1892. Meetings at 322 South Salina Street, Syracuse, N. Y. Amos Padgham, President. George Timmins, Vice-President. E. H. Burdick, Fred Frazer, J. R. Clancy, J. D. Pennock, and the Officers, Directors. Edward C. Howe, Treasurer. Herbert F. Smith, 1316 Spring Street, Syracuse, Secretary.

*Tech Camera Club.*—Established September, 1889. Meetings, bi-monthly, at half-past Seven p.m., in the Boynton Hall of the Polytechnic Institute. Dark room and Printing room also at Boynton Hall. The purpose of the Meetings is to discuss photographic subjects and, as far as possible, to diffuse a knowledge of the science and art among the members of the institute. The Executive Committee transact all business connected with the Club. L. E. Booth, President. H. H. Tracy, Vice-President. H. P. Davis, L. E. Booth, H. P. Crosby, J. P. Anderson, and H. Sinclair, Executive Committee. H. P. Wires, Treasurer. C. A. Davis, 14 Goulding Street, Worcester, Mass., Secretary.

*Texas State (Tex.) Photographers' Association.*—Meetings at different places in the State. Conventions twice a year. J. S. Webster, President. Six Vice-Presidents. S. T. Blessing, Treasurer. C. F. Cooke, Secretary.

*The Camera and Wheel Society of Bridgeton.*—Established January 29, 1890. Meetings, first Tuesday evening of each month, at 48 East Commerce Street. Henry A. Janvier, President. Oscar F. Anderson, Vice-President. Emerson B. Garrison, Frank M. McTear, jun., and George Hampton, Executive Committee. Sydney E. Bower, Treasurer. Hugh L. Reeves, 48 East Commerce Street, Bridgeton, N. J., Secretary.

*The Pioneer Amateur Photographic Club of Brooklyn.*—Meets at Eight o'clock, South Oxford Street, Brooklyn, on the first Monday in each month from November to July. Lewis Atkinson, President, Edward Moran, Geo. W. Street, and Gilbert A. Robertson, Committee on Admissions. Dr. Skidmore Hendrickson, 636 St. Mark's Avenue, Brooklyn, Secretary.

*Troy (N. Y.) Camera Club.*—Established July, 1889. J. E. Fairlee, Chairman. Arthur Smith, Treasurer. James Muir, Secretary.

*Union County (N. J.) Camera Club.*—Established November 25, 1889. R. M. Fuller, of Cranford, N. J., President. J. L. Warner, of Roselle, N. J., Secretary and Treasurer.

*Washington (D. C.) Camera Club.*—Established as Argents 1883; re-established March, 1887. Meetings at 1420 Pennsylvania Avenue on the second and fourth Tuesdays at Eight p.m., from October to June; second Tuesdays in July, August, and September. S. H. Griffiths, M. D., U. S. Navy, President. Max Hausman, Vice-President. A. S. Lothrop, Treasurer. D. Dickenson Jewett, Secretary. J. Albert Cole, Office, Supervisory Architect, U. S. Treasury Department, Washington, Corresponding Secretary.

*Waterbury Photographic Society.*—Meetings at 63 Bank Street, Room 18, on the first and third Fridays of each month. C. R. Pancoast, President. Edward H. Everett, Vice-President. Samuel B. Hill (Chairman), E. W. Mooring, jun., and E. E. De Witt, Executive Committee. George S. Husker, Treasurer. E. E. De Witt, Secretary.

AMERICAN PHOTOGRAPHIC SOCIETIES—*Continued.*

*Watertown (N. Y.) Camera Club.*—A. R. Wilson, President. T. E. Knowlton, E. P. O'Connor, Miss Helen Treadwell, and Miss Fannie Moffatt, Vice-Presidents. C. G. Lewis, Treasurer. George I. Woolley, Mullin Street, Secretary.

*Wilmington Camera Club.*—Meetings are held on the first Saturday evening in each month. Christian Febiger, President. A. D. Poole, Vice-President. J. R. Moore, Treasurer. John H. Danby, 712 West Street, Secretary.

*Worcester Camera Club.*—Re-established 1892. Meetings are held at the Club Rooms, 405 Main Street, Worcester, Mass., U.S.A. Annual Meeting in May. Albert M. Powell, President. Edward M. Wood, Vice-President. Albert M. Powell, Edward M. Wood, A. H. Parker. Albert H. Chaffee, D. W. Carter, A. A. Barker, and E. C. A. Becker, Executive Committee. A. H. Parker, Treasurer. Albert H. Chaffee, 492 Main Street, Worcester, Mass., Secretary.

*Worcester Lantern Slide Club.*—Established 1889. Meetings at 9 Elm Street on the last Tuesday of each month in winter. G. E. Francis, E. V. Scribner, and F. P. Draw, Committee. George E. Francis, 9 Elm Street, Worcester, Massachusetts, Secretary.

*Yonkers Photographic Club.*—Established February 15, 1889. John W. Alexander, President. John W. Alexander, F. W. R. Eschmann, George B. Ritter, George B. Wray, George S. Pentz, E. T. Sherman, and E. D. Gardner, Board of Directors. George B. Wray, Treasurer. Eugene D. Gardner, Buena Vista Avenue, Yonkers, N. Y., Secretary.

*Zanesville Camera Club.*—Established March 15, 1888. Meetings at the Rooms, 1, 2, 3, 4, 14½ South Sixth Street, on the first Thursday of each month. M. J. Harkins, President. E. C. Downard, Treasurer. B. V. H. Schultz, 49 South Fifth Street, Zanesville, Ohio Secretary.

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## THE FRONTISPIECE.



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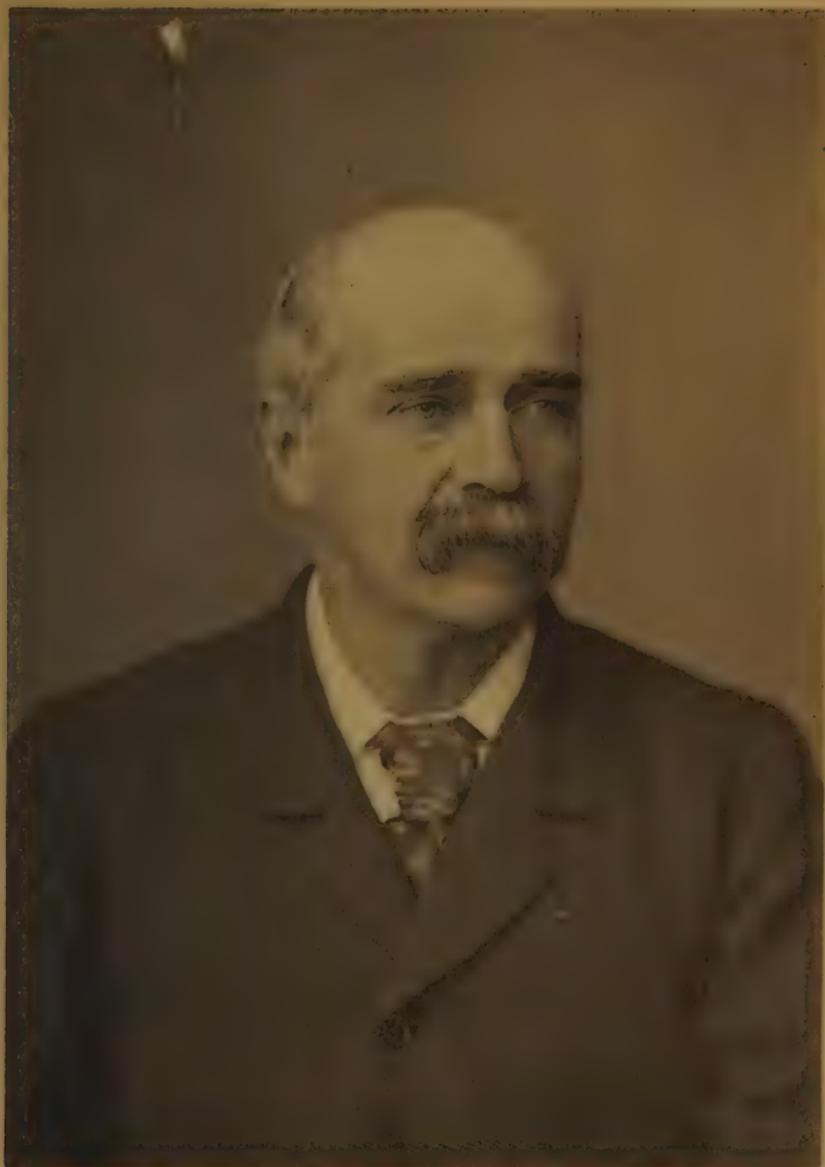
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## SUMMARY.

THE progress in heliochromy made during the year is most gratifying. On the basis of Lippmann's method of producing the colours of the spectrum by interference, M. Lumière has modified the method by applying it to gelatine plates. The pictures which have been publicly shown attest the actuality of the colours of Nature, which, unlike some produced in former times are perfectly fixed. The exposure in the camera of these has now been reduced to four minutes.

An advance of a very decided nature has been made in photographic lenses. Taking advantage of properties possessed by certain specimens of Jena optical glass, Herr Goerz, of Berlin, has produced an objective different in certain features to anything hitherto known, in respect of excellence of definition, conjoined with flatness of field with a large aperture, and freedom from astigmatism. The manufacture of these double anastigmatic lenses has been intrusted to Messrs. Ross & Co., London. A detailed account of its nature and construction will be found in the Epitome on another page.

There is gratifying evidence of the increasing growth of stereoscopic photography. On every hand we hear of the desire of Societies and Clubs to have this topic presented to them; and we know of numerous instances of photographers having binocular fronts adapted to their half-plate cameras. When the facilities now afforded in this direction, and the intrinsic merits of this class of picture are taken into consideration, we are very safe in asserting that the stereoscope has a great and lasting future in store.

A new kind of bromide paper, the 'Nikko,' has been introduced by the Eastman Company. One of its peculiarities consists in its giving a warm roseate picture, although developed. Some interesting problems in the chemistry of the toning bath have been elicited, confirming the long-known fact that the sulphide of silver is one of the most permanent argentic bodies. In this connexion we may note that gelatino-chloride paper seems to be gaining in popularity, as the numerous articles in this ALMANAC devoted to the subject testify.

Since the great reduction in the price of aluminium was made, the use of that metal in the manufacture of lens and camera mountings has been rapidly increasing, until at present it is fast supplanting brass, especially for the metal fittings for the highest class of cameras, as it is found to be not only light but strong and rigid.

Although a few of the numerous small Clubs and Societies throughout the country seem to have outlived their usefulness, others have sprung up and taken their place. A Central Club has recently been established which bids fair to have a career of usefulness. Its headquarters are in London. Its members are scattered abroad all over

the country as well as in London, and it is felt that it will prove useful as a rendezvous for both country and town photographers, manufacturers, and dealers. Over forty Societies are now affiliated to the Photographic Society of Great Britain.

Since last year many new developing substances, such as metol, glycin, reducin, &c., have been introduced, but it is too early to gauge their effect upon the use of pyrogallol, hydroquinone, &c. With most professionals, however, the first named in all probability still remains favourite.

Increased attention is given to lantern matters by societies and individuals, and it may be safely said that optical projection for recreative and scientific uses was never more popular.

The Photographic Convention of the United Kingdom for 1894 meets in Dublin, under the presidency of Sir Howard Grubb, F.R.S.

Numerically the list of those who have passed away since the compiling of the necrology for the preceding ALMANAC is happily not great; but we have to deplore among them the death, on January 13th, 1893, of Mr. William Bedford, who was cut off in the midst of his usefulness. Excellent in counsel, he was a man of prudence, tact, and sound judgment. He was an admirable artist, and possessed a thorough knowledge of the higher technique of photography. He was a warm friend to poor struggling *employés* in our art, and was ever at his post as chairman of the Photographers' Benevolent Association. We have also to record the demise of Mr. William Morley, on September 19th, 1893, late of Upper Street, Islington, long engaged in business as a photographic dealer; Mr. G. W. Wilson, of Aberdeen (March 9th, 1893), who gave such an impetus to both the art and technical aspect especially of binocular photography; Mr. John Harmer, of Littlehampton, long a contributor to this JOURNAL and its ALMANAC; Mr. John Homersham, one of the old school of workers; Mr. G. M. Whipple (Kew Observatory); Mr. A. W. Scott, who gave much attention to lantern matters, and was the inventor of the patented saturator bearing his name; and others less known.

#### PORTRAIT OF CAPTAIN ABNEY, C.B., R.E., F.R.S.

Our frontispiece this year is a portrait of that distinguished man of science, Captain W. de W. Abney, and it is a colotype reproduction by Messrs. Morgan & Kidd, from a negative taken specially by Mr. R. L. Kidd.

Captain Abney's labours in the field of scientific research as applied to photography constitute him undoubtedly one of the highest living authorities on the subject, while as an all-round *savant* the position he occupies is one of great eminence. Besides being President of the Photographic Society of Great Britain, he is also President of the Camera Club, President of the Royal Astronomical Society, a Fellow of the Royal Society, and is a member of several other learned Societies. He has recently been appointed Director of Science at South Kensington.

## MICRO-STEREOGRAPHY.

By THE EDITOR.

NEARLY seventeen years have elapsed since the subject which will now be attempted to be compressed into readable form for the ALMANAC was, for the first time, brought prominently before the world through the medium of a paper I read at the British Association for the Advancement of Science.

At that time the stereoscope, applied either for purposes of education or amusement, was at its lowest ebb, so I in a large measure relaxed association with it and consigned it to the limbo of things for which the world was not then quite ripe.

Since those days the stereoscope has again come to the front—this time to stay, and photo-micrography has also been gradually but very firmly asserting itself. Hence, I conclude that the times are more ripe than they were for re-introducing the subject under the auspices of modern additions to our knowledge.

## SUITABLE AND UNSUITABLE OBJECTS.

There are innumerable microscopic subjects that are incapable of being enlarged more effectively binocularly than monocularly, and these have no part in our present selection. An object, whether a leaf, a bug or flea, certain diatoms, or in brief anything that has been pressed flat between the mounting slide and its cover, although suitable for lantern projection, must be excluded from that class of subjects adapted for stereoscopic purposes because, in virtue of their being squeezed flat, they have no depth, which, as every intelligent reader knows, is essential for stereographic purposes.

On the other hand, I could enumerate equally innumerable subjects which possess the properties desiderated, of which the head of a crane fly, certain whole flies, polycystina and anything in which there is bulk or depth may be adduced as examples.

## THE POWERS BEST ADAPTED FOR BEGINNERS.

For beginners I strongly recommend the use of low powers and objects adapted for them. We all know that there are subjects too small by far to be seen by the unaided eye, but which become plainly visible when examined microscopically under powers of an eighth, a sixteenth, a twentieth of an inch, and upwards; and although such minute organisms can be photographed and shown on a—say—twelve-foot lantern screen

with a singular degree of plainness, yet is it in a large measure practically impossible to reproduce them so as to show relief.

#### ADVANTAGES OF MICRO-STEREOGRAPHS.

Before plunging *in medias res*, I may say a word or two on the advantage of the application of binocular microscopic objects to the stereoscope. It is very well recognised that with the microscope placed on a table with a revolving circular top any suitable object, when once properly lighted and adjusted by the controller of the seance can, by rotating the table, be brought successively before each one present and be seen by all under identically similar conditions. But this department of the exhibition is terminable with the rotation of the instrument amongst those present; whereas, if it were photographed previous to a fresh object being inserted, the circle of spectators would be practically increased to many thousands, as the object and effect sought to be attained would be placed on permanent record. A microscopic seance could then be held without a microscope at all, the presence of a collection of such pictures being pre-supposed. This is one advantage, others can easily be imagined.

It is to the photographing of what are usually known as low-power subjects that I shall here confine myself. It may be done by either a binocular or monocular system, and the two pictures may either be produced side by side on one plate of glass or upon separate smaller plates.

If in the lens or front end of a quarter-plate camera, capable of long extension, the eyepiece end of a microscope, placed horizontally, is inserted, and an object having a considerable degree of depth is placed on the stage, if the object-glass, which we may assume to be one of an inch focus, be a good one having a wide angular aperture, it will be found that the image on the ground glass of the camera is sharp only on one plane, but that the various planes of the object can be rendered quite sharp by focussing from one to the other. This, however well suited for ocular examination, will not answer for photomicroscopy, especially that of the binocular class. For in this everything should be defined from the nearest or highest point of the object to that which is most remote. It may, and doubtless will, make a semblance of confusion when any single one of the pictures is examined, but the stereoscope makes this all right, and relegates every part of the object to its proper place.

As in landscape nature there are scenes which cannot be adequately represented photographically except by the binocular camera, so in the myriad things which constitute that world, the details of which cannot be seen by unaided vision. Who, for example, ever saw as they ought to

be seen those most beautiful of all minute organisms, the *Polycistina*, by other than the binocular microscope? What appears under an ordinary magnifier but fantastically beautiful shaped grains of sand become by this instrument gorgeous globes and hollow vessels of exquisite symmetry in crystal and finest porcelain fashioned by the hands of a master.

It is not more difficult to produce a photograph of a microscopic object than of anything else, and the difficulty of making a binocular photo-micrograph does not much exceed that of making a single picture.

#### MONOCULAR PROJECTION.

Two exposures may be made side by side on a stereoscopic plate at one operation, or they may be made successively on different plates. As the latter possesses certain advantages, mainly, however, in respect of simplicity, I shall first speak of that system.

#### RELIEF BY ALTERING THE DIRECTION OF THE LIGHT.

As an initial experiment take any object possessing a moderate degree of thickness and as transparent as possible, the head of a rather large fly, a whole flea, or any similar object. It should be mounted in a transparent fluid, such as glycerine. Place this on the stage of the microscope, the object-glass of which (one to two inches in focus) should have fitted to it a small diaphragm to give it sufficient penetrative power. The microscope must be placed in a horizontal position with its eyepiece end inserted in a small camera from which all light is carefully excluded, except that from the lamp of the microscope, the flame being not in the axis of the instrument, but as far to one side as possible to be transmitted by the object-glass to the eyepiece, and thence to the ground glass of the camera. Focus sharply and expose a plate—a quarter-plate being sufficiently large for the purpose. Now, leaving the microscope and camera quite undisturbed, shift the lamp to the opposite side of the axis to which it was previously, and again expose a plate. On developing these two, a dissimilarity will be found by the near and distant parts of the object having undergone a slight displacement.

#### RELIEF BY SEMI-CAPPING THE OBJECT-GLASS.

One of the oldest methods of making stereo-photo micrographs consists in placing a cap upon and close up against the first lens of the object-glass. This cap is closed except at one side of the centre, which causes the light to be transmitted through one side of the objective only. After an exposure has been made and the plate removed, a second plate is inserted, a semi-rotation given to the perforated cap and another exposure made.

From a pair of negatives thus produced prints may be made which, when trimmed and properly mounted, will show perfect relief in the stereoscope.

#### RELIEF BY AN OSCILLATING STAGE.

By closely stopping down the objective so as to increase its penetrative range, good stereoscopic micrographs may be obtained by means of a stage so constructed as to present the object with slight alternating obliquity to the object-glass. This is on the same principle as when a sitter is placed in an office chair the seat of which is capable of being rotated and a portrait of him is taken, a second exposure being made after the sitter has been rotated two or three degrees from the first position. Such a pair of portraits will prove to be truly stereoscopic, the degree of relief shown being in proportion to the degree through which the sitter was rotated. Precisely so it is with the microscopic object, placed as it is in the centre of a slide to which a see-saw motion is capable of being imparted.

It will, I trust, already have suggested itself to the reader that while by the means described of taking stereoscopic negatives by successive exposures on, say, quarter plates, the pictures after being trimmed are mounted side by side, yet that by employing a stereoscopic negative plate in a dark slide capable of being shifted laterally so as to bring first one half and then the other opposite to the axis of the microscope, both can thus be taken side by side, ensuring identity in the stage to which the development is carried, with the advantage of printing upon one piece of paper without having to trim or cut it.

#### BINOCULAR PROJECTION.

I now come to another phase of the subject, viz., that by binocular projection, by which both exposures are made simultaneously. This system is necessary when, owing to the presence of life or motion, or a rapid change in the structure of an object, pictures taken in succession would prove to some extent dissimilar.

In the binocular system it is necessary that the beam of light should be divided into two equal parts as soon as it is transmitted through the object-glass, each being projected on to the sensitive plate, under as nearly as possible similar conditions. There is this difference between binocular projection for photography and that for visual examination in the microscope, that whereas the latter must be presented in true stereoscopic arrangement, this is a matter of no moment in the former in which it may just equally well be pseudoscopic, for this only entails the very slight trouble, when both images are impressed upon one plate, of cutting the prints and transposing them when mounting. Besides, as will pre-

sently be shown, although the exposures are made simultaneously, it does not by any means follow that the sensitive plates must be placed in or near to the axis of the object-glass, for images of great excellence may be obtained when the plates are at right angles to such axis.

#### STEREOGRAPHY BY DIRECT REFLECTION.

Probably the simplest system is one of the variety I mentioned in the British Association paper alluded to. Simplest because it entails so little expenditure of optical means, this being within the power of every one to make for himself, while the body of the instrument consists of a long wooden box, provided at each end with an appliance for holding a quarter-plate dark slide, and there being a perforation in the centre to enable this box-camera to be placed directly over the upper end of the object-glass. All this can readily be imagined, hence no illustration is needed. But I must invoke the aid of a diagram to show the other portion.



FIG. 1.

Let the lens in the figure represent the upper or back lens of the microscopic object-glass, which may be a one, two or three-inch power of the combination, not the single, class. I may premise that the tube of the microscope is so constructed as to be detachable from the rest of the body which contains the appliances for holding the object-glass and for focusing. Just above the object-glass, and inside the camera, is a pair of small mirrors, which are formed of plane glass, these being placed at an angle of ninety degrees to each other, or at forty-five degrees to the axis of the object-glass. When the rays from the object fall upon these they are reflected to the right and left on to the sensitive plates *c, c*. It is only necessary that these plates be placed at such a distance from the mirrors as to be on the focal plane.

The way I constructed the mirrors was thus: Having obtained two pieces of nicely worked glass, each three-quarters of an inch by one inch, I ground two of the edges of each of them (the three-quarter size) to a sharp bevel, so that when placed together in V-form the junction should form a fairly sharp edge. In this position they were fastened together very firmly by means of cement, the kind I preferred being what is known as 'brick-dust cement,' and which consists of equal parts of rosin,

beeswax and finely pulverised brick-dust, although I have since found that ochre or plaster of Paris will serve as well as brick-dust. The glasses, bound carefully together in position, are made slightly warm when the cement is poured in the cavity between them. When cold, the exposed surfaces are made scrupulously clean and are silvered by means which will be found on another page of this annual.

By means of a second reflection the pair of images may be directed in a line nearly parallel with the axis of the object-glass. This enables the pictures to be taken side by side on one plate. The second pair of mirrors are placed as at B B (fig. 2). They are each formed of selected



FIG. 2.

worked glass, as in the former case. They, or one of them at any rate, should be erected on a simple stand capable of a slight motion so as to permit of both images being nicely adjusted as to distance from each other, upon the stereoscopic sensitive plate. The diagram indicates the principle only, not the detail. The loss of light by the two reflections is very little, less than would have been anticipated *a priori*; and if care has been taken in selecting for the mirrors glass having a good surface the definition is all that need be desired. Although the *P. Formosum* is not an object for a binocular, I have made by the arrangement just described and with a power of half an inch, a photograph in which the markings show with great distinctness.

#### PRISMATIC REFLECTION.

An equilateral triangular prism of very small dimensions when placed immediately over the objective, its flat side next to the latter, fulfils in a perfect manner the requirement of effecting an equal dividing of the rays transmitted. This it does in virtue of internal reflections shown in fig. 3. In this, rays from the object-glass enter the prism, and are reflected internally from its oblique surfaces passing outwards to *cc*, the sensitive plates on which they are focalised. Although the images given are quite good it is open to the objection that the two tubes or cameras must be placed at an inconvenient angle as will be perceived by noting the relative

positions of the plates to the axis of the lens. It was a strong appreciation of this that led me to adopt the long straight camera shown at fig. 1



FIG. 3.

which does not differ much in principle from the prismatic one just described, except in that the reflections by the former are obtained by a prism which, by a necessity in its construction, causes the emergent rays to pass out in the oblique manner that they do, while by the latter the reflections are from metallic surfaces which can be set at any angle to the axis, enabling one to cause the rays to be directed, within certain limits to wherever one chooses they should do so.

#### NACHET'S BINOCULAR.

In the drawing of Nachet's first binocular here given (fig. 4) the rays



FIG. 4.

from the triangular prism spoken of are projected into two other prisms the faces of which are normal to the reflected rays. By impinging upon

the hypotenuses of these two similar prisms the rays proceed onwards in the manner shown until at the further end of the camera they are brought to a focus side by side on the sensitive plate. Dr. W. B. Carpenter, while admitting that this Nacet instrument comes near the theoretical standard of perfection, doubted the possibility of its affording a satisfactory view of the more difficult class of test objects; for although the general course of the rays on entering and emerging from each prism may be perpendicular to its surfaces so that they suffer no refraction, many of them will, he says, be slightly oblique, therefore undergoing not only refraction, but also some amount of chromatic dispersion.

The theoretical perfection of this system induced me some years ago to give a very full trial to one to which I had temporary access. Failing to obtain such good definition as I was led to expect, I substituted for the larger prisms a pair of mirrors placed in the same position as the hypotenuse of those shown in fig. 4, and by their aid the definition was rendered perfect. I can only surmise that there had been some waves of inequality in the refraction of the glass of which the prisms had been formed which militated against their performance, for, as previously said, the principle of their construction is sound.

#### STEPHENSON'S BINOCULAR PRISMS.

These when made small (and there is no necessity for them being otherwise for high powers) may be inserted in the body of the object



FIG. 5.

glass, of course at its upper end. Their form and method of action is such that in each there are two refractions and one reflection, being unlike that of Nacet in which there are reflections only without refraction.

The system consists of (fig. 5) two similar prisms placed in relation to the object as shown in the diagram. In this the rays proceeding from the object-glass fall upon the surfaces C B of two truncated rectangular prisms, the hypotenuse planes of these prisms being placed together but inclined to each other at an angle of about  $4^\circ$ . The whole of the light from the objective thus enters the prisms under circumstances which compel its refraction towards the surfaces A B, from which it is reflected, and, in its now divided form, emerges from the surfaces A D and proceeds onwards to the focussing screen.

#### THE WENHAM SYSTEM.

To say that the quadrangular prism invented by Mr. F. H. Wenham is that which is almost universally applied to binocular microscopes at the present day is merely to say, in other words, that after the test of time it stands highest in popular esteem, nothing having been yet introduced to depose it from the high position accorded to it at its introduction.

When I say that by the Wenham system one-half of the light is sent on direct to the eye, and the other half is transmitted through the agency of a prism, some may imagine, as I mistakenly did at first, that the conditions for ensuring the equal illumination of the two halves of the transmitted rays were not perfect. But in practice I have not found any appreciable difference between the directly transmitted ray and that which undergoes reflection. So long as practice is right we can afford to ignore a hypercritical theory.

The following describes the Wenham binocular system both in theory and practice (Fig. 6). A prism B C D is so mounted as to be capable of being slidden in so as to half cover the object-glass A, or to be with-

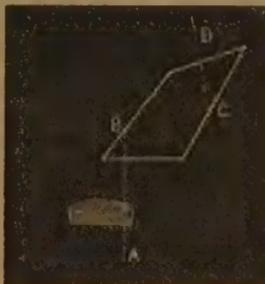


FIG. 6.

drawn when the binocular effect is not sought to be introduced, and the whole surface of the objective is required for monocular purposes. The under surface of the prism being plane, and situated at a right angle to the axis of the lens, the light passes directly through it until it meets with

obstruction at the oblique surface B, by which it becomes diverted, being reflected to C, which, in turn, and owing to its oblique incidence, ejects it from the prism through the surface D, which is normal to the direction of best emission.

#### PHOTOGRAPHIC LENSES OF SHORT FOCUS AS MICRO OBJECTIVES.

It may not be known so widely as it deserves to be, that excellent photo-micrographs of large objects—by which we mean objects of a quarter or a half inch in diameter—can be obtained by means of a pair of short focus stereoscopic photographic lenses, although still better by two of those short focus miniature portrait lenses of about three inches focus, of which a battery of half a dozen or a dozen is mounted on a brass plate for the purpose of taking a number of small portraits, nearly akin to postage stamp size, by one exposure. In making a trial of these we found it necessary to mount them much nearer together on the camera than the usual distance apart of lenses in a stereoscopic camera, and also to place them in slight obliquity to the axis of the camera so as to be directed to the point at which the object to be photographed was to be placed.

#### SHOULD THE EYEPIECES OF THE MICROSCOPE BE USED?

Let it be borne in mind that by the employment of the eyepiece the exposure will be considerably prolonged, and also that the relative position of the image on the focussing screen, as regards top and bottom, will, as regards working without the ocular, be reversed. It is almost needless to remark that the lower the power of the eyepiece the less will be the magnification on the focussing screen at a given distance from the objective. Low eyepieces are invariably to be recommended for the tyro. I removed the smaller or eye lens from an A Huyghenian eyepiece, and had its place supplied by an achromatic of similar power, and found that the definition was better than that obtained with the original one, which, as every microscopist knows, consists of a simple plano-convex. This forms a useful projecting eyepiece.

Of the merits of the projection eyepieces, specially prepared of Jena glass by German opticians, I am unable to speak from practical experience, but the work I have seen done by one was not, in my estimation, superior to what was obtained by the modified Huyghenian mentioned. The Zeiss projection eyepiece which I examined differs from that in every day use, in that the glass to the outside corresponding with the eyeglass of the others, is composed of two seemingly similar meniscus lenses mounted close together and convex surfaces out. I have been informed, however, that they are mainly intended to be used with apochromatic object-glasses. A difference on the power is obtained by the separation of the field-glass (a plano-convex) and the eye-lens.

If I were asked which of all the systems here described is the best for stereo-microscopic purposes, I would be inclined to favour those by a single microscope, at any rate for simplicity, the stereoscopic effect being obtained either by altering the direction of the light by a cap with a perforation, which allows only one half of the object-glass in succession to transmit the light, or by the super stage oscillating slide, which presents the object with slight successive obliquity to the axis of the instrument. Really excellent stereographs can be obtained by either of those methods, and by the employment of any ordinary monocular microscope.

I might have enjoined the great importance of padding up the aperture at which the end of the tube is inserted into the front of the camera ; but every one who enters upon this really enticing field of photography is supposed to be gifted with common sense enough to know this.

#### THE LIGHTING—SUNLIGHT—THE HELIOSTAT.

Ordinary sunlight, when it can be had, is the best for photo-micrographic work.

The best method of using it is undoubtedly through the agency of a heliostat, a mechanical appliance by which the sun is in effect made to stand still. By its means a beam of sunlight may be reflected into a room from a small mirror placed in a window having a southern aspect, and will remain motionless for several hours, which is an immense boon to those who wish to make experiments with a fixed light of the greatest purity and power. There are various kinds of heliostats, some of them very expensive, others quite simple ; but all are made on the same principle and conduce to the same end.

There is a striking analogy between a heliostat and an equatorial stand for a telescope. In the latter, when the sun, a star or a planet, has been got into the centre of the field of observation, it is kept there by the telescope being made to rotate on its stand at the same apparent speed, and, but for this, telescopic photography of the heavenly bodies would be impossible. In the heliostat the apparent motion of the sun is neutralised by its rays being received on and reflected from a mirror mounted on an axis which must be inclined to the earth's surface, according to the latitude of the place in which it is being used, and hence known as the polar axis. This must be geared to suitable clockwork to ensure its rotation automatically. In one which I constructed without any expert assistance, the clockwork consists of the movement of one of those little round nickel-plated German-made timepieces now universally sold all over this country, at prices ranging from one shilling and tenpence to half a crown. The polar axis carries a small frame in which is situated the mirror suspended at its centre like an ordinary bedroom glass, so as to enable it to be slightly pointed downwards to the front, so that when the

sun's rays fall upon its surface they may be reflected to a second and firmly fixed mirror in front, but preferably lower than the other. From this latter a beam of sunlight is reflected into the room where operations are to be conducted, and when once the clockwork has been set going this beam never changes its direction during the day, the angle of incidence being equal to the angle of reflection. The gearing of the clock with the heliostat is very simply effected by removing the hands and shipping tightly a boxwood pulley of any dimensions (by means of a socket in the centre) upon the axis of that wheel which carries the hour hand of the clock—that by which the hours, not the minutes, are indicated. A similar pulley is fixed upon the polar axis, care being taken that it is twice the circumference of the other, so as to make only one revolution to two of the other. This forms a heliostat capable of doing everything that can be effected by the costliest instrument that can be constructed, including, if need be, an optical lantern, or a solar microscope entertainment, during the morning or afternoon, in addition to the special use for which I here recommend it—the photographic enlargement of minute bodies.

#### THE LIGHTING (*continued*)—THE LIMELIGHT.

There are two drawbacks to the system of lighting just described, first the uncertainty of the unclouded sun's shining at all when we wish it; and, secondly, the fact that operations in connexion with photo-micrography are usually conducted in the evenings by those whose avocations tend to keep them engaged in other pursuits during the day. The lime-light here steps in to the rescue, and owing to the inestimable boon of compressed gases in cylinders being now so easily obtained, its services may be had recourse to almost at a moment's notice, much more so than when oxygen had to be specially made when wanted, on account of its rapid deterioration when stored in a bag.

#### THE LIGHTING (*concluded*)—THE OIL LAMP.

Let not those who are prevented from employing the former systems of lighting feel discouraged. A good paraffin lamp will, especially if some shredded camphor has been added to the oil, give a light possessing such whiteness and intensity as to enable one to make really excellent photo-micrographs. But it goes without saying that a much longer exposure must be given than when either sun or lime forms the illuminating agent. This will be more particularly felt when the object is an opaque one.

## ANOTHER PHOTOGRAPHIC CRUX.

By CAPTAIN ABNEY, C.B., F.R.S.

PHOTOGRAPHY is not quite so plain sailing as it used to be when photographers were content to work by rule of thumb. In fact, it was difficult to follow any other rule, for the old wet process varied so much in sensitiveness from time to time that it became next to impossible to carry out any accurate observations on photographic action except in a qualitative manner. The noted invention of the gelatine process, however, has rendered possible quantitative measures of this action, and from a knowledge of what is to be expected in this stable process we can form conclusions as to what occurs in the more unstable wet process. It is due to the fact that accurate quantitative measures can now be taken that the writer has been able to give to the photographic world a new crux, which is that the old rule that exposures with two stops of different areas require the inverse times of exposure if the same amount of chemical action is to be obtained is inexact. With slow plates this is particularly the case, though it approximately holds with the very rapid plates which are now extant. In some batteries of stops we have a range of  $f$ -6 to  $f$ -120, or diameters which are  $\cdot 1$  to  $20$ . This means that the areas are as 400 to 1, and consequently, if the smallest stop be used, the old rule for length of exposure would be that it would be 400 times that required with the largest stop. In a paper recently read at the Photographic Congress, the writer has shown if a lantern plate to which an exposure of ten seconds with a certain intensity of light (which we may call unity) is given, has a certain density of image, that an exposure of 1440 seconds when the intensity of light is only  $\frac{1}{44}$  by no means shows the same amount of chemical action, but only about one-quarter. If these two plates were exposed with these intensities of light respectively, that is, with stops diminishing the light which reached the plate in these proportions, the exposure given with the smallest stop would be about four times too small. There is a further matter which has also to be taken into account. In, say, a landscape there are photographic intensities which vary from the light of a white cloud to that of the deepest shadow, if only one stop be considered, the gradation will be harsher than it would be supposed to be if the assumed law held good. A slow plate, it is believed, is always said to have a steeper gradation than a quick plate, and it seemed somewhat difficult to find a reason for this, but the observations made fully account for it, for, as before stated, the rapid plate more nearly obeys this assumed law. The crux is, then, what is the cause of this deviation? The writer believes he has the solution, but it may be of course the wrong one, and he leaves it to photographers for the present to do two things, first, to repeat the simplest of his experiments to satisfy themselves as to the correctness of what he has found; and secondly, if they satisfy themselves of the accuracy of the observations, to account for it.

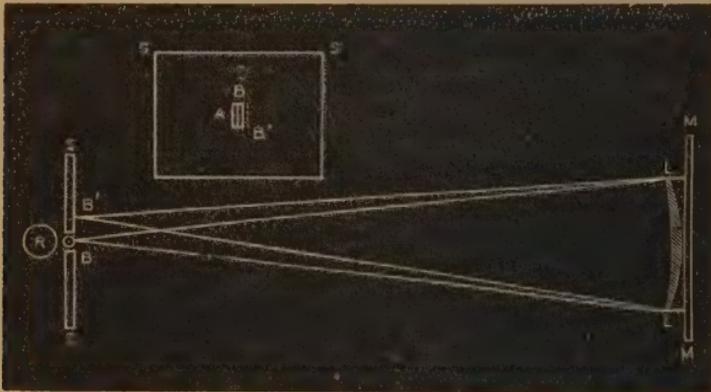
## ANOTHER METHOD OF DETERMINING FOCAL LENGTHS OF LENSES.

By C. H. BOTHAMLEY.

IN last year's ALMANAC I described one of the methods of determining the focal lengths of lenses when direct sunlight is available. In a climate like this, however, it is necessary to have some method that is independent of sunlight. Now there is a method well-known in some physical laboratories, but not generally known, or at any rate not generally practised, to the extent that it deserves. The method in question involves the use of no elaborate apparatus, is simple and speedy in execution, is very accurate, and involves no calculation, the focal length being ascertained by direct measurement.

Instead of being dependent on sunlight for a beam of parallel rays, the lens itself is made to form a parallel beam with the aid of a mirror.

The things required are a candle or some other source of light a screen of card, with a small aperture cut in it; a small piece of mirror, larger than the lens itself and some means of measuring the distance from the lens to the screen.



The general arrangement is shown in the figures. The aperture A in the screen SS (fig. 1) should be small and across the middle of it should be stretched a very thin iron or platinum wire B. At the outset the lens LL is placed close up to the mirror MM (fig. 2) so that the axis of the lens is normal to the surface of the mirror. The source of light R is placed behind the aperture in the screen and as close up to it as possible, the position of the aperture being such that it is exactly opposite to the centre of the lens. The lens is now very slightly inclined to the mirror so that the image of the wire B falls on the screen at B' close by the side of the aperture (fig. 2).

The screen and source of light are now moved together backwards and forwards, keeping the aperture in the axis of the lens, until the image of the wire is sharply defined at B'. The distance from the screen to the lens is then the focal length of the lens. Four or five measurements should be made and the average taken.

Of course, if it is found to be more convenient, the lamp and the screen may remain fixed whilst the lens and mirror are moved backwards and forwards together, but care must be taken not to disturb their relative positions.

## REMOVING GREASY MATTER FROM ALUMINIUM DUST.

By THOMAS BOLAS.

IN the ALMANAC for 1893 I described several ways of using aluminium in producing a flash-light for photographic purposes, and, after pointing out that aluminium dust, to burn satisfactorily, must be much finer than the ordinary magnesium powder, I intimated that a sufficiently fine aluminium powder, such as the aluminium bronze powders now in the market, may be used in an ordinary flash-lamp, especially if a stream or puff of oxygen is employed instead of air.

The aluminium bronze powders of commerce, such as those sold by Mr. W. C. Horne, of 2 Whitehorse Alley, Cowcross Street, London, con-



tain a trace of greasy matter, which tends to prevent the ready separation of the grains when the dust is blown through a flame; indeed, sometimes large clots blow through without being burned.

As I showed at a demonstration given before the Photographic Society during the past year, this greasy matter may readily be removed by heating the aluminium bronze powder in a closed vessel to about the melting point of zinc, after which operation the grains readily blow apart, and complete combustion takes place in an ordinary flash-lamp, and this without the use of a stream or puff of oxygen.

I now wish to give practical details of a convenient and certain method of heating the aluminium powder, so as to drive out or destroy the greasy matter, and leave the powder in a free or mobile condition.

The cap and plug of ordinary iron gas-pipe, when screwed together as shown in the sketch, give us a convenient covered crucible, in which to heat the powder, while the good conducting quality of the iron ensures that the whole of the powder is heated with approximate uniformity.

The sketch shows the cap and plug of three-quarter inch gas-pipe on a scale of about two thirds, and such a cap will hold about half an ounce of the aluminium powder. The plug should only be screwed in about one thread, and if the fit is at all tight, a nick should be filed, to allow of the escape of vapours; after which the whole is heated for about ten minutes over a small Bunsen-burner flame, a spirit lamp, or even at the margin of a fire in an open grate. When the whole has been kept for five minutes at the lowest temperature which will give a smart hiss when touched by a damp finger, the crucible is allowed to cool, and the aluminium powder will now be found to be in a suitable condition for use in any flash-lamp.

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### WHAT PHOTOGRAPHERS HAVE LOST.

By E. W. FOXLEE.

DURING the past year there has been a great deal of correspondence in the JOURNAL about the depression of photography as a profession; but I take it that it is only in portraiture, and, perhaps, in landscape photography, that the depression exists, or, at least, to any great extent. Photography is as largely employed commercially as ever it was, but in another direction, and in this photographers as a body have, unfortunately, not followed it, but allowed it to drift into other businesses, with which it, at one time, had no connexion whatever. I allude to the mechanical processes generally.

In all of these processes a negative has to be taken, and in some a transparency has to be produced as well. Clearly this is the work of the photographer. The next stage of the work, whatever be the process, is entirely photographic too. Take, by way of example, photo-lithography. From the negative the transfer has to be produced by the action of light on bichromated gelatine, all this is a strictly photographic operation from the beginning to the end, when it is handed over to the lithographer to place on the stone, yet the whole of this business has been absorbed by the lithographer simply because photographers did not take it up in the first instance. The same remark applies to the 'zinc process,' although that, like photo-lithography, and, indeed, all the other processes, was first described with full working details in the photographic journals. Process blocks, again. The making of these is really the legitimate work of the photographer. The work, up to the final stage, the etching of the image, is absolutely photographic all through. Then, again, the etching is entirely a chemical operation, yet, where is the professional photographer, that is, portrait photographer, who has taken it up in this country?

As another example let us take photogravure. This, like 'process work,' is strictly photographic. As generally worked, from a negative a transparency is made. From this another negative, by the carbon process, is printed on a copper plate, all photographically, of course, and the engraving of the image is a simple chemical operation. But professional photographers appear to have ignored it altogether, and are permitting it, like the previous processes, to drift into other channels, chiefly abroad. By far the larger proportion of the reproductions of English paintings by

photogravure are produced abroad. Why? One can only assume because work of equal merit is not to be obtained in this country. There is also the Woodbury process, which is well adapted for such small work as portraiture, particularly when large numbers are required. Yet, so far as I am aware, no portraitist has ever adopted it in his business. It is true that to work this process a somewhat costly plant is necessary; but, judging by other processes, were it otherwise the result would probably have been the same.

There is yet another process to be alluded to, and it is one that is specially suited to the requirements of ordinary photographers. I allude to collotype, the working of which, in this country, is chiefly confined to a few large firms. This process may be classed as being even still more entirely photographic than any of the other processes referred to, inasmuch as when the strictly photographic operations are completed the plate cannot be handed over to any ordinary workman as in the case of engraved plates, 'zincos,' process blocks, &c. Although the printing from a collotype plate is, in principle, analogous to printing from a lithographic stone, yet it requires a special training to do the work, and, curiously enough, it is found in practice that a lithographic printer can rarely be made a good collotype printer, therefore it is usual to take intelligent youths and girls and teach them how to do the printing, which can be done in a very short time.

There are few photographers in manufacturing towns but could at times have materially increased their returns, and, probably, may have a similar opportunity in the future, if they could work a good mechanical process. Now the collotype process is specially suited to their purpose. It is well adapted for every class of subject, is not difficult to work, and the necessary plant for its installation may be had for a very moderate sum indeed. With these facts before one it is not a little surprising that this most valuable process has so long been, and is still being, so neglected by professional photographers, particularly by those in provincial towns. In a recent controversy on the depression of the portrait trade a great deal was said about the injury done to it by modern amateurs. I think no similar complaint is ever likely to be made in connexion with any of the photo-mechanical processes.

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## SINGLE OR MULTIPLE DEVELOPING.

By G. WATMOUGH WEBSTER, F.C.S.

THE remarks I shall make on this subject are not intended to have any bearing on Messrs. Hurter & Driffield's most valuable investigations, but I shall assume that the photographer, starting work upon developing, is governed by the belief that in altering the proportions of the ingredients of his developer, he is able, by varying the manner of using it, to govern, to a considerable extent, the gradations of his negative as regards their printing powers. It is an old and acknowledged principle in pyro-developing, especially with plates of doubtful correctness of exposure, to begin with weak solutions containing a minimum of alkali. There is then power retained to add the necessary chemicals to increase or diminish

the exposure values. The query to be solved is whether it is better to develop plate by plate, or to have several at once undergoing treatment, and so save much time. With the inexperienced hand a little doubtful about the negative he is producing, or the skilful but not over-ready worker, there can be no doubt that attention should be confined to one plate at a time. But to the experienced worker, familiar with all the appearances of negatives produced under a great variety of circumstances, who can tell at a glance very soon after the image appears whether his plate is correctly, or under or over timed, the conditions become changed, and, if suitable preliminary precautions are taken, there is no reason why he should not take in hand a large number of plates at a time. If, however, we may take, say, six minutes as the average time it takes a plate to finish development, it is obvious that when there are a dozen or more undergoing treatment at once, the operator must be ready of resource and prompt in judgment to enable him to get full value from his exposures. There must be no dissolving of crystals, diluting of strong solutions, and so forth. Every needed chemical must be ready for instant use, close at hand, and every convenience for measuring promptly available. To do all this satisfactorily, the first step is to know thoroughly the capabilities of the plates under hand, the time they require to arrive at full density, working with standard solutions, and, most important, the maximum proportion of ammonia to pyro permissible.

This known, the plates may be divided into three batches, say, three large dishes, and a quantity of developer containing one-half the maximum of ammonia, mixed beforehand and poured into three measures or jugs. It is better to have some one to help, then all three batches can have the developer poured simultaneously upon them. Ranged close at hand may be placed three wide-mouthed bottles, each containing the extreme maximum amount of ammonia for one trayful of developer, and diluted with water in quantity equal to about one-fourth of the trayful of developer being used. Also equally ready for use must be he restrainer, not nearly so diluted.

As the pictures begin to show themselves in the films, the ready worker will know at a glance how the exposures have gone. If all right, he has simply to wait till density is reached, and then proceed to the next batch. If, however, he find some under and some over exposed, he proceeds instantly to change the places of the plates till he gets all of a sort in one dish—under, over, correct exposure. In the first case, tilting the dish, he dashes the bottleful of ammonia into the solution, rocks endways, and then floods the plates. In the second case he quickly pours as much restrainer as he requires, and proceeds. The last dish needs no change. If under-exposure is slight, he uses half the bottleful, and so on.

Here we have, perhaps, nothing new to the practised worker, but I have thought that a detailed plan of procedure might be useful to those who are timid at developing many plates at once. I may say, in conclusion, that when once facility is obtained in working large number of plates at once (which is very useful when, perhaps, several days' exposures are to be developed at a time), it is actually easier, and more uniform results may be obtained than when working plate by plate. The fact is, quick judgment is aided by the relative appearances of the number

of images as they come into view at once, or at different times, and of themselves they almost tell us what is needed. I find it positively easier to develop a score of half-plates, for example, than if I have one single exposure.

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### THE UNIPOD.

By ANDREW PRINGLE.

MANY workers with hand cameras have found the advantage, under certain conditions, of resting the camera on a wall, or fence, or anything that may happen to be handy. Even the round rail of, for example, a wire fence is a great help towards securing steadiness for an exposure of a second or two. Many a time I have given exposures even longer than this, by pressing the camera against the side of a house or fence; in fact, I would undertake to get a steady exposure of many seconds in this position. But as one can not always find a fence or a building at the precise spot where it is desired, I bethought me that even a one-legged tripod—a very fair *taurology*—would be of service for exposures of a second or two. And so it will be found; a staff with a sharp point, and of such height that the camera, when placed on it, reaches to a convenient height for the eyes, will be found a valuable adjunct to the equipment of the hand-camerist. The camera should fix on the top by screw or bayonet-joint, and during exposure should be tucked under the arm, or pressed against the chest, the breath being held, of course. The unipod itself may be useful as a staff, or as a defence in case of attack, and when not in actual use, may be carried by the 'Missus.'

I am aware that if I claimed this as original, I should not have even one leg to stand on, for after I had evolved it out of my own inner consciousness, I heard that it had been used by Mr. H. M. Hastings, and probably others.

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### SOME POINTS IN STEREOGRAPHY.

By THOMAS BEDDING.

#### SEPARATION OF FOREGROUND OBJECTS.

THE maximum distance of objects in the foregrounds of stereoscopic transparencies or paper slides when mounted for examination is frequently, and, indeed, generally given as three inches. Sometimes an even greater distance is recommended, but, for ordinary work, which neither assumes nor necessitates an exaggerated effect, such a recommendation is philosophically false and practically a drawback. To some extent, much of both these objections applies even to a distance of three inches, notwithstanding that such a separation involves *per se* no great outrage under one or the other head. Persons of normal eyesight, accustomed to examine in the stereoscope three-inch separated stereographs, would, perhaps, be unconscious of any optical inconvenience, but if a few comparative experiments in this direction be made, however, a difference in

effect will be felt, and no difficulty will be found in realising that even three inches may, and in a great many cases probably would be, too great a distance for foreground objects.

In the course of a paper which I recently read before the North Middlesex Photographic Society on the subject of stereoscopic photography, I myself gave three inches as the distance of separation of foreground objects, and most of my slides and transparencies are produced with regard to this direction. So cut and mounted, I find no palpable strain in examining them. Recently, however, a great many stereographs have come under my observation, and it dawned on me when examining them that coalescence, both in the stereoscope and viewed when simply converging the optic axes, was obtained with a remarkable degree of ease, even though a great number were looked at. Measurement showed a foreground separation of  $2\frac{3}{4}$ - $2\frac{7}{8}$ . Upon next returning to an inspection of a series of slides which were separated at distances ranging from 3 to  $3\frac{1}{2}$  inches, I was surprised in the difference of effect on the eyes. In the latter case coalescence came far less readily and naturally, and after a time I experienced quite a sensation of pain. Both sets of slides were of one class of subject, landscapes with near foreground objects, and taken under the same angular condition. The effect of relief in the slides mounted at distances under 3 inches was, if anything, truer than in the other case.

Probably, therefore, those who are commencing stereoscopic work will find it advantageous to allow of a separation ranging from  $2\frac{5}{8}$  to  $2\frac{7}{8}$ . To those who are accustomed to separate at a greater distance, I recommend a trial of the effect of diminishing it not more than what I have mentioned. Like myself, they may undergo conversion on the point.

#### STEREOSCOPIC PORTRAITURE.

This is a branch of stereoscopic work much neglected even by those who do a great deal of binocular photography. Saying nothing for the moment of the charm and satisfaction of portrait stereographs to their producers, the presentation of an ordinary monocular portrait and one produced by binocular treatment to the estimation of one's non-photographic friends will show that that most discerning of judges, the public, infinitely prefers properly prepared small portraits in duplicate to single pictures. It is needless, of course, to urge anything more in support of this brief plea for portrait stereography beyond saying that in its own phase of photography it yields all the realism, delight, and verisimilitude of landscape stereography.

I may, however, throw out a hint or two for the guidance of beginners. The stereoscopic relief of binocular portraits is greatly aided by the presence of accessories, vignetted heads and portraits against plain backgrounds not giving such an enhanced effect as those in which other objects nearer to and further away from the lenses than the sitter are included. From this it is deducible that portrait stereography in the drawing-room, the boudoir, and the study supplies the best opportunities for obtaining the most pleasing results. Nothing could be more acceptable to people than photographs of their friends and acquaintances amid their home surroundings, in their habits as they live, depicted as only binocular treatment can render them.

## SENSITIVE SURFACES FOR STEREOSCOPIC PRINTING.

The introduction and extensive use of gelatino-chloride paper comes very opportunely for the stereoscopic renaissance. I hesitate to say that of late years the quality of commercial albumen papers has deteriorated, although I hear complaints that it has from many experienced professional photographers. I am, however, certain that not only in my own stereoscopic work, but in that of others, the qualities of the slides on albumen paper have frequently not been what is required. Minor but palpable defects, such as lack of transparency in the shadows, poorness of deposit, diffused meanness, are bad enough; but when capped by a conspicuous magnification of the texture of the paper in the stereoscope, the sum-total of drawbacks becomes formidable, and the richness of effect upon which the slide partly depends for its success is absent.

Fortunately the highly surfaced papers are available, so that a perfectly homogeneous vehicle for the printed image can be had, and thus the magnified image can be viewed without, as it were, the pores of the paper breaking it up into a kind of grain. As regards the final surface of stereoscopic prints on gelatine paper, I prefer not to heighten it by stripping from glass or ebonite, but to allow the prints to have just the surface they acquire by spontaneous drying. As these lines are penned chiefly for the behoof of photographers inexperienced as regards stereography, it may be well to remark that platinum and other rough-surface papers are unsuitable for stereoscopic slides for the reason above given.

## BACKING STEREOSCOPIC TRANSPARENCIES.

There is no denying that the cost of stereoscopic transparencies far exceeds that of slides, and on that account may deter many from undertaking their preparation to any extent. Ground glass for backing them is advised by some and insisted upon by others; comparatively speaking, it is an expensive item, but it is not a necessary one. Probably the cheapest way of backing the transparency with ground glass is to prepare it on a ground-glass transparency plate, but that, of course, does not obviate the use of a cover glass, and such a plate may not always be available or suit the photographer.

Backing the transparency with ground glass is, however, not essential. A plain cover glass answers just as well, but then the picture cannot be viewed by transmitted light, the effect being marred by objects in the line of sight showing through the transparency. All that is necessary is to place a sheet of white or grey-tinted cardboard at an angle of about 45° with the transparency when it is placed in the stereoscope and view the picture against the cardboard backing. Although but a makeshift arrangement, this answers very well, especially where the transparencies are prepared mainly for the edification of the domestic circle.

## THE CAMERA DIVISION.

Not every subject, in landscape photography, is suitable for binocular treatment, and therefore the amateur in search of the picturesque and interesting, besides his pair or pairs of lenses, should always be provided with an extra front, capable of carrying lenses for monocular work. Emergencies often arise where it is desirable that the conversion of the

camera from a binocular into a monocular, and *vice versâ*, should be effected with great rapidity. The removal of the front, or the replacement of another, are both, as the novelists say, the work of a moment, but either taking out or putting back the collapsible division occupies several moments, when, perhaps, they can ill be spared.

I venture to suggest to those who are of an inventive turn that an expanding division, which could be quickly and temporarily released for monocular work, and instantly reset for binocular exposures, without the necessity of having to take it bodily out of the camera, would be a great convenience and a valuable time-saver. Such a device may already exist, but this suggestion is made in ignorance of it.

By the way, I am happy to note that classes for stereoscopic slides and transparencies are open for competition in several forthcoming exhibitions. I trust that shortly no exhibition will be held without an opportunity is given photographers of showing what can be done in this most beautiful branch of a beautiful art.

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#### ON THE PREPARATION OF TABLETS FOR VITRIFIED PHOTOGRAPHS.

By A. L. HENDERSON.

I WAS extremely interested when reading Professor Haddon's 'lecturette' and demonstration on the above subject, and I think, Mr. Editor, you cannot do better than reproduce it in your Annual. Indisposition prevented my being present at the meeting and taking part in the discussion. Mr. Haddon did not refer to what I consider a most important part, viz., the composition of the enamel. It has a wonderful effect on the finished picture, as well as the amount of colouring matter used. It has been said that Venetians obtained colour or opacity by a secret method, surmised to be calcined harts' horns (not ammonia); and this was considered better, as metallic oxides are apt to alter the colours applied to form the image.

Arsenic is a flux and colouring matter, and is a favourite substance for common plates employed for writing. Oxide of tin is by far the best for fine work, more especially when gold or platinum forms the base of the picture. Tin enamel is generally known as hard enamel—I presume because they generally add a large amount of tin to the proportion of soft glass or flux. Two parts of commercial hard tin enamel to one part of flux gives a fair average for photographic work. If a photograph is put on pot opal and another on flashed, it will soon be recognised how important it is to have the enamel of correct transparency. Bear in mind that an enamel plate does not admit of transmitted light. Many of my clients imagined, because an enamel was soft, that a hard photograph would be improved by vitrifying. Quite the opposite.

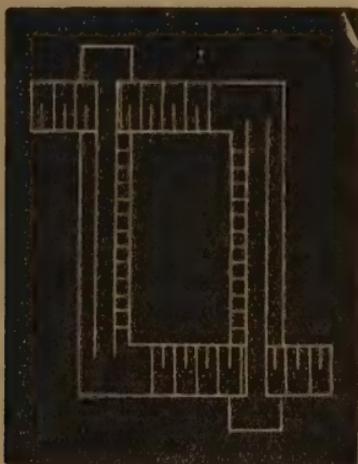
I once visited a manufactory where dials were made for cheap Swiss clocks. The letters were transferred from copper engraved plates, the colouring matter being mixed with the ink, afterwards intensified by dusting on colour. These faces were sold by weight; it was surprising to see them being shovelled into a scale, like potatoes. The enamel was made in Switzerland.

This manufacturer made all my plates. They were not made of the common enamel, but specially prepared. I am inclined to think that he has carried to his grave some secret, as his successors do not produce the quality and finish of the master. An open fire is the best, and I hit on a good plan to prevent sulphurisation—that is, to have an opening in the chimney of the furnace ten or twelve inches above the muffle, and an iron door fixed, such as is used in a scullery copper. When I wished to reduce the draft, or what is commonly called damping, I open the door more or less, thereby allowing the fumes to pass up the chimney.

### A USEFUL PRINTING APPLIANCE.

By E. DUNMORE.

It frequently happens that a print has to be cut down to a less size than that for which it was originally designed, an operation requiring more judgment and care than appears at first sight if it is to be reduced satisfactorily. Some pictures cannot be reduced in size without in a great measure spoiling the effect; others, again, look very much improved by being cut down to, say, half or less of their original dimensions. The part to be selected is generally decided upon by shifting the print about on the cutting board, covering portions of it with card or paper, having a straight edge, so that all but the part required is hidden from view. The following is a simple arrangement and saves a good deal of trouble—so simple that it has in all probability been adopted by somebody already; at any rate, it is original as far as I am concerned. This is it: Make two L shaped



pieces of cardboard, say, twelve inches for the longest and ten inches for the shortest arm, and two and a half inches wide. Down each of the longer arms cut two slits to within about an inch of each end, and then interlace one with the other. When they can be slipped about with ease, and form rectilinear openings of any size within their capacity, the

diagram will explain how they are fitted together. The shape and size being fixed on, to facilitate which the cards may be divided, as a rule, a pencil is run round inside the gauge, and the print is then ready to be trimmed. A more substantial gauge might be made of thin metal, with a couple of binding screws to keep it in place after adjustment.

Another little plan I have found useful on occasions when mounting prints of different tones in an albumen, is when the print is insufficiently toned and too warm in colour to rule a scarlet line round it, which by contrast will seem to make the print cooler, in colour, and when they happen to be over-toned or too cold, a blue line will have the effect of warming them up, and without any objectionable appearance.

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### AN EASY METHOD OF MOUNTING GELATINO-CHLORIDE PRINTS.

By T. N. ARMSTRONG.

THE mounting of gelatino-chloride prints is looked upon by a good many casual workers as an operation somewhat troublesome and risky.

I am not writing this for the benefit of professional workers, or those who know how to utilise their glue-pot (which is, perhaps, the best of all means to employ for the purpose), but for those who have merely a few prints now and again to mount, and who have not the means at hand which a professional mounter would employ.

Let anyone, therefore, who has merely a few prints to deal with procure a sheet or two of gummed paper, the same as is used for covering over jam pots; any stationer will supply such for a copper. Cut from this a number of long strips, in width about three-eighths of an inch, or similar to lantern binding strips. Fold these, cut stripes down the middle, gummed side out, then proceed to cut and trim these the exact lengths of the four sides of the print, and by moistening *one side of the strip only*. Apply it neatly to the print all round the edges, the double edge of the strip inwards. Next take the mount, and mark or notice the exact spot the print is to occupy on it; then moisten the other side of the gummed strip and place the print neatly on the mount, pressing it into close contact. The result is very neat and cleanly, and if properly done it is impossible to detect that gummed strips have been employed. Of course, the prints should be previously backed, and trimmed to the exact size required.

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### HOW TINTYPES MAY BE UTILISED.

By F. W. MUNRO.

By the way the somewhat opprobrious title given to those little shilling positives, so well known to frequenters of our marine watering places and country road sides of a Sunday forenoon, does not properly convey the accurate idea of the origin of the title. It is not in any way connected with tin plate as might be thought, but has its inception in a small class of portraits produced in America on ferrotype plates, which, from their

small dimensions were known as tiny photographs, which term was corrupted or evolved into tynatypes, further corrupted into tintypes.

I find that many of these little seaside portraits are taken on glass backed up sometimes with black varnish and occasionally with black velvet. In this case the further utilisation of the tynatypes is an extremely simple matter. Benzol, or even scraping will remove the black varnish, and the black velvet may be lifted away. In either case you have, when looked through, a negative which may not, perhaps, be intense enough to print from, but which is quite good enough to copy as a transparency or to enlarge from. I know of one of these from which a  $15 \times 12$  enlargement was subsequently produced, and which met with the highest approval.

While a positive on glass may be copied either by direct light or as a negative, the reproduction of one on a ferrotype plate is confined to that by reflected light alone. This has to be done by the camera, the means to be adopted being those employed when copying an ordinary print. The care involved is mainly that of having a powerful side light which will bring into strong prominence the less noticeable features of the photograph.

When having a tintype made on the beach it is not half a bad plan to hint to the operator of a doceur of a few pence extra provided he focusses the subject extra sharp. This will infallibly place you in possession of a positive from which an enlargement may afterwards be obtained if desirable.

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### HOW TO FOCUS ENLARGEMENTS WITH THE 'WORKING STOP.'

By W. G. STRETTON (Rangoon).

WHEN focussing enlargements it is generally considered advisable to employ the 'working stop' since the focus of the lens is lengthened when employing a small stop, but when using such a stop it is almost impossible to see the detail in the negative clear enough for fine focussing. To get over this difficulty proceed as follows:—Take an ordinary 'dry' plate  $\frac{1}{2}$  or  $\frac{1}{4}$  size (it is as well to make two) into the dark room, fix in hypo, wash and dry well; you have now a clear glass with a substratum of gelatine. Take a fine mathematical pen, charged with indian ink, rule on it horizontal and vertical lines, as fine and as black as possible, about  $\frac{1}{8}$  inch apart. This is your 'focussing plate.' To use it proceed as follows:—Set up your enlarging apparatus and insert your negative in its place.

Having got the screen in position, according to the size of enlargement required, take your negative out of its carrier and in its place insert the 'focussing plate,' when you will find that the fine black lines thereon can be focussed with ease on the white screen. This done, replace the negative and expose, and you will find that the enlargement is as sharp as you can get it. You will be astonished to find how easily the lines can be drawn on the gelatine film, no fear of 'running' so long as the same is quite dry. I use a fine mathematical drawing pen and a flat ivory rule, as supplied in the boxes of mathematical instruments.

## ALCOHOL VERSUS BLISTERS.

By W. D. RICHMOND.

My method of preventing blisters on albumenised paper is so ridiculously simple that amateurs, and others, would appear to think there is nothing in it, and so do not try it. It may be that, though published in THE BRITISH JOURNAL OF PHOTOGRAPHY a long time ago now, it has not yet reached the knowledge of the many interested in photographic printing on albumen; and, in response to the annual invitation to pen an article for the ALMANAC, I thought it would be well to draw attention to it again. I find, on looking over the 'Answers to Correspondents' occasionally, that our editor has been good enough to recommend it on several occasions, and has even gone so far, if I do not mistake, as to say that he has never found it to fail. It has been the subject of a somewhat long article in THE BRITISH JOURNAL OF PHOTOGRAPHY, so, in this instance, merely an outline will be given, but that will be found all that is necessary.

When about to tone prints on paper liable to blister, wash them on the back with spirits of wine, either pure or methylated. This is simply done by means of a tuft of cotton wool or other similar contrivance, and no more need be applied than sufficient to render the paper transparent. They may now be put into water to wash, previous to toning, or they may be put at once into the toning bath if it be so desired, but that is a detail not recommended. The point to be insisted on is that the spirit must be applied *before the prints are wetted*. An instructive experiment is to make a print upon paper known to blister, apply the spirit to one half of it, and then let it take the usual course, or, rather, the one most likely to produce blisters. It has been said above that the spirit must be applied to the paper while it is yet dry, and I regard it equally important, though I have not absolutely proved it to be so, that the paper should be immersed in water while it is still wet with spirit.

One who has not yet made the use of spirit habitual may occasionally forget to apply it, and think of it only after the print is in the water. The remedy is then to finish the washing—and, for that matter, the toning also—and then apply the spirit after blotting the water off the print. The spirit will soon replace the water absorbed by the print, and will render the paper semi-transparent; after which it may be put into the hypo as usual, without fear of blisters arising. The permeation of the spirit is shown by the transparency of the paper at the back of the print, and there is no need for an immersion of the print in spirit to effect this. There are some papers that become semi-transparent by mere soaking in the washing water, and these I have found do not blister.

And now for another application of spirit. Every one knows the effect of the contraction of a print in drying when mounted in the ordinary way. The paper expands so much while under the influence of the aqueous solvent of the starch or gelatine, and contracts so strongly in drying, that even the stoutest boards are pulled out of shape. Spirit in the mountant has been found to have good effect in this connexion, but cockling may be greatly reduced by washing the back of the print with methylated spirit immediately before applying the mounting solution. While the spirit is in the paper it seems to keep the gelatine out,

and so keeps down the expansion. I have just tried it by mounting two prints on ordinary writing paper, one with the spirit and one without. The result is a great difference between the two, entirely in favour of using the spirit.

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### INCREASING THE SENSITIVENESS OF PLATES.

By G. WHITWORTH.

THE following idea for increasing the sensitiveness of gelatine plates is, in the main, I think, due to the late Robert Hunt, who, if I mistake not, pointed out that dry collodion plates, if treated with a solution of silver nitrate, acquired great additional sensitiveness. For use with gelatine make up the following solution:—

|                               |            |
|-------------------------------|------------|
| Methylated alcohol .....      | 8 ounces.  |
| Silver nitrate solution ..... | 3 drachms. |
| Ammonia liquor .....          | 1 ounce.   |

Immerse the plates in this for five or six minutes, dry, expose, wash and develop as usual.

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### MAKING THE BEST OF A LOW-ROOFED STUDIO.

By S. W. ROUCH.

I KNOW of a small studio in which the roof is so low as to be almost touched by the hat of a man of average tallness, and yet in which full length figures are produced in which the background appears to extend a considerable distance above the head.

Curious to know how such an effect could be produced, I made inquiries and was invited to witness the operation. The photographer told me that the idea was not original with him, as he had been told of it when on a visit to the United States of America. I make no apology for describing it, as it may be useful to some other photographer whose studio may be little over six or seven feet high.

A strip of calico painted the same colour as the background, and about half a yard in width is suspended from the roof but much nearer to the camera than the sitter. Being so near to the lens its lower edge is quite out of focus and blends with the background, the top of which is out of the view of the camera. It must not, of course, dip down so low as to obstruct the view of the sitter from the lens. The nearer this supplementary background is hung to the lens the more out of focus will the lower edge be, and the higher will be the semblance of the background.

If the colours of the real and the sham grounds are properly matched, and a photograph of the whole is taken, it is difficult and sometimes impossible to tell where the junction lies. A gentleman five feet eleven inches in height was photographed in my presence standing, and it is impossible to say from this photograph that the background does not extend to at least two feet above his head.

## A FEW WORDS ABOUT PICTURE COPYING.

By VALENTINE BLANCHARD.

THE recent statement that a valuable water-colour drawing was completely ruined by stupid treatment—and this by a skilled photographer specially trained in the art of copying pictures—seems incredible, but so it is. The drawing in question was mistaken for an oil painting, and treated by the French method accordingly. This said method was kept a profound secret by a celebrated copyist of oil paintings in Paris, and only oozed out after his death many years ago. The plan in question was to evenly coat the oil painting to be exposed with a varnish of white of egg; this gave an even glaze, which was not so glaring, however, as ordinary varnish, but sufficiently so to remove most of the usual inequalities. This coating was easily removed by a sponge and plenty of water. When applied to a perfectly dry oil painting, and not left on for any length of time, little harm could happen, and many of the paintings of this period were specially painted for copying by the aid of photography, and were then considerably strengthened in colour for sale afterwards.

Only those who have had a large practice in picture copying can fully realise all the difficulties that present themselves, and a few words, therefore, on this important subject may prove of service to many readers of this annual.

Now, first in importance is the question of lighting the picture, for in the proper performance of this operation complete success depends. Any one who has attempted to copy a Daguerreotype knows that its highly polished surface acts as a looking-glass, and the difficulty, therefore, lies in getting the light to fall at such an angle that the reflections are thrown away beyond the reach of the eye of the lens; as, however, the mirror-like surface of the silver plate catches up the fullest rays of light, the polished front of the camera or the brass rim of the lens is quite sufficient to disturb the even illumination of the plate, and it becomes necessary to prevent any light whatever from falling on the camera front. The best method for accomplishing this is to box in the space between the Daguerreotype and the camera front, excepting a small opening at the top just immediately in front of the picture, and to take care that the light travels along the buff marks—that is to say, the lines or grain of the polish—and not across them. In dealing with oil paintings this Daguerreotype experience has to be remembered, for most of them have highly reflecting surfaces; and that as the angle of incidence is equal to the angle of reflection, it necessarily follows that any stray light reflected from objects in front of the picture will be caught by its glazed surface and thrown back into the lens, and so mar the photographic result.

To get the best effect, therefore, in the copy, the light should fall in a solid, unbroken mass on to the picture, *and should come in same direction that it did in the artist's studio.* This is a most important point, for in most pictures there is a marked difference in the effect if viewed with the light coming in an opposite direction to that taken by it when they were painted. In order to avoid the shadow from the brush or the mahl-stick, the main body of the light is from the left, and though most

painters examine their work under several aspects of light, the principal part of the work is done with it in a fairly constant direction.

A practised eye can speedily distinguish the right lighting to employ for the best effect. If the light be permitted to fall too obliquely on the picture, every bold touch of colour will have a distinct shadow, and the general effect in the photographic copy will be coarse and rugged. On the other hand, if the light be too much in front, some of the edges of colour to be seen in boldly-painted pictures will reflect light, and so completely upset the effect intended by the painter.

In the days when the albumen varnish was most employed, everything was done to get smoothness of effect; but the taste has very much changed since then, and in many of the modern *photogravures* of the French School every touch of the painter shows up palpable and distinct, and some of them bear evidence that the original pictures were copied in direct sunlight.

Of course, for all pictures with vivid and strongly contrasted colours, orthochromatic plates must be employed, and the light made yellow by the use of a disc of glass of the right colour to intercept the white light, or by any other artifice that may suggest itself.

The great point of all, however, to remember is that every ray of light not employed in the direct illumination of the oil painting must tend to weaken or mar the results, and look well after little chinks of light between blinds, and cover up every reflecting surface that cannot be removed, as, for instance, the polished wood of the stand or the brass parts of the lens, with dark non-reflecting cloth or velvet.

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### NIKKO PAPER.

By R. E. CHESTERMAN, D.Sc. (Cairo).

MUCH attention has been given to the subject of toning bromide prints with a view of providing a ready means of substituting for the characteristic blacks and greys yielded by that paper a somewhat warmer colour. It is astonishing how fashion has completely changed within the last few years in this respect. We all remember the favour with which platinum black, and similar effects on gelatino-bromide were viewed by not only professional and amateur photographers, but also the non-photographic public. Not long ago he would have been considered a bold man who would have prophesied such a revolution as has recently taken place. Taste, however, is notoriously fickle in these matters, so that it is just as likely that ere long we shall all be reverting to the cold tones that are literally so much out in the cold just now.

Of the methods of imparting warm tones to bromide prints that have been advocated, that by means of uranium yielded me at times very pleasing results, but its main drawback in my hands was the difficulty of securing both the exact tone I wanted and also uniformity of result. An initial difficulty was, of course, the obtainment by development of an image of suitable colour to receive the deposited uranium. I found that a somewhat weak, sepia-like picture was the best for the purpose, but I

never quite hit upon a plan of exposure and development which produced uniform results.

A friend of mine has recently sent me out here a sample of the new Nikko paper, which I have tried, and with which I must express myself greatly pleased, as it gives me without much trouble just the effect I desire to produce, namely, the warmth of gelatino-chloride by simple exposure and development. I do not know how the paper is prepared, but the reddish tint of the sensitive surface contains just sufficient warmth of material to modify developed blacks, and thus relieve them of their characteristic, and at present unfashionable, coldness.

For development I have been somewhat restricted by the scanty contents of my makeshift dark room here, but I find that with soft negatives, a full exposure, and development with rodinal stock solution diluted about 1 : 40, I obtain most pleasing warm blacks. Toning I find unnecessary. As regards the *glacé* surface of the prints, I do not care for this in photographs of any kind, so that with Nikko I find it necessary to remove it. This I effectively do by squeegeeing the washed prints in contact with the rough side of a sheet of celluloid.

I have made a few experiments with hydroquinone and ammonium carbonate, with a small proportion of caustic alkali, and find I get passable results with this, but my experiments have been so few that I am unable at present to enter into details.

Another advantage of Nikko paper is its use for stereoscopic slides, the basic warmth of the pictures obviating that common defect of chalkiness. I send you with this one or two prints, so that you may judge of their effect for this purpose. As a high authority on stereoscopic photography, I know that you, sir, will welcome any device for getting rid of this too common defect of stereo slides, and Nikko just does it nicely without the necessity for 'sunning down,' &c. It is, in fact, an ideal paper in this regard, a little flatness of image being no drawback. Of course, the 'surface' should be left on the prints.

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## A MERCURY-RODINAL INTENSIFIER.

By F. DUNSTERVILLE (Royapuram, Madras).

WITH reference to the leading article in the JOURNAL for 29th September on 'Rapid Intensification,' I see mention is made of metol as a satisfactory reducing agent after mercurial bleaching.

I may mention that for over twelve months I have used *rodinal* (1 part to 31 parts water or  $\frac{1}{2}$  drachm made up to 2 oz. with water) for the same purpose for the intensification of lantern slides and stereoscopic transparencies; up to this none of them have altered in the slightest degree.

I find it most satisfactory, not the slightest veil is thrown on the high lights, and the shadows (though well intensified) retain the most perfect clearness; I have recommended it to several friends out here, and as it would appear not to be generally known, I regret that I did not publish it at an earlier date. 'Metol' is not procurable in India at present, and probably will not be for some time.

## BOUND FOR JAPAN.

By R. P. DRAGE.

IDLX lounging on the deck of a fine P. & O. liner two days out from Colombo on my way to the Far, Far East, recollection has suddenly come upon me of a rash promise made in a certain editorial sanctum that I would not entirely forget my old friends at home.

The voyage hitherto has been an exceptionally fine one, almost like being on a lake. We called at Gibraltar. I landed there for a couple of hours with my camera, and was speedily informed by a loquacious native 'oo no use et Kodeck heer.' By-the-by, what a monument to the advertising enterprise of a certain firm is it to find that amongst the numerous classes of people that one meets on board a large mail steamer, ninety-nine out of a hundred style any camera that is held in the hand when exposing, a Kodak. I am not a possessor of that form of camera, and endeavour to explain the peculiarities of my 'instrument (a 'N. & G. Standard B') to many interested groups; but it is of no use, I am always greeted when I appear with the camera with 'Hullo, kodaking again!'

In spite of the warning at Gibraltar, I succeeded in getting several street views there, and also at Malta I was pretty fortunate, and at Brindisi also, that dirtiest of dirty Italian towns. After a splendid run through the blue Mediterranean close to the Ionian Isles, with a little rolling and pitching off Crete, we arrived off Port Said, landed there and got many picturesque groups. Making our way through the Canal, I was greatly struck at night when standing in the bows of the steamer directly over the huge electric searchlight, with the weird effect of the scene. Both banks of the canal were made as bright as daylight within the range of the searchlight, and every now and then figures would appear to start into the glare, and then disappear into the darkness again. There seems to be a great deal of traffic along parts of the banks of the Canal, both night and day. The heat in the Canal and the Red Sea was intense, the thermometer in the chart-room on deck running up to 102° in the shade. Nearly everybody sleeps on deck, night and day, *especially day*, and many are the unstudied, but picturesque, groups that I am begged to aim at while they are in the arms of Morpheus. I sternly resist the temptation, yet I am laughed at when I tell the tempters that to do such things would be abusing the use of a camera.

At Aden it is also intensely hot, and we lose many of our passengers, who change here for Bombay. Affecting are the partings between the officers returning to India and the young ladies who are bound for Australia, who have made friends during the voyage. Many touching pictures might have been made, but my better feelings prevailed *as usual*, and the camera was put aside.

How strange it seems that, amongst such a number of military and service men, no one of them understood anything about photography. Here they were going to all parts of India, even across the Himalayas, to Afghanistan, Baluchistan, all parts of Burmah, and the Malay Peninsula, some of them stating that, when they got to their destination, they would perhaps go for a month without seeing a white face. In such extreme cases, I ventured to hint to them, what a companion a camera would be.

And how hard it seems to hear some of these fine, hearty-looking fellows say that when they started for England on leave they went on board more dead than alive. In one case, where two started together from a distant station in Burmah, only one reached the boat, and he only just alive, the other one having died on the journey to the coast. It seems a necessity that one year in three should be spent away from India, else the climate is too much for them.

The journey across the Indian Ocean was uneventful. Shoals of flying-fish are seen, and the usual concerts and entertainments are held. I was repeatedly asked to take groups on the deck, but I was obliged to refuse, pointing out that if people had to wait perhaps six months for pictures of the group all interest would most probably have gone by then. I have such a lively recollection of attempting to develop plates on a steamer on a former trip in these waters, when the heat was so great that, on lifting the plate out of the developer, the emulsion all ran off the glass in a stream.

At Colombo we that are going eastwards change on to another steamer, which we find waiting here for us. Some of us avail ourselves of a chance of landing for an hour or so to look round. The heat on shore is intense, and we are glad to rejoin the ship after saying 'Good bye' to many pleasant friends we have made who are bound for Australia.

There is plenty of work for the camera in Colombo Harbour, but we are carrying the mails, and must hurry off. The majority of passengers on this vessel are missionaries, male and female, who are bound for various districts in China. Some of the ladies hold diplomas, so that they are also able to minister to the bodily ailments of the natives. All the missionaries appear to be intensely in earnest and devoted to their perilous calling. The principal leader, who has spent many years in China, gives me some useful information for camera work; and as he tells me that in his district he has often been in peril of his life, one can only admire the bravery and perseverance of these pioneers. He also tells me of a curious instance of the use of photography. A steamer some time ago was wrecked off the Coast of China. The natives murdered the crew, and looted the vessel. The Mandarin, or Governor, of the district, in response to the demand of the Central Government, collected the required indemnity and captured the murderers, who were duly led out for execution. They were placed in a row before execution, and photographed; their heads were then cut off, and placed at the sides of the bodies; the scene was then photographed again, and the two photographs were forwarded with the indemnity for the purpose of convincing the Government that justice had been satisfied.

At all these ports of call our decks are invaded by crowds of vendors of all sorts of things, and some capital pictures can be taken. I was intensely amused with one coal-black gentleman who had a straw basket for head-covering, and whose entire clothing could not possibly have cost more than about fourpence, opening out a quantity of cases of jewellery, and offering to sell us gorgeous rings and precious stones at prices ranging up to 50*l.* and 60*l.* One he offered us at 45*l.* he gravely assured us could not be bought at Streeter's, in Bond Street, under sixty guineas. He said he would always return the money if we were not satisfied. We naturally pointed out to him that we did not visit Colombo every day, so that any desire on our part to have our money back could not well be

gratified. I managed to get a very good shot at him while he was so persuasively eloquent.

At Penang, reached after four days' sailing from Colombo, I landed for a short time. Here was endless work for the camera—the native shops and streets, the 'rickshaws,' the gharrys, the stately Sikh policemen, the active little Chinamen, the large-eyed Malays, and specimens of all the different races of India, a truly grand harvest for the camera. But, alas! as I have said before, we are carrying the mails, and are hurried off. We are taking several deck passengers, Chinese, Malays, &c., a very rough looking lot, who, however, carry deck-chairs with them, which they turn into very comfortable bedsteads, some of them going so far as to produce nice white quilted beds and lace-edged pillows; they make their beds and go to sleep directly they get on board. The scene on leaving Penang Harbour was a magnificent one; all the lights of the houses were very bright, and the night was intensely dark. There had been a great deal of thunder and lightning during the day, which some one said was the cause of the phosphorescence in the water, which was hardly correct. As the ship moved out, cleaving the water, the waves appeared just as if the harbour was alight, breaking into a succession of masses of silvery green; the effect altogether was most entrancing. As we got further out to sea, the phosphorescence gradually disappeared.

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### THE ASTIGMATIC SALOON.

By A. BLURR.

THE photographic public have received so well what I have written in the past on things photographic that they will no doubt be glad to hear about my contributions to the astigmatic saloon, and how they were produced. In past years it has been my privilege to receive basketfuls of medals from the Pyro, Soda, Glycin, Borak and many other societies. As the Pre-Raphaelite style so well known was beginning to die out, and was not appreciated by the more artistic and educated public as it had been, after consultation, *in camera*, with some other members of the brotherhood, it was decided not to do anything more in the Pre-Raphaelite style or to contribute to any of the above-mentioned Societies. The coming Astigmatic Saloon gave me an opportunity for developing some 'things' in a new style, and I decided on a great effort to show what could be done by combining the many artistic and mechanical powers now embraced by the word Photography.

Living at the seaside, I decided that my works should be confined to scenes on the seashore, or those to be found in the country in the immediate neighbourhood. A considerable time was occupied in making a collection of photographs of cliffs, open stretches of sandy beach, and lobster-pots; in the neighbourhood inland of smock-frocks, sun-bonnets, donkeys, and cabbages. These have been combined in various proportions to make the 'things' contributed to the Astigmatic Saloon. The first combination of some of these is the *symphony* now so well known under its title, Pyramidollkinone. It is typical of the style, and, for those who have not seen it, a description will give them an idea of the merits of the style, and enable them to work at and become members of what promises to become a new school.

In the distance a cliff, facing north, rises into a sky with heavy clouds, the rays of the sun just peeping through them; in the middle distance, from another negative, is a group of bathing women, in sun-bonnets, discussing the merits of Peecham's Bills; and in the immediate foreground is 'an old salt,' in a smock-frock, sitting on a lobster-pot, and facing the early-morning sun. Having brought all these into harmony with one another, the combination was enlarged, not by means of an ordinary lens, but through the keyhole of the dark room—the first time a photograph had ever been produced through an aperture of this shape. To the shape of this aperture is due the beautiful softness, the obliteration of the joins and bills on the bathing waggons and the *timbre* of the composition.

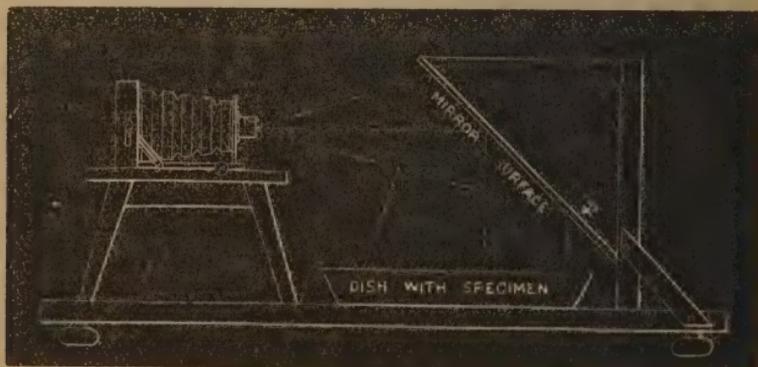
The frame was made by a kind friend in the American lumber-trade. It is of split logs. One side of the frame has the bark left on, the other three respectively show the inner grain of the wood as split, only stained red, green, and blue. The yellow mount, which imparts a finish to the whole, is made from an old sack.

At some future time I hope to be able to publish a more detailed work on the production of these 'things.'

### MEDICAL PHOTOGRAPHY.

By VICTOR A. L. E. CORBOULD.

ONE often wishes to record either certain small impulse movements, or gross differences in form under varying circumstances; to show these effectually the background must be black, and a profile view of the movement obtained. By this means I have succeeded in showing, without the intervention of any recording lever, the variations due to respiratory and



cardiac impulse by double exposing a plate upon such subjects as herniæ, quiescent, and during straining efforts, giving the latter exposure about one-tenth of the duration of the former.

On the other hand, one is frequently embarrassed by this same movement whilst endeavouring to get a distinct record of distribution of skin disease or outline of tumour. Cardiac impulse seldom gives much trouble, but not so respiration; this may often be got over by making the patient

take a long inspiration, and then on its completion making the exposure; having previously tested the probable duration of the period of rest thus obtained.

Delicate pathological specimens are often best shown when floated out in water or spirit, and if a suitable tank with *plate-glass* front is not at hand I have found the most useful method to be that of placing the specimen in a flat porcelain dish, arranging the tissue so as to show best when looked at from a bird's-eye point of view. Then, by using a *plate-glass* mirror, placed at an angle of  $45^\circ$  to the horizon, vertically over the specimen, and raising the camera on a suitable stand so that the axis of the lens is placed opposite the centre of this mirror, the reflected image can be focussed; of course, care must be taken to do away with all vibration as much as possible, as in this case it is most essential that 'the surface should remain untroubled.'

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### SOME USES OF THE NICOL PRISM IN PHOTOGRAPHY.

By BIRT ACRES.

IN some branches of photography the difficulty of overcoming reflections from polished surfaces prevents satisfactory results being obtained. This is notably the case in photographing machinery, jewellery, plate, &c.; but, although it is not so fully recognised, the same thing takes place in landscape work, but is more noticeable in pictures of wooded glens, or other subjects with foliage, many photographs taken in summer-time with the trees in full foliage looking as though the leaves were covered with snow. With the aid of a Nicol prism a large proportion of these objectionable reflections may be easily destroyed, permitting a photograph to be taken which more truthfully represents the object photographed—as although these reflections are visible to the eye, and therefore correct, still the sensitive plate exaggerates these reflections so enormously that the values of light and shade are entirely destroyed.

It is not necessary here to go into the scientific principles of the question, as all I purpose dealing with is its practical application to photography.

When a Nicol prism is interposed between the eye and reflecting surfaces, it will be found, on slowly revolving the prism, that most of these reflections alternately disappear and reappear—that is to say, with the prism in one position one set of reflections would be destroyed, whilst with the prism rotated slightly these reflections would reappear and possibly some others be destroyed. Precisely the same effect takes place if we interpose a Nicol prism between the object photographed and the image on the ground glass—reflections from polished surfaces can be eliminated. The plan I adopt is to fix my prism on to the front of the lens so that it can be revolved without altering the position of the camera. If the prism is attached to the lens, the lens and prism could be revolved together by slightly unscrewing the lens in its flange. Unfortunately, Iceland spar (of which the prism is made) is now exceedingly scarce, and large prisms are very costly. The prism I have in use has a diameter of one and a half inches, and I find that with a lens of six inches focus I can cover a  $3\frac{1}{4} \times 3\frac{1}{4}$  plate without distortion. A half-plate

could be covered by using only one of the combinations of the lens, which gives twelve inches focus with the *same angle of view*.

Having mounted the prism as described, point the camera almost in any direction—if indoors, focus on some polished furniture, which, to the eye, shows reflected light—revolve the prism and note in which position the most objectionable reflections are quenched. On exposing plates with the prism in various positions, some striking differences will be observed.

In addition to the cases previously mentioned when the Nicol prism is useful, it will also be found a very great help in photographing oil paintings, the reflections from the surface of which are so well known to every photographer.

In photographing the most delicate cirrus clouds I have produced some very remarkable results—clouds that in consequence of their colour were almost invisible to the eye being strongly defined when viewed through a prism. Unfortunately I have very little time for experiment and I have to lay this subject before the readers of the ALMANAC in a very unfinished state; perhaps at some future time I may be able to give some more details as to the result of polarising and analysing the light before allowing it to reach the sensitive plate, and also as to the effect of the interposition of Tourmaline plates, &c.

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## FURTHER NORTH.

By J. WEIR BROWN.

WHILE many of us are travelling far afield with our cameras, seeking, out of our own country, fresh fields for our pleasant labour, it occurs to me that the beautiful that lies within the compass of our own shores is not by any means fully explored. Scotland has provided much work for those who delight in the depiction of Nature, but she has still in reserve for the adventurous much more that is little known. I think I am not far wrong if I surmise that the generality of tourists—English ones at all events—usually limit their voyaging in Scotland by a line drawn from Oban to Inverness, leaving unvisited the wild grandeur of the country that lays to the North and West of the Caledonian Canal. Certainly there is plenty to interest and delight the user of the camera much further South, but a time will come when we will hear a whisper among our friends, say at our lantern exhibitions, ‘Oh, the Trossachs again!’ or ‘Loch Lomond, &c. We have seen them so often before!’ And I only wish in these notes to drop a hint to those who want to be in the front that there is abundant material awaiting them in the North, which will equally delight and interest their less travelled acquaintances.

Let me suggest (I am presuming that his holiday is short and that even a couple of days are precious) that, instead of repeating that charming excursion, which has probably taken him more than once already from the Clyde to Oban by the palatial steamers on the West coast—that the camerist in search of new scenes make his way direct to Oban by rail. Coming from the South, Oban may be reached by direct rail only two or three hours later than the hour of arrival at Glasgow, and by proceeding in this way at least a day is saved. Here, then, is his real starting-point, and here he must deviate from the route taken by nine out of every ten tourists. The *slow* steamers may not sound very attractive, but I de-

cidedly recommend them. By them you certainly get glimpses of the Highlands that you entirely miss if travelling by the mail boats. One of the charms of them is that they go dodging in and out every loch and bay up the West coast. Wherever two or three huts are gathered together on the coast, there will the s.s. *Claymore* or *Clansman* be found at some part of the season. They have their regular calling-places, but they have also their irregular ones, and wherever there are a few bags of wool or a few barrels of herrings to be picked up there will the steamers go. In some cases they make their way far up these beautiful narrow lochs which indent every league of the Ross and Sutherland coast, and on a recent visit our stay at some of the places was sufficiently long to afford us an opportunity of landing, sometimes for two or three hours. Such chances are not to be missed by the hand-camera legion, as there will be seen the native of these parts intent on his every-day work, and too busy with his own affairs to look anything but his own natural self, even when the little black box is being levelled at him. The boat calls there, perhaps, but once in two or three months, and he must dispose of his accumulated gear then and there in spite of all the snap-shooters in the Highlands.

Where there is so much grandeur at every turning-point of the trip, it is difficult to single out any particular stopping-place without injustice to a host of others. But if I were pressed to decide, I might suggest that the country lying between Gairloch and Poolewe, a stretch inland along Loch Maree, with the surrounding mountains, would afford the photographer endless opportunities of catching nature in all her moods. A stay of a week might well be made, working from either of these places as a base. There is a little country inn on the seashore at Poolewe which, judging from my passing experience of it, would make a charming headquarters. Over the hill, just above Gairloch, there is a large hotel, very grand and, I fear, very expensive; but, apart from that, Poolewe is the place to my taste—plenty of cottar subjects to be had here with their companions, those beautiful, wee, rough Highland cattle—‘Ah, yes, inteet, but the queys wass goot’—and some cots, too, that no longer hold cottars. The foot of Loch Maree is only about a mile from the inn, and its outfall is a stream which will offer many opportunities. Across the hills to Gairloch is a charming walk of six miles (English), affording peeps of as grand Highland scenery as is to be found in Scotland. The *Claymore* calls at Gairloch and Poolewe every Friday, I think, and those who are not stopping at either of these places may still enjoy the walk across the mountains, as the boat takes from two to three hours to get round from the one loch to the other, and Captain M’Eachnie very courteously gives his passengers the full allowance of time, and waits for them at Poolewe Ferry.

After a stay in this district, the journey northward may be resumed by the steamer on the following Friday, or a return to the South may be made either by land or sea. If the latter be chosen, the traveller’s belongings will have to be got over to Gairloch possibly, for I am not sure that the steamer calls at Poolewe on the southward voyage. From Gairloch he may also go up Loch Maree-side by coach by way of Auchnasheen and continue his journey by rail to Inverness.

Should he decide to go on by the steamer, I can answer for the delights of the remainder of the journey north to Stornoway. Some of the finest

and wildest Highland lochs will be touched on the way. The steamer remains from Saturday night till Monday morning at Stornoway, and on the return trip slightly varies her route.

I have not attempted any description of the scenery—such a theme is too big for an ALMANAC article; but if any of my readers are tempted by these notes to go further north, I can promise them a delightful trip and plenty to do.

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## RECOVERING PLATINUM RESIDUES.

By J. R. HOPWOOD, Ph.D.

PROBABLY few amateurs who employ the beautiful process of printing in platinum reflect that of the valuable sensitising salt with which the paper is coated only a very small proportion goes to form the reduced image, the remainder, containing probably seventy or eighty per cent. of metallic platinum in combination, passes into the oxalate developing solution, and is eventually cast away. Where an amateur works the platinum process to any extent, however, it seems a pity to throw away an appreciable quantity of a most valuable substance, and as the keeping and recovery of platinum residues entails no trouble or skill, I give the following plan of procedure for the benefit of those who may wish to know how to obviate an unnecessary waste.

Keep all used developers in a suitable vessel, and when a large quantity has been collected, heat the mass just short of boiling point, and then add to it a saturated solution of ferrous sulphate, say, in the proportion of about a third of the volume of the oxalate solution. A black precipitate will be thrown down; this is metallic platinum. Now pour off the ferrous oxalate, and wash the platinum precipitate, which may be disposed of to a refiner. I should think that where a photographer, professional or amateur, habitually works the platinum process, it would be well worth his while to save his residues and recover them. I do not remember to have seen the foregoing method of recovery referred to recently, and I hope it will be useful.

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## A NEW RETOUCHING DESK.

By GEORGE MASON.

HAVE just seen at Mr. Warnerke's studio, Sauchiehall Street, Glasgow, a retouching desk of a new and novel construction a short description of which, I think, will be of some importance to the professional photographer. The desk is a box pyramid shape, flat on top. The base of this cone is twenty-four inches square; the top eight inches square. The interior is lighted by electricity, an incandescent lamp fixed into an opal concave reflector; these are fitted to the top of the box inside, a little hole in the top allowing of the connecting, or withdrawal of the light. The interior of the box is painted white. The four sides of the desk are composed of wood, with a pane of ground glass inserted in the centre of each. This glass can be arranged for the largest size worked, and masks made to fit for the smaller sizes. This desk is set on a table a little larger than the square of the desk so that four retouchers can be working at the same time. The light is very steady and soft.

## NOTES ON PRINTING-OUT PAPER.

By E. DUNMORE.

THE printing-out gelatine papers are, I believe, now in very general use, and bid fair to hold their own, for there is no doubt that better prints can be made from weak over-exposed negatives on this, than on albumenised paper. As we get used to its peculiarities objections at first raised against it rapidly vanish, and, for my own part, I think quite as good results may be obtained generally from fairly good negatives, with as little or less trouble, as upon the albumen-surfaced paper.

On albumen paper no method of printing would secure a thoroughly good print from a thin over-exposed negative, and on the printing-out paper the same may be said of a hard, dense negative, from which it is equally difficult to get a good result.

There is one golden rule to be observed in working with printing-out paper, and that is, to well wash between each process. The method I have found to work best is, in the first place, to clear the prints by well washing from soluble silver salts, let them be soaked and moved about until the water is free from opalescence; then place them in an alum bath, containing two or three ounces of alum to the pint of water, for ten minutes; well wash again to free them from the alum; and tone with sulphocyanide of ammonium and gold. The published formula answers well. Thirty grains of sulphocyanide, dissolved in sixteen ounces of water, to which are added two grains of chloride of gold; let it stand two or three days before use. Immediately before toning add a few drops of solution of gold chloride. As the bath gets used up make some fresh and add to it, don't throw the old away; it will, in all probability, get muddy, but this mud will subside, and the clear part can be poured off, as the mixed baths seem to work better than those entirely new.

In opposition to the instructions of the Ilford Company I *never* intentionally let the prints get apparently over-toned on the surface, finding if they are they are very much over-toned and black when finished. Instead, as soon as they are slightly toned by *reflected* light, they are removed and placed in a dish of water prior to fixing. If they have a moderately toned look by *transmitted* light, they will be black when finished. The thing is not to over-tone. I have worked with samples of albumenised paper that required precisely the same amount of toning.

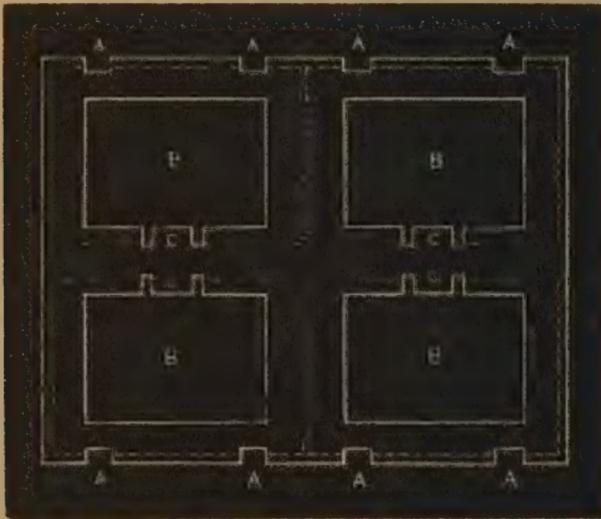
The charge brought against the P.O.P. of absorbing a large quantity of gold is scarcely just. I believe it requires a *little* more than albumen, but very little, unless the prints are kept in the toning bath an unnecessarily long time, when they will undoubtedly absorb a lot of gold. There is a considerable darkening in the dry prints, which must be allowed for in toning. The condition of the toning bath will probably influence this. However, with the plan I adopt, there is a steady uniformity in the action, and, provided the prints are printed to the same depth to begin with, the evenness of colour when finished will leave nothing to be desired, very little over-printing being necessary. When toned give them a good wash, and place them in a fresh hypo bath of three ounces to the pint of water, and keep them moving about for twenty minutes; then wash in plenty of changes of water for an hour

afterwards lay them in folds of clean calico till about half dry, when they can be placed between sheets of blotting-paper one on the other until quite dry, when they will be found flat and bright, ready for trimming and mounting in the usual way, having given no more trouble than albumen paper.

### HOLDER FOR DEVELOPING FILMS IN.

By H. G. N. CONYBEARE.

LIKE so many others, I have been bitten by the hand-camera craze, and, as 'I do the rest' myself, I soon found the desirability of developing several films at once. Every one who has tried it knows the difficulty the films give by getting on the top of each other and causing uneven development and scratches of the surface. To avoid this, I have devised the following little apparatus for holding four quarter-plate films in a whole-plate dish. A sheet of tin or thin zinc is cut seven inches by nine inches; portions are cut away along the edges, leaving four teeth, A A,



sticking out on each side; these are turned up and bent over, so that one edge of the film goes under them easily. For the sake of lightness four openings, B, are cut out of the sheet. On the inner edge of these openings teeth c are punched up to put the other edge of the film under. The films occupy the position shown by the dotted lines. By having only three teeth over each film to hold it down, it is more easily picked out for examination and replaced. The metal should be given a coating of Brunswick or Japan black, especially if made of zinc. One of the frames is also useful in the fixing-dish to keep the films under the solution. Perhaps some enterprising firm might find it worth while to put this, or something similar, on the market.

## THE USE OF OPPORTUNITIES.

By JOHN HOWSON.

Much has been said and written on that well-worn subject, 'the decay of professionalism,' but I do not find such decay to exist except where its cause can be clearly traced. On all hands I find the man whose work is careful, his business habits good, and his attention to all the details of his profession thoughtful, still commanding good returns and making money. The Americans have a saying that there is always room 'on the top,' and this applies fully, and without any question of uncertainty, to the work of professional photographers. I see much of the methods adopted by them, and can tell, from the inevitable outward signs, how a business is succeeding. It is not position, it is not an old-established name, or an imposing show-case or entrance, that tells of good trade. These may be aids, but without those careful, thoughtful, personal qualities of judicious management and supervision, which have their effect on every branch, these aids are of no avail.

There are little men to my knowledge—many of them in bye-streets, in suburban terraces, in country market-places, or even country lanes—who have built up and kept going a paying business, and have earned themselves a name, more or less widespread, for good work, promptitude, and careful posing, whose heart is in their work, and who do not sit down and write letters to the journals, or spend time bewailing the decay of trade. Certainly profits are not so readily made as when prices were better, photographers fewer, and the art newer to the public; but I doubt whether the discrepancy is so great as many would have us believe. There is always business to be had by the hard worker who knows what he has to do, and does it with a will and with care; who looks after his sitters personally, keeps himself up to date in processes, and is not satisfied to work as he did in the days gone by. Too often I have found men who have been photographers for thirty years or more think that the present has nothing to teach them, and talk as though the man who is their junior in business knows nothing, and despise him accordingly.

My thoughts on this subject are emphasised by a case in point which has recently come under my notice.

A young friend of mine went to a Regent Street studio to be photographed, and, when the proof came home, was horrified to find that her nearest friends did not recognise the photograph. Her fair hair came out perfectly black, and the negative was so clearly under-timed that I am surprised any photographer, however wanting in pride of work, should allow a print from such a negative to leave his studio. When remonstrated with, he said he had been a photographer thirty years, and that a photograph could not lie—it must be like the original.

How like the blind self-confidence of the 'old stop-short-where-he-began' worker. I send you, Mr. Editor, his proof; and, as a standard of comparison, I send you a print from a negative of the same sitter, taken by another friend, and I venture to ask whether such a print does not most emphatically confirm my views? [Yes.—Ed.]

The second negative is on an isochromatic plate, and the print on P. O. P.; but, even apart from these advantages, which the professional does not seem to find it wise to avail himself of, I think there is

ample proof that his print is far from what it ought to be, and, as such, it is a proof of my contention that want of care, want of good work, want of the use of opportunities, and a general want of giving full value to the public for their money, is more at the root of bad business than any of the other reasons that are usually put forward.

The failure is from within, and not from without.

I wish particularly to be understood not to point at any special house, but only to avail myself of an opportunity of pointing a moral which photographers generally may take to themselves as they may think fit or consider necessary.

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### TESTING SODIUM SULPHITE.

By H. BROCKLEHURST.

THE important part played by sodium sulphite in the constitution of most developing solutions renders it necessary that a suitable sample should always be employed. Its function is to preserve the reducing agent, such as pyro, by preventing its oxidation, and to that end it is best employed either in a neutral state or acidified. In the latter event, however, the acid bisulphite is conveniently used.

Dealing with the ordinary sulphite, however, we find that two of its commonest impurities are the carbonate and sulphate of soda. The presence of the former, being an alkali, is inimical to the conservation of the pyro; and the sulphate, while in some respects inert, is undesirable for a similar reason. The presence of carbonate of soda, or the caustic salt, which is also occasionally met with in small quantities, can be ascertained by the aid of phthaleine or phenol, which turns a deep red in the presence of an alkali. To test for sulphate, add chloride of barium to a solution of the sulphate. An insoluble precipitate, barium sulphate, denotes the presence of a sulphate in the sodium sulphite.

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### WARM TONES WITH BROMIDE PAPER.

By H. COLEBROOK.

THE variation from the cold tones of platinum and bromide papers seems to meet with increased approval as time goes on; and, if one may accept the sum total of the criticisms upon the exhibitions of 1893, there still remains plenty of room for work in this direction. It must be remembered, however, that it is quite possible to have too much of a good thing. As soon as the platinotype process began to find favour it was put to all manner of unsuitable uses, simply because many imagined it to be 'the rage;' and rough surfaced papers meet with a like ill treatment, as recent exhibitions clearly show. Many other examples might be quoted of a general want of appreciation of 'the right thing in the right place,' a fact based upon the worker failing to see the true significance of the means at his command. The infinite number of printing processes with their wide range of tones place an almost unlimited power in the hands of those who use their intelligence consistently with the common rules of art; and to

do this one needs to have a practical knowledge of all the means at one's command, *not* a knowledge of one or two applied constantly and indiscriminately. A warm snow scene, or a cold volcanic effect may be interesting as novelties, but such incongruous and ridiculous attempts force one to the conclusion that the rules of art are not more lacking than the laws of common sense. Be this as it may, the writer's aim is not so much to give a disquisition upon misapplied toning processes, as to offer a few remarks for the simplification of one that is useful only when properly applied.

Doubtless many users of bromide paper have discovered that the developers, hydroquinone, metol, eikonogen, etc., in place of the old ferrous oxalate, have a tendency upon occasion to produce a slight veil or fog in the high lights, this being especially noticeable with some brands of paper. To produce merely passable results with the following toning process, it is essential that the high lights be perfectly clear, and to this end the ferrous oxalate developer is recommended in preference to the others. The exposure should always be full, but the development must be stopped in accordance with the subsequent tone required. To make this clearer it must be understood that the toning action is an intensifying one, and therefore, as the brightest red tone obtainable is the maximum amount of intensification, to produce the required depth in the finished print it is necessary to somewhat under develop. On the other hand, when it is required merely to change the natural grey into a slightly warmer colour, the print should be developed to within a shade of the usual depth. After development the prints are fixed and washed in the usual way, extra care being taken to remove all hypo, as the presence of the latter is liable to cause discoloration. When the prints are sufficiently washed they may be toned at once, or dried and toned at another time at pleasure. The following toning bath, given by Mr. Weir Brown in last year's ALMANAC, may be used as it stands if extra warm, or red tones are required, these tones being reached in from one to two minutes:—

|                               |            |
|-------------------------------|------------|
| Water .....                   | 8 ounces.  |
| Acetic acid .....             | 90 minims. |
| Ferridcyanide potassium ..... | 4 grammes. |
| Nitrate of uranium.....       | 4 grammes. |

Should, however, a medium warm brown be required, it will be obtained in a more satisfactory way by doubling the quantity of water, three times the quantity being used when a slight change of tone only is wanted. The addition of water serves more than one purpose. The toning bath in its strongest form works more rapidly, intensifies more, and gives greater contrasts of light and shade with higher tones. By dilution the bath is brought more under control, intensifies less, gives quieter tones, and less contrast of light and shade. Bearing these points in mind, the operator may obtain any tone he wishes, and at the same time may have a good deal of control over the subsequent depth of his print. One other variation in the tones may be made by using an old bath that has already done service, or one that has been kept for a week or so without being used. The tones given by such a bath are less pronounced and brilliant, but, nevertheless, are pleasing and serviceable at times.

Previous to toning, do not sponge or rub the surface of the print, as any abrasion may cause patchiness of tone. During toning keep the

print carefully covered by the solution, as neglect of this precaution may also cause inequality of tone. Remove the print from the bath as soon as the requisite tone is reached, very little alteration taking place in the final washing and drying. The best method of washing is to place the print under the tap in a clean dish which should be alternately filled and emptied until the lights of the picture are free from yellow stain. This operation may take from five to fifteen minutes. Do not allow the stream of water to run continuously upon one portion of the print, but turn the dish round every now and again, so that every part of it comes occasionally directly under the tap. Do not rub the surface and do not leave the print to wash or soak. As soon as the lights are clear, remove and hang up to dry *at once*, as by carrying the washing farther than necessary the tone will begin to leave the surface, and will do so unequally.

Should there be a slight veil or fog in the lights of the print before toning, this fog will be found, after toning, to have changed to a brownish tint; or, should the lights of the print, after drying, be yellow through insufficient washing, then three courses are open to the operator.

First, to immerse the print in a weak solution of hydrochloric acid (one drachm to the pint of water), which will, in nine cases out of ten, have the desired effect, though as to the wisdom of the procedure the writer has not sufficient knowledge of chemistry to determine. Prints, however, treated in this way, have shown no signs of deterioration after a considerable period. Second, to kill the effect of the degraded whites by placing over the print a card mount of cream or drab tint, or an old gold plush mount, avoiding anything white in frame or mount. Third (and this perhaps is the wisest), to discard the print altogether. The care in producing clear whites cannot be too greatly emphasised, except, of course, when the reverse is chosen for the sake of effect.

These, then, are the most important points in producing warm-toned bromide prints with uranium. With respect to the beauty of uranium-toned prints, there can be little diversity of opinion, except when the process be misapplied—which is too often the case. To produce warm tones indiscriminately is sheer foolishness, and this remark bears also upon *degree* of tone. By carefully selecting the degree of warmth to suit a print that is the better for a warm tone, a picture may be made; but to seek after warm tones solely, and only because they are 'the thing,' results in raising the hair of the art critic, and causing mutual recrimination.

Up to the present, very little light has been thrown upon the question of permanence of uranium-toned bromide prints, though, as the results upon untoned bromide paper are undeniably not permanent, this does not seem of vital importance. As far as can be judged from uranium intensification of negatives, the above toning process would tend to render the print more permanent than in its unaltered state.

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## A PLEA FOR TECHNICAL PHOTO-MICROGRAPHY.

By A. J. BANKS.

IN these days of keen competition in professional practice, as well as in ordinary business transactions, he is indeed fortunate who can find sufficient leisure time in which to pursue any branch of scientific recreation. Nevertheless, there are many who are in this enviable position; but, un-

fortunately, the results of their labours, as far as the photographic element is concerned, are to be found running mainly in one direction, namely, in the popular vein of pictorial effect. There are few workers, comparatively speaking, who turn their photographic skill to practical account in the scientific world in which the microscope holds an exalted position. This is the more deplorable because the conditions under which many scientific men are compelled to work render direct photographic aid almost impracticable.

It is to those students of microscopy who have acquired some little skill in ordinary photographic manipulation, and who are fortunate enough to be able to carry on experimental work, and follow up their own inclinations, that these few remarks are offered, in the hope that, if they are not sufficiently powerful to draw many into the extremely fascinating practice of technical photo-micrography, they may, nevertheless, serve as a reminder to those who may have contemplated such a course.

As a general rule, professional photographers fail to secure satisfactory results of microscope preparations owing to their want of perception of the salient features of the object under treatment. And it is mainly for this reason that the aid of amateur photographers, skilled in the preparation of microscopic objects, would be of great value to many scientific men.

The photo-micrographist's field of work is almost inexhaustible, but men who are specialists, and who will follow a systematic plan of work, either privately or in conjunction with professional practitioners, are greatly needed. There are many skilled photographers connected with manufacturing industries in which photo-micrographic help would be highly appreciated. Accurate photographs of the starches, of the very numerous commercial fibres, the reproduction of the characteristic forms of pure crystals under different conditions of crystallisation, the photographic examination of blood from various sources, the appearance of seeds during successive stages of the germinating process, the reproduction of the natural ferments employed in the various fermentation industries, along with those which exercise a baneful effect, and induce disagreeable results. All these, and, indeed, other branches too numerous to mention, would greatly benefit by a more earnest attempt at specialisation by the leisured photo-micrographist.

The writer is aware that there are a great many amateurs who frequently 'dabble in photo-micrography,' but the majority are, apparently, content to treat the subject as a mere pastime, and there can be no possible probable manner of doubt as to its being, not only an agreeable, but also a highly instructive pastime. Nevertheless, it must surely be the experience of all that, the greater the practical value, and the broader the application of one's results, no matter whether they be arrived at in one's daily business or in the pursuit of one's hobby, the keener and more fascinating becomes its practice. And, whilst by no means depreciating the value of the labour of the photo-micrographist who follows the purely scientific lines of his hobby, one cannot help thinking it a pity that so much excellent talent should remain practically latent which, if directed into technical paths, would assuredly be productive of much good to many of our professions and industries.

'How few  
Know their own good, or knowing it, pursue.'

## A CHRISTMAS APPEAL.

By H. SNOWDEN WARD.

LAST year, in the pages of the BRITISH JOURNAL PHOTOGRAPHIC ALMANAC, I made an appeal on behalf of the Benevolent Association, and, though I have no wish to harp on one string, you must please pardon a brief allusion to the same subject this year. This winter the Benevolent will attain its majority, for it has been working for twenty-one years, through good report and evil report (a good share of the latter), in the effort to alleviate the worst of the poverty that must come to some of the members of every profession. Many have run down the Association, few have tried to work it up. Those who have given their time and their money to its services have been publicly reviled as blackguards and thieves, but they have plodded on. At the end of twenty-one years the funds are supported by not many more than twenty-one professional photographers (assistants included). Can there be a more pitiable monument to the lack of public spirit amongst the profession?

At the end of twenty-one years can we not make a fresh start? Let bygones be bygones, and let us hope and believe that the cause of charity will no longer be neglected by our professionals and their assistants. I am a believer in the professional photographer; I have known him personally for nine years, in all parts of the British Isles, as a warm-hearted, generous man, and I do not believe that he will allow his profession to rest under the stigma of having its only charity supported almost entirely by the despised amateur, and by the photo-material makers, who have so generously stood by it.

The work of the Benevolent is, as it always has been, open to the fullest scrutiny by any one who is genuinely interested in the work, and I shall be glad to send report and balance-sheet for the current year to any one who makes application.

## ON MOUNTING OPALINES.

By E. E. FEARN.

As the mounting of opalines is rather difficult to the average amateur, I venture to think that the following will prove of use to some:—

Have in a clean dish or tray some melted gelatine (about  $\frac{3}{4}$  oz. water to a sheet of gelatine), and having cleaned the opaline glass, place one end of it in the gelatine, face upwards, and gradually lower it until the glass is covered, on one side only. Then take the picture to be mounted (which has been previously placed in the gelatine), and bring the picture and glass in contact, avoiding air bubbles; then squeegee the print to the glass, allowing the superfluous gelatine to return to the tray; set aside to dry, and when ready, place on the back, or this may be done whilst wet, and one drying is then sufficient.

Should the print to be mounted be on a gelatine printing-out paper, placing it in the gelatine will dissolve the picture, so another method has to be adopted. One way I have tried with success is to coat the glass as above, and then bring the picture and glass in contact under water, and squeegee as usual.

## SIMPLE ADJUSTABLE VIGNETTES.

By G. G. MITCHELL.

I HAVE lately added a useful form of vignette to my stock of printing appliances, and find it gives very satisfactory results, with the least possible trouble in preparation, after it has once been made up. I can recommend it to the notice of all who have vignetting work to do. It has also this good feature about it, that it provides a use for some of the waste plates which accumulate upon our hands much more rapidly than we care about, and which puzzle most of us to know what to do with.

To make an adjustable vignette for, say—cabinets, I cut a piece of



cardboard about four-and-a-quarter by nine inches, and make the usual pear-shaped opening in it of such a size as will permit of several diminishing sized openings in *papier mineral* being overlaid upon it, and pasted down upon each other, so that a soft gradation may be secured in the print. This done, I take a couple of waste plates, which have been cleaned, and enclose the mask between them, binding the sides in the manner of a lantern slide. When the binding is dry, the masks which projects at both ends beyond the glass, can be pulled a little either way, and being held sufficiently tight will remain in any position desired to suit the requirements of the negative. The glasses prevent the paper mask from being damaged or soiled by use, and lie nicely within the front bevel of the printing frame, without any further care as to adjustment till the required number of prints are made.

With ordinary care the vignette will last any time, and is even none

the worse should a glass be accidentally cracked, so long as the binding holds.

The idea is quite simple, but a diagram may make the matter plain at a glance. Other forms than that described may be readily suggested. If time can be spared for it, a piece of tissue put over all will further enhance the effect.

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## HOW TO TAKE AN INSTANTANEOUS PHOTOGRAPH.

By EDGAR PICKARD.

THIS is rather a comprehensive subject, far too much so to be fully discussed here, but what I wish to make a few remarks upon would be better entitled as 'How to decide what is to be taken, and from what position.' In order to obtain a successful picture, this is the all-important point, especially in instantaneous work.

There is a great temptation to take a shot, without carefully considering whether the conditions are favourable or not, in which case it is almost certain that some of the conditions might have been improved by a little forethought. It stands to reason that six photographs carefully taken are more interesting afterwards than sixty taken haphazard.

Now, in taking ordinary snap-shots, such as would be taken with a hand camera, with an exposure of, say, one-fifteenth up to one-eightieth of a second, the same points must be observed as with much shorter exposures, such as one one-hundredth of a second; but in the former case there is more latitude in development on account of the greater effect upon the sensitive film. However, if I confine my remarks to extremely short exposures, they will, for the most part, apply in the other case. These remarks are intended for beginners only, so that any one other than a beginner will wisely stop here.

To mention some of the conditions which are necessary in order to get the best results, we must have the most rapid plate, a lens working with a large focal aperture, a brilliant light, an efficient shutter, that will give the required exposure, and, when all is said and done, a willingness to take the subject at a distance, when, on account of rapid movement, it is impossible to satisfactorily take it close to.

Plates can now be obtained, of various brands, that make it possible to obtain sufficient exposure, under favourable circumstances, in the one five-hundredth part of a second, and in, perhaps, even the one one-thousandth part of a second. Nevertheless, it is generally better to give as long as the movement of the subject will allow—that is to say, just so long that the amount of blur on the plate is not sufficient to show. This can be calculated mathematically, but perhaps in practice a little judgment gained by experience is all sufficient, always bearing in mind that the nearer the subject the more difficult to take, on account of its larger size upon the plate and its proportionately greater blur thereon.

The direction of movement of the subject makes all the difference. If it is travelling broadside to the camera there is the maximum of movement; if at an angle of forty-five degrees to this, just twice the exposure may be given, while the same amount of movement only will show upon the plate. If the object is moving directly towards the camera, a still longer exposure may be given.

It is not only necessary to take into account the general forward movement of the subject—for instance, the top spokes of a wheel move more rapidly than the bottom ones, the feet of a horse move much more rapidly than the rest of the body, the legs and arms of a man likewise; and it is, therefore, the movement of these that must be taken into consideration in estimating the length of exposure admissible. A good example of this will be seen by referring to the photographs of cricketers which are reproduced in the advertisements of the Thornton-Pickard Manufacturing Company. The bat is moving at the highest rate of speed, and a certain amount of blur may be detected. The balls also show a slight elongation, which is due to their motion. To get these perfectly sharp, it would probably have been necessary to reduce the exposure by one-half, which would undoubtedly have resulted in an under-exposed picture. The fact of the bat being darker, and less prominent than the figure, made it possible to ignore a little indistinctness, and get the necessary exposure. Again, if the movement of the bat had been directly across the picture, or if the background of the bat had been white, the resulting blur would have been sufficient to spoil the picture.

It is in little matters of this kind where a little forethought is necessary, and by a slight change in the position of the camera, by giving a little longer exposure, or being content to take a subject at a distance if circumstances will not allow of it being taken close to, that a good picture may be obtained.

The moral of these remarks is this: don't attempt the impossible; don't take a telegraph-post out of a window of a corridor-train, nor horses galloping broadside on, unless they are at a respectful distance; but select a subject in an open place, where there is plenty of light, use the largest stop your lens will work at, and the most rapid plates that you can buy; then, if your subject is light in colour and you can take it on a mid-summer day, so much the better.

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## EVERY MAN HIS OWN PHOTOGRAPHER.

By W. HARDING WARNER.

THIS may appear at first sight to be a ruinous title to all engaged in our fascinating pursuit, looking at the matter in a commercial light; but it is not so, for it will be found that the more you work your camera and lenses, the richer you will become. To explain: every human being on this globe of ours has a head, a mind, two eyes, and a mouth. Let the eyes be to all as a pair of lenses; your mind as a camera, capable of reflection, and by such means able to take in and be filled with the love of doing good and helping your brethren in photography; let both eyes and mouth be used in giving expression to others of the happiness of your disposition and the desire to make all happy around you—thus, you will always make successful pictures, and, whether portrait or landscape be your *forte*, you will set others thinking why you should always seem to be contented with your lot, and they will strive to imitate you. Thus, from being a thin, discontented man, you will get stout and jolly.

## ISOCHROMATIC PHOTOGRAPHY AND THE USE OF THE SCREEN.

By B. J. EDWARDS.

Now that the use of isochromatic plates is becoming so general, a few hints on the use (and abuse) of the screen may not be out of place. In the early days of isochromatic photography, it was the practice of most writers to insist on the use of the screen as absolutely necessary, in order to obtain any good result. This mistaken idea has been more recently repeated by more than one writer, who might easily have discovered his error by actual experiment. Even at the present time the question is often asked, 'Will they work without a screen?' It does not seem to be generally understood that the real and only use of the yellow screen is to cut off, when desirable, a portion of the blue and violet rays, and thus prevent their too pronounced action on the plate. In ordinary landscape work it only occasionally happens that it is advisable to sacrifice these or any of the rays of light which help to make the picture; a view which is suitable for an ordinary, is equally suitable for an isochromatic plate, the only difference being that, while it is equally sensitive to all the rays which act on the ordinary plate, it is, at the same time, more sensitive to those colours which, although visually the most brilliant, have the least effect upon ordinary gelatino-bromide; in other words, the colour-sensitive plate sees colours which are nearly invisible to the ordinary plate, hence it happens that, under certain conditions of light—as, for instance, when the yellow rays predominate, or when photographing certain colours—a colour-corrected plate will prove much more rapid than an ordinary plate of the same normal speed in white light. Taking an ordinary and an isochromatic plate, which are known to be of equal sensitiveness, in the middle of the day, it will be found that, towards evening, as the sun gets lower, and the light more yellow, the relative sensitiveness of the isochromatic plate is much greater, so that it is possible to obtain good negatives some time after it is too late in the evening to use ordinary plates. In such cases, a screen would be quite superfluous, and a positive disadvantage. The colour of the light acts as the most perfect screen imaginable, and the effect of another screen in addition would only be to lengthen the exposure, and thus destroy the advantage of the colour-sensitive plate. It must not, however, be supposed that the use of the screen is to be entirely condemned; on the contrary, properly used, it is a most important adjunct, and places in the hands of the photographer a power which enables him to produce results unattainable by any other means.

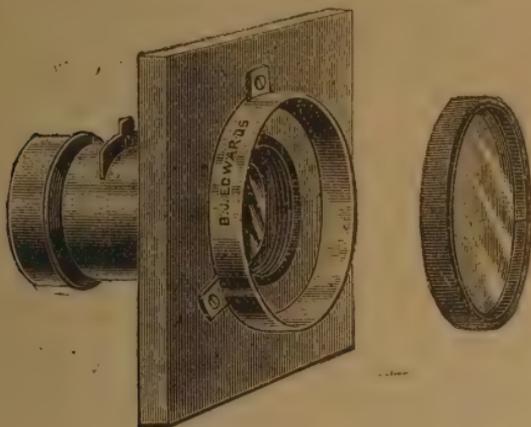
In copying oil paintings, the screen is absolutely indispensable; also in landscape work it is sometimes of the greatest value—cloud effects, and the various tints in autumn foliage are rendered better with the screen; also owing to the peculiar effect of the screen in cutting off mist or haze in the atmosphere, the extreme distance which, in misty weather, would be quite lost, is sufficiently clearly rendered, together with corresponding brightness in the other parts of the picture.

In a dull winter light the value of the screen can hardly be over-estimated, especially for architectural subjects; a view of a building which, taken in a poor light in the ordinary way would be a flat and un-

interesting object, comes out with the screen bright and clear, with all the details in sharp relief, almost as if taken in sunshine. In such cases, the screen is a boon to professional photographers, whose work has frequently to be done under very disadvantageous circumstances.

With regard to what constitutes a suitable screen, there seems to be much misconception. Many seem to imagine that any ordinary piece of yellow glass will answer the purpose; it has also frequently been stated that it is only necessary to coat a piece of ordinary glass with some yellow varnish and place it behind or before the lens, but very little experience will show that either of these are worse than useless, as, owing to the want of perfect flatness of the two surfaces, the definition of the lens is destroyed, and the image distorted.

If a glass screen be used, it is absolutely essential that both surfaces be optically worked, *i.e.*, ground and polished perfectly plane, so as not to interfere with the curves of the lens; it is obvious that if either side be



ever so slightly concave or convex, the focus will be lengthened or shortened, so that the image will be no longer in focus. With a perfect screen, there will not be the slightest appreciable difference, either in the definition or in the length of focus. The screen is best made of very thin glass, in the form of a circular disc, mounted in a velvet rim, so that it is very light, and, if accidentally dropped, it will not break; the velvet rim may be arranged to fit either into the hood on the front of the lens, or on the back of the lens mount within the camera, it answers equally well in either position, but for some reasons the latter is to be preferred. A convenient method of holding the screen in this position is shown in the woodcut.

Another, and cheaper form of screen which answers the purpose admirably, and which is much used, consists of a thin film of coloured medium, which is placed in the diaphragm slot of the lens. The best material for this purpose is a very thin plate of perfectly clear gelatine, stained with a permanent dye of the proper colour; in this way a very perfect screen can be made, as the thin film does not interfere and spoil the definition. A convenient method of holding the yellow film in posi-

tion was designed by the writer some years ago, and has been since extensively adopted. It consists of a thin plate of metal folded at the bottom, and cut to the required shape, so as to form a double stop, between the leaves of which the tinted film is placed; the aperture is cut through both leaves of the size required, or the opening may be made of a larger size, and reduced by inserting, with the film, a small piece of thin black paper, perforated with a circular opening to correspond with the size of the stop it is desired to use; the total thickness of the diaphragm screen must not be greater than will go easily into the slot of the lens-mount. Whether these or glass screens be used, it is well to have two or three of different depths of tint for various kinds of work. For oil paintings, a moderately deep tint is preferable, while, for ordinary landscape work, a pale lemon yellow is most suitable; if a deeper screen were used, the distance would, in many cases, appear too sharply defined, and the atmospheric effect, which is so charming in a good landscape, would be lost. For flower subjects, the screen is rarely needed. The accompanying illustration of a group of dahlias is taken in ordinary daylight without a screen; both negatives are exposed for the same time and under the same conditions of light. This simple test, which may be easily verified by any one, shows, in a striking manner, the precise difference in colour-sensitiveness between the two kinds of plates employed. The colour of the flowers—a clear brilliant yellow—is exactly the tint which an ordinary plate fails to render satisfactorily; and although, with many subjects, the difference would not be so strongly marked, it must be remembered that, where the yellow rays predominate, as they so frequently do in nature, just to the same extent will the ordinary photograph be untruthful. For this reason it is found that portraits in the studio, taken on isochromatic plates, require less retouching than those taken on ordinary plates. In portraiture it is found advisable to dispense with the screen, and adopt the plan of tinting the light by diffusing it through pale yellow muslin or tissue paper; in this way the desired result is obtained without materially increasing the exposure. The tinting may be modified to any extent by the admixture of white light from nearly the same direction. When artificial light is used, no tinting is needed, as, even with the electric arc lamp, the colour of the light is of quite a yellow tint as compared with daylight, therefore, in artificial light, the colour-sensitive plate works with less exposure than others, because the whole of the rays are utilised.

For enlarged negatives of microscopic objects, isochromatic plates are found of immense service, and are now used almost exclusively in this work. Not only is the time of exposure much shortened, and better detail secured, but it is also found that good ordinary microscopic objectives, which are not specially corrected for photography, and which, with ordinary plates, give blurred images, will, when used at their visual focus with colour-sensitive plates, give perfectly sharp definition in the negative.

It is interesting to note that, although the question of photography in natural colours is quite distinct from the correct rendering of the value of colours in monochrome, colour-sensitised plates play an important part in all the recent most successful attempts to solve the problem. In Mr. Ives' beautiful process, three negatives are taken on an isochromatic plate through different screens, each arranged to transmit or cut off

certain rays. From these negatives are made transparencies, which are each separately illuminated by suitable coloured light, or by its own portion of the spectrum. The three pictures being projected on a screen and superimposed, or optically combined by ingeniously contrived reflecting mirrors, produce a brilliant picture in all the colours of nature. In the process of printing in natural colours, which has recently been so successfully worked out by M. Weissenberger, of St. Petersburg, the three negatives which are employed are also made on colour-sensitive plates in a similar way; while the latest sensational results in natural colour photography by the Lippmann process have been produced, each complete picture, on a single plate coated with a special gelatine emulsion, isochromatised, or rendered colour-sensitive by the now well-known eosine method.

It would also seem that, apart from the use of colour-sensitive plates for special purposes, their value is becoming more universally recognised for every-day work. Formerly it used to be a matter of regret that colours in photography could only be rendered untruthfully. This cause of reproach no longer exists; there is now no reason why photographs should be taken which fail to give, even approximately, the proper value to the most brilliant colours in nature.



## A PLEA FOR A HIGHER CRITICISM.

By JOHN A. HODGES.

THAT photography, as a pictorial art, has made very great progress during the last decade, few, who have given serious consideration to the matter, will venture to deny, and if proof be demanded, the walls of any photographic exhibition, will afford it. In almost every public collection of photographs one or two pictures are to be found which stand out in front of all the others, and which are as much entitled to be considered works of art in monochrome as any production of the brush or pencil. For the present position of photographic art we are more indebted to P. H. Emerson than to any other exponent of photography past or present. His teachings and works have simply revolutionised the art. In saying this I am fully aware, and have not forgotten, that the treatment of the subject by the suppression of the focal plane did not originate with him, but it was not until his *Naturalistic Photography* fell like a thunderbolt at the feet of photographers that any serious consideration was given to the principles therein expressed. Received at first with sneers and jeers, it is not going too far to say that the present-day work of all the most capable men bears striking testimony to the influence of his teaching. But it was not with the intention of writing a panegyric on the author of the book just referred to that I commenced to pen this article, but rather to call attention to a matter which seems to me to deserve more attention than it has hitherto received, namely, the value of press criticism. No one can be more fully alive to the delicate nature of the ground upon which I am treading than I am myself, but I feel that its importance fully justifies me in calling attention to it here.

Every practical photographer must acknowledge his indebtedness to the photographic journals for the guidance which he receives in the technical and manipulative portion of his work, and to a certain, but more limited extent, in the artistic, but surely the dignity of photographic art at the present time deserves a more capable and masterly criticism than is commonly bestowed upon it. To those who are hungry to learn I have no hesitation in saying that photographic press criticism is, in the majority of cases, entirely valueless, simply because it is penned by those who, though their knowledge of the technical and scientific aspects of photography may be erudite, are quite incapable of assuming the far different rôle of the art critic.

To put my ideas into a practical form, I would suggest, with all respect, to our friends who sit in editorial chairs, that the services of a capable art critic, preferably a painter, though not necessarily a photographer, should be engaged to criticise, from a purely artistic standpoint, the pictures, deserving and undeserving, collected at the larger exhibitions of photographs which are now annually held. Let me, however, be not misunderstood; far be it from my intention to underrate the value of editorial criticism on all matters pertaining to the *technique* of photography, and I should be one of the last to suggest that such criticism should be withheld; each is necessary for the well-being and advancement of our art-science. The truth is that photography has now three well-defined and distinct aspects, the scientific, the technical, and the artistic. The interests of the two former are well safeguarded; it is on behalf of the latter that this appeal is made.

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### DRYING CELLULOID FILMS AND GELATINE PRINTS.

By A. E. DEAN.

MANY of those who employ celluloid films dry them by suspending them with an American clip from a line of string conveniently hung for the purpose, and on the whole the plan is as good as any. I have, however, noticed that where the film has an inherent tendency to curl to an abnormal degree when dry, dessication by suspension favours that property so much that the film often becomes uncomfortably curly, thus entailing much trouble in flattening it out in the printing frame, &c.

By drying the films in the following way, however, their tendency to curliness will be partly neutralised by intimate contact with an inflexible support, and flatness, always a great desideratum in films, will be obtained, if not in perfection, at least virtually, so far as the handling of the film for printing purposes is concerned. After the sensitive film has been developed, fixed, and washed, place it while still wet (plain side) in contact with a clean sheet of glass its own size, or larger, and then rear on end gelatine side to the wall, at the usual angle, or place in the drying rack in the same manner as a glass plate, to dry spontaneously. The film will not peel from the temporary support until it is quite dry, so that danger to the gelatine surface need not be apprehended. I use the backs of glass negatives, &c., for the purpose. I may mention that I dry gelatine prints in the same way, and find it highly convenient for preventing curling.

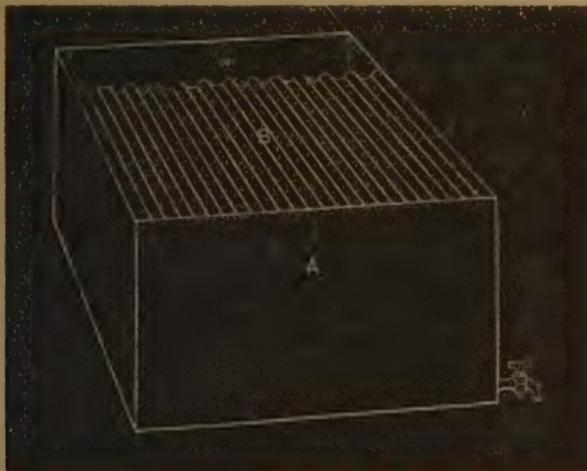
## WASHING ALBUMEN PRINTS.

By PROFESSOR STEBBING (Paris).

I TAKE for my subject the washing of albumenised proofs, hoping what I have to suggest will be of service to some of my colleagues living in a place where water is scarce. I must begin by observing that proofs are sometimes not well washed, even when abundance of water is used. On the other hand, all hyposulphite of soda can be eliminated from proofs by very little water if used with care and economy.

The transfer of proofs from tray to tray is very good, as the prints are separated one from the other; but the manipulations are long and fatiguing, and the operator is like to take up two, three, or more at a time, and in consequence, hyposulphite of soda is thus left behind.

The system employed in my establishment on the Continent requires that the prints be simply rinsed on being taken out of the fixing tray, and an immersion of a night in a very simple apparatus, which I will endeavour to explain as clearly as possible.



The apparatus consists of a large tray, say, one yard in length and two feet in breadth, and about ten inches deep. This tray is divided into two parts by a series of glass rods lying across it. These glass rods are supported by two bands of crimped zinc, about half an inch in width, each of which is soldered on the inner side of the tray, about two inches from the top. A plug or tap is placed at the bottom to draw the water off. A Turkish towel is now laid over the ends of the tray, and now lies upon the glass rods. (The width of the tray must be calculated according to the width of the towel.) The tray is now filled with water, and the rinsed proofs are laid upon the towel, image uppermost. The following morning the first thing to be done is to draw off the water by the tap until it has gone down to the towel. This water will be found saturated with hyposulphite of soda, whereas the surface water will be found to be free.

A sort of dialysis has freed the proofs of the salt contained in its fibres, and by its specific gravity has gone down to the bottom of the tray, leaving the proofs and the upper part of the water free from hyposulphite of soda. When the proofs are all taken off the towel, the tray is filled up to the top with fresh water, taking care not to disturb the water under the towel.

If many proofs are to be washed, two or more towels containing proofs may be laid one upon the other.

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## A NEGLECTED EXPOSURE TABLE.

By EDGAR CLIFTON.

EXPOSURE tables, like most other pieces of photographic apparatus require a certain amount of judgment to be exercised in their use, for while undeniably useful to the tyro, any blind reliance upon them as exact guides will only result in disappointment. The classification of subjects is necessarily very rough and there is room for very serious error in timing the exposure for a subject which may come anywhere between an 'open landscape,' and a 'landscape with heavy foliage in the foreground.' In spite, however, of such tables being only partially founded upon a scientific basis, they and their cousins of the slide rule family, yclept 'exposure meters,' &c., have saved many a plate to the photographer who did not possess the experience and knowledge which is here boiled down into a very 'bovril' of photographic information. Long experience in developing plates exposed in every part of the globe has convinced me of the necessity for a table which should give the approximate relative exposures for different localities. The task of compiling such, seemed hopeless to a stay-at-home worker like myself, although I was able form some rough ideas on the subject by studying the failures of those of my pupils who had obeyed my injunction to keep a careful record of their exposures. From these I gathered such information as would, for example, justify my informing any one going to the West Indies, that he would have to reduce his exposure by about 20 per cent. as compared with what would be required on a fine day in England (not reckoning the work to be done in the vicinity of large towns, where smoke is an important factor). I was therefore delighted to find in the issue of this ALMANAC for 1881 such a table which, although not complete contains so much valuable information that I trust the Editor will permit me to quote almost the entire article accompanying it. The title is 'The Actinic Quality of Light in Different Countries,' and it is written by that skilful and scientific photographer the late Colonel Stuart Wortley. In it he says:—

'I took the opportunity during my voyage into distant lands to make some careful tests of the different quality of the light in various places. These tests were made with two different kinds of actinometers, as well as by a special set of dry films made for the purpose, in order that I might compare the actual working of a plate with the scientific test of actinometry.

'I did not find that the light was so greatly superior in foreign countries as is generally supposed; and, putting the light of a very fine English

day as 750, I found to be the power of light in various places as follows:—

|                                            |      |
|--------------------------------------------|------|
| At sea, 28 S. Pacific Ocean .....          | 1000 |
| „ 42 S. Atlantic Ocean .....               | 970  |
| Tahiti, in early morning .....             | 950  |
| At sea, 16 S. Pacific Ocean .....          | 950  |
| „ 21 N. ....                               | 900  |
| In San Francisco harbour .....             | 870  |
| On Rocky Mountians .....                   | 850  |
| Summit of Sierra Nevada .....              | 820  |
| Virginia, Southern States of America ..... | 800  |
| Sidney, Australia .....                    | 800  |
| Melbourne, „ .....                         | 800  |
| Niagara Falls.....                         | 780  |
| England .....                              | 750  |

‘I will not trouble you with the light that was worse than a good English day beyond saying that the light at the Equator was comparatively poor in quality, though apparently very brilliant.

‘I have photographed a good deal in India, and consider the light there to be about equal with that in Australia and somewhat better than that of Egypt, while when photographing at Naples I considered at the time that the light was a good deal better than even our best English light.’

If the foregoing paragraphs emanated from a less trustworthy source they would perhaps be hardly worth reproducing but the fact that the writer was not only a scientist but a photographer of high artistic ability, gives them a claim on our serious consideration. Unfortunately the list is far from being complete, but if such of our readers who work or have worked in England as well as in foreign countries would each contribute their particular experiences to the Editor it would probably result in a table which might be an annual feature of this ALMANAC and which would certainly not be the least useful in it.

My excuse for digging up such an old matter is to be found in the vastly increased number of people who now travel with a camera, as for every one to whom Colonel Stuart Wortley's table would have been useful to in 1881 there are at least a dozen in 1894.

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### MY COPYING BOARD.

By J. T. HACKETT.

For a long time I worked with a makeshift contrivance, which I need not describe here, but will proceed with a description of the one I now use and have used for several months. My copying-board measures eight feet long and is eleven inches wide. It is made of flooring boards in the following simple and cheap manner. Two or four red deal planed flooring boards, about six and a half inches wide and one inch thick, or one and a half inches thick if preferred, are cut to the required length. Mine were cut eight feet long, two only being used. These were fastened together, side by side, by means of four or six pieces of the same kind of

board, in such a manner that an open slit or groove about one inch wide was formed in the centre throughout its entire length. Nails can be used for fastening these cross pieces to the long pieces; but stout screws are much better and stronger. This groove is for a piece of wood to slide in that is fastened to the bottom of the board, upon which the picture to be copied is fastened. By this means the picture is always kept in a central and parallel position to the lens and camera, and its distance from the lens easily and quickly adjusted; and, when this has been settled, it can easily be fixed temporarily by the aid of a screw or otherwise.

This fixing is not necessary if care is taken not to shift it while copying, but it is safer to do so. The copying camera is fixed upon the copying board at one end by the aid of thumbscrews, or otherwise. After the copying board has been fixed by thumb or other screws to the tops of two camera stands, both fixed to the same height, or other suitable supports, a shelf can be used for one end to rest upon, instead of a stand; but the camera end is best fixed to a heavy studio stand for obvious reasons. Into the end nearest the lens of the piece of wood that slides in the groove of the copying board to which the support holding the picture to be copied has been fixed is screwed a screw-eye, and to the latter a piece of string about eight feet long is tied, the other end of which is taken along the groove and passed under the camera. This string is used for pulling the picture into focus with, which is done in the following manner:—

We will suppose that *the camera and lens have been set to enlarge a carte-de-visite to a cabinet size.* For distance, see the table at the end of this and similar Annuals, as it varies with the focal length of the lens and the size the enlargement or reduction is to be. Now push the picture to be copied well out of focus, and then put the head under the focussing cloth, in the usual manner, for the purpose of seeing the image upon the ground glass of the camera; then pull the string carefully and slowly until the image of the picture to be copied is quite sharp upon the ground glass. Now screw or clamp the support of the picture in position, insert the working stop, &c., and then expose as usual.

If the same lens and camera is always used for copying, enlarging, and reducing, it will be a good plan to make *a series of marks* upon the edges of the copying board nearest the groove showing the exact spots at which the picture to be copied must be fixed in order to get a negative twice as large, half the size, &c., of the original picture, as the case may be; as then, if the sizes are marked at each mark, it will be a great help when using the same camera, lens, and copying board again, and will save a great deal of time, because the proper size will be found upon the copying board as previously indicated, and the picture will be found in correct focus at the same time. The baseboard of the camera must also be marked at the proper spots in a similar manner to the copying board, and then all the usual sizes can be undertaken quickly and well, and any odd sizes easily obtained by proceeding as indicated in the directions given for using the foregoing apparatus. I always use a 10×8 camera and a rapid rectilinear lens for copying, enlarging, and reducing, and by the aid of the above arrangement can reduce a cabinet picture to about one inch in length, if necessary. I need hardly add that, in reducing, the picture to be copied is placed further off the lens; and, in enlarging,

the reverse; and, for copying the same size, the camera is expanded to the same extent, as the picture is from the lens, so, if the latter is eight inches from the lens diaphragm slot, the sensitive plate must be eight inches from the diaphragm slot also.

The bellows of the camera should be capable of expanding to about three feet, but two feet will be quite long enough to enlarge a cabinet picture to 10 × 8 inches when using a lens of about ten to twelve inches equivalent focus.

By the aid of a suitable negative carrier, instead of that used to fasten the picture or print while being copied, transparencies for the lantern, &c., can be as easily made as negatives from prints can. Any one who requires details on lantern-slide making, enlarging, &c., had better get a copy of the books written upon those subjects only which are advertised at from 6d. to about 2s. each almost every week in one or the other of the many photographic journals.

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### INTERNATIONAL WORK.

By H. SNOWDEN WARD.

My title refers to the work of the International Bureau of Photography, which was founded at the World's Congress on Photography, in Chicago, during the past summer. The Bureau consists of photographers in all parts of the world, and has objects that are large enough to be denounced at once by those timid people who condemn as impracticable any scheme that requires a little faith and patience to carry it out. The ultimate objects of the Bureau are not novel. They have been advocated many a time in the pages of *THE BRITISH JOURNAL OF PHOTOGRAPHY* and other photographic journals and annuals, as well as in more general publications. Some of them are as follows:—

1. To secure the official recognition of photography by the Governments, local as well as central, of all civilised nations.

2- To secure the establishment of national depositories for the reception and care of photographs, and especially negatives, of literary, historical, or scientific value.

3. To establish an International Bureau for the exchange of prints and other reproductions of negatives in the national depositories, and to enable colleges, museums, and students to obtain photographic records from every land.

For the attainment of these objects, which will be attempted in detail and by degrees, the Bureau will rely upon national and local Committees, formed to carry on special sections of the work, while the Bureau itself will simply attempt to carry on the general propaganda, and to centralise and record the results of the efforts of the sectional Committees. It will, of course, look to the Photographic Societies for the bulk of its support, and I believe that it will be found that nothing leads to a greater strengthening of a Society than the taking up of a section of Bureau work by its members. Such definite work will give the members an incentive to regular and systematic work, will lend an interest hitherto unknown to the Club outings, and will secure for the Society an amount of official and press recognition that is almost impossible under other circumstances.

The taking up of a work for the public at once gives a different status from that enjoyed by a Society that only works for the interests of its own members.

The ultimate objects of the Bureau include the establishment of that desideratum for which THE BRITISH JOURNAL OF PHOTOGRAPHY has often contended, a national gallery of photographic portraits. They include the adoption of complete and extensive sets of photo-mechanical prints, and sets of lantern slides, for the teaching of every subject that can be so illustrated in Board schools as well as in colleges. They include the supplying of every museum and free library with complete sets of reliable illustrations of geography, geology, ethnology, and every other science that can be photographically illustrated, so that the student can find in every such place a collection that would cost a fabulous sum if it consisted of the real specimens. They include the recording of all objects of literary, historical, or antiquarian interest, especially those events, customs, and objects that are only temporary, or that are in danger of removal or destruction.

The first, and at present the only, work that the Bureau can assist and advocate is that photographic survey work, which Mr. W. Jerome Harrison, the real initiator of the Bureau, has done so much to promote. In one respect, we shall attempt to work differently from the surveys at present in existence, for, having in view the ultimate establishment of depositories for the negatives, we shall strongly urge the surveys to make it a rule that the *negatives*, and not only the prints, shall eventually be the property of the survey, in trust for the nation. There should be no real difficulty about this, for, until the depository was established, each surveyor would be the custodian of the negatives of his own taking, and, even when in the depository, he could have the right to borrow his negatives for the purpose of making prints or slides. In practice, I think it would be very seldom that any negatives would be thus borrowed, for, if they were subjects likely to be often wanted, the maker would take a duplicate, or make one from the original negative.

With regard to the providing of depositories, I believe that in most counties, and in many of the great towns of the country, a suitable place could be obtained immediately if the district Photographic Society would approach the local authorities with a set of negatives, or even prints, of local historical value, or even if an offer was made to commence a survey on condition that a proper depository was provided for the results of such survey. There are, at least, two towns in the country where suitable accommodation has been provided, and is being used by the local Societies. In all cases where an approach to the local officials is to be made, it will be well for the Photographic Society to take stock of its resources and power, and to approach the local historical, antiquarian, architectural, and similar Societies, with a view to forming a federation for the work of the survey. These Societies will not only add to the influence of the surveyors, and be useful on any deputation, but they will give invaluable advice as to the objects that are, and that are not, worth photographing, and the best view-points for scientific and historical purposes. I say nothing as to the method of conducting a photographic survey, or as to its exact objects. These particulars have been given in the *Journal of the Photographic Society of Great Britain*, March (?), 1892, and circulated to all the affiliated Societies; but if any one who is in-

terested in the subject has not access to this journal, I will gladly send some printed matter on application and a penny stamp at the offices of the Bureau.

The Committee has in hand at present some printed matter on the subject of surveys, for the use of Photographic Societies that may think of taking up the work, and also a leaflet showing how people interested in scientific and other pursuits, and those who have the management of free libraries, museums, &c., may help the work. We invite all Societies that have already undertaken survey work to communicate to us the results of their experience, and also to report progress annually. We hope to be able to give publicity to such reports in quarters that could not be reached by the Societies themselves, and where they will be calculated to help forward the general work.

In France M. Leon Vidal has taken up the work of the Bureau in real earnest, and our members in America, India, and elsewhere, are preparing to go forward as soon as they have supplies of the literature that we are preparing. In fact, we hope that practical efforts towards realising the objects of the Bureau will be started early next year in every English-speaking land and in the principal foreign countries.

The scheme is a big one. It will be met with ridicule by those who find destructive criticism a cheap and easy pastime. Let me put it on record that the members of the Bureau do not expect that all its objects will be attained immediately, or that they will ever be obtained in their fullness by the efforts of the Bureau. We want all the helpful criticism and all the suggestions possible, but we protest against the unfair criticism that is found in one of its mild forms in the recent writings of 'Cosmos.' He condemns us for talking and not working. This is the charge that is brought against every photographic effort that appeals for wide co-operation. The critics too often stand aloof, offering not a stroke of assistance, and attempt to prejudice a work at the outset by asserting that it will result in nothing. In such a case surely the few who *do* attempt some practical work should not be charged with insincerity and a desire for self-advertisement, because their efforts are of little avail, and are rendered so by the fact that their critics refuse the co-operation that is sought.

The original members of the Bureau, nominated in Chicago by the Hon. James B. Bradwell, are as mentioned at foot. Any one of them will be pleased to give, or to receive offers of, assistance on the lines of the Bureau's works. Steps are being taken to add others to the number, so as to make the Committee international in the widest sense. At present the work of General Secretary is undertaken by myself.

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John Carbutt, Wayne Junction, Philadelphia, U.S.A.

Shapoor N. Bhedwar, Swiss Lodge, Cumballa Hill, Bombay, India.

Leon Vidal, Paris, France.

Professor W. K. Burton, Imperial University, Tokio, Japan.

Mrs. Elizabeth Flint Wade, Buffalo, U.S.A.

Dr. John Nicol, Editor of the *Photo-Beacon*, Tioga Centre, N.Y., U.S.A.

*Vice-Chairman*: Gayton A. Douglass, Chicago, U.S.A.

*Chairman*: H. Snowden Ward, Memorial Hall, London E.C.

## NOTES ON THE METOL DEVELOPER.

By F. C. BEACH (New York).

DURING the past summer I have given this new developing agent a very fair trial, and have been well satisfied with its workings. Metol is said to be produced by the action of either sulphuric, hydrochloric, or oxalic acid upon monomethylparamidometacresote, containing, as will be seen, a preservative element of value. An experiment I made of developing an under-timed plate with a solution containing a small percentage of sodium sulphite and a large percentage of carbonate of potash convinced me that, unless the percentage of sulphite is increased proportionately with the alkali, the reducing action of the developer on the film will not be so powerful. The reason seems to be that the alkali has a strong oxidising tendency on the metol unless protected by a proper quantity of sulphite. To illustrate, I put two 4×5 plates in one tray, dissolved eight grains of metol in two ounces of water, to which was added one ounce of a strong solution of sodium sulphite and water (supposed to be strong, but had been standing for some time). This was poured over the plates, and allowed to remain two or three minutes. Then half a drachm of potash solution (made by dissolving one ounce of potassium carbonate in three ounces of water) was poured into the graduated, and the developer poured into it, then flowed over the plates a second time. The plates were so much undertimed that even this quantity of alkali did not start the image but very faintly. Another half drachm of potash was added. This accelerated perceptibly the development. After two more additions of half drachms and prolonging development for ten minutes or so, the developer became very dark, so as to obscure the film from view, but the shadows did not fog. Development seemed to be complete as far as it was possible with that solution; the plates were removed and fixed. They were thin, but had detail brought out where it appeared as if it could not be, since they were slow plates, exposed with full aperture of the lens (Ross' hand camera lens) and slow shutter. I next took some fresh sodium sulphite in crystals, made a strong solution, dissolving one ounce in two ounces of water. Dissolved eight grains of metol in one and a half ounces of water, and added one and a half ounces of the sulphite solution. I began by adding to this one drachm of the potash solution. The four plates to be developed were of the same emulsion, and had the same exposure as the other two. I continued to add an excess amount of potash solution, two and a half drachms in all, and observed that the developer kept perfectly clear all the time, of a light orange colour. It only required about six minutes to bring out the image fully and to gain all the density desired. In my hands the developer works very satisfactorily. It is very soluble, clean, does not stain the plate or fingers, and is rapid and energetic when desired, or slow according to the amount of alkali added. With a large percentage of sodium sulphite present, I am certain it can be preserved colourless for some time. For convenience it would be a good plan to keep it in solution in the proportion of forty-eight grains to one ounce of water, in which is also 144 grains of sodium sulphite, then the number of grains desired can be readily measured out.



Result with an Ordinary Plate  
giving unfaithful colour values.



Result with an Isochromatic Plate  
giving correct colour values.

---

Taken on Edwards' XL Isochromatic Plates (without Screen).



## USEFUL JOTTINGS.

By W. H. BARNES.

*How to Prevent Frilling.*—Bad cases of frilling are fortunately uncommon, but as they do sometimes crop up, and result in serious trouble and loss, the knowledge of a satisfactory method of dealing with plates exhibiting a tendency in this direction may be of service.

Obtain some of Hartley's transparent celluloid varnish, and, with a camel's-hair brush dipped in the varnish, go round the edge of the plate, varnishing the face of the plate all round for a width of about one-sixteenth of an inch, being careful also to varnish the edge itself. Let the plate remain after varnishing for at least ten minutes for the varnish to get thoroughly hard. During the first two minutes it is better to allow it to lie flat, so as to avoid any risk of the varnish running over the face of the plate, which might occur if it were stood on end before the varnish had set. The plate may then be developed with perfect safety. The edging of celluloid varnish perfectly stops the emulsion from detaching itself from the glass at the edge, even during the longest development, and so prevents any water getting underneath the film. Care must be taken to avoid fogging the plate by light during the operation. After use, wash the brush in methylated alcohol to free it from varnish.

*Vignetting.*—Among the many and varied means of making vignettes in use by photographers, the following method should take a leading position, from the ease and rapidity with which the vignettes can be made and the facility with which the shape and size of opening can be adapted to the requirements of the subject. Procure a good *quick-drying* sample of Brunswick black and a small size hog's-hair brush. This should be bound round so as to leave only a short length of the bristles. As an example of the method of working, we will suppose an ordinary half-plate negative is to be vignetted. This is put into position in the printing frame as usual, and the frame closed; a half-plate glass (a washed-off negative, for instance) is placed on the front of the frame, this will drop into the recess to within a quarter or three-eighths of an inch of the negative, about the right distance for the vignette to be from the negative in the majority of cases. This glass is best fastened in position by means of gummed paper round the edge, which serves the double purpose of fixing the glass and of excluding the light round the margin. The glass being in position, remove the back of the printing frame, or open one half only if preferred, and, holding the frame and negative up to the light with one hand so as to see the outline of the negative, take the brush, dipped in the Brunswick black but having only a small amount of varnish in the brush, and outline the opening you intend to have; then paint over all the rest of the glass with the varnish. In outlining the opening, use the brush so as to produce a serrated edge, not a hard line. If it is not likely to slow the printing too much, lay a piece of tissue paper over all. This will retain its position by adhering to the varnish. When printing in a dull light, dispense with the tissue paper. As in all vignetting the distance of the vignette from the negative should be varied according to circumstances.

*Improving Yellow Negatives.*—It sometimes happens that a pyro-developed negative is let pass insufficiently cleared, or that in process of

washing the film becomes more yellow than is anticipated, and in consequence the negative prints harder than is desirable. To remedy this it is requisite to get rid of the yellow stain; but, after a negative has been allowed to dry, none of the ordinary means of doing this are effective. The following is, however, a method which I have found fairly successful. It consists in toning the negative with sulphocyanide and gold. The bath should be mixed much stronger than for prints, and the toning will take some time. The proportion of sulphocyanide should be kept down because of the solvent action of this salt upon the gelatine. The following formula has answered in my hands:—

|                                 |            |
|---------------------------------|------------|
| Sulphocyanide of ammonium ..... | 15 grains. |
| Chloride of gold.....           | 2 „        |
| Water .....                     | 4 ounces.  |

Dissolve the sulphocyanide in three ounces of water, the chloride of gold in one ounce, and mix by pouring the gold into the sulpho-cyanide—not the reverse. Let the solution stand for five minutes, and it will then be ready for use.

### A SIMPLE WET-COLODION PROCESS.

By EDWIN BANKS.

AFTER many years banishment into obscurity, the wet-collodion process is now coming to the front again, and its importance is gradually forcing itself upon the notice of the photographic world. It possesses qualities which no dry plate can equal, and the readiness with which negatives of any size, small or large, can be produced, renders it indispensable where quick work is attempted. Every old collodion worker, however, will remember the continual struggle he had to maintain with his silver bath and collodion, how one or other was continually going wrong, by reason of perpetually accumulating organic matter from ether and alcohol, particles of dust, or dust he inserted with every plate. A bath that worked well overnight would often be useless in the morning, and then require neutralising, sunning, boiling, precipitating, and filtering, and, after all, take a day or two to get into working order again. When we remember that every plate dipped into the bath alters its constitution, and that it ceases to be a pure solution of silver nitrate, one cannot wonder at the troubles which were perpetually following the wet-plate man, troubles of which the dry-plate worker of modern times can have no conception.

By the following method all these difficulties are either done away with or reduced to a minimum. Make a good collodio-bromide emulsion as follows:—

|                 |            |
|-----------------|------------|
| Ether .....     | 5 ounces.  |
| Guncotton ..... | 60 grains. |

In a separate bottle, placed in a saucepan of water, and gradually brought to a boil, put

|                         |                 |
|-------------------------|-----------------|
| Nitrate of silver ..... | 100 grains.     |
| Water.....              | 20 to 30 drops. |

When the silver is all dissolved, add gradually five ounces of alcohol

(methylated). The silver will probably be precipitated, but soon re-dissolve by heat. When dissolved, add to the plain collodion. Now weigh out 100 grains of cadmium bromide, and add at once to the silvered collodion, and immediately shake well for five minutes. This completes the collodion, which, however, improves much by keeping.

Now for use. Clean thoroughly the glass and wash well, coat while wet with dilute albumen—white of one egg to thirty ounces of water—and rear up to dry. Coat with the collodio-bromide emulsion, taking care to have a smooth film, and allow to set well. In a dipping bath or flat dish have ready a solution

|                           |            |
|---------------------------|------------|
| Iodide of potassium ..... | 100 grains |
| Water .....               | 10 ounces  |

and immerse the plate in this, and keep it well covered till all the greasy appearance caused by the ether and alcohol has gone, and the solution flows smoothly over the plate. Then take out and wash under the tap to remove all the iodide. Up to now the dark room is unnecessary, as all can be done in broad daylight. The reason of this is that the iodide in the solution displaces the bromide from the silver, and forms silver iodide, which, when formed in the presence of an excess of iodide, is not sensitive to light even after washing the excess away. To render sensitive, take into the dark room, and flow over the plate a solution of twenty grains of nitrate of silver, made slightly acid with acetic or nitric acid, and place in dark slide for exposure.

You will now have a sensitised iodised wet plate equal to any formed by the bath process when at its best, with the advantage that your sensitising silver solution remains pure and free from any organic impurities, whilst an ounce or two of solution will sensitise some dozens of large plates. For photo-lithography and process work of all kinds it will be found a great boon, as spots, pinholes, fog, and all the abominations of bath plates, are conspicuous by their absence.

Develop precisely the same as in ordinary wet-plate process, either with sulphate of iron or pyro and citric acid. For lantern slides in the camera, or for wet-plate opals, no process can surpass it, using pyro developer. It may be well to mention that any waste emulsion can be utilised for this process, provided that it is not precipitated and moderately fine. No matter how fogged it may be, the iodide bath puts all right. Collodio-chloride also may be used if you have any that is otherwise waste. Many experimentalists have batches of emulsion which are unsatisfactory for ordinary development, but which may be profitably used up this way. I have never met with one that failed, however bad it was for its legitimate purpose.

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## DIALYSIS.

By JAMES MARTIN

In April, 1862, it was my privilege to contribute an article to the pages of volume ix. of THE BRITISH JOURNAL OF PHOTOGRAPHY, in which I suggested the employment of this process for the determination of the variable amount of soluble chlorides occurring in the process of albumenising paper.

Reference to that paper will show that colloidal substances, such as gelatine and albumen, act as septa, through which dialysis takes place.

It should be premised that the term dialysis (*dia*, through, and *luo*, to loose) was applied by Graham to the varying rates at which certain bodies diffuse themselves into liquids through a membrane, called a *septum*. He found that *crystalloids* dialysed rapidly while colloids passed through very slowly. The process is now in daily use in laboratories, especially for separating crystalline poisons from the contents of the stomach in cases of suspected poisoning.

Now, the condition of a photographic print, whether on albumen or gelatine, on its first immersion in the washing tank immediately after fixing, is strongly suggestive of dialysis, endosmosis, and exosmosis; and, though, at the first glance, such recondit processes may seem to have little practical bearing, I think I shall be able to show they have an important relation to the length of time a print should be washed, and its probable permanency.

I much regret that the claims of business prevent me from actually experimenting, and oblige me to confine myself to suggesting the direction in which experiment may advantageously be made.

The point seems to be this: A print, regarded structurally merely, consists of two parts, the film of albumen or gelatine and the supporting paper, each of which has two sides, and it is not drawing too largely on the imagination to assume that there is a *space* between the paper and the film.

It will be seen at once that immersion in a large volume of water readily removes the adherent hyposulphite, but it is equally obvious that, in order to the solution of the unaltered chloride, the hyposulphite must necessarily interpenetrate both paper and film, and be enclosed in the theoretical intervening space.

The print and its enclosed hyposulphite are now in the condition when dialytic action is doubtless set up, and any one of the readers of THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC, having the necessary time at his disposal, would be doing a service to our art-science by dialysing a twenty per cent. solution of hyposulphite of soda according to the directions on page 144, volume IX., of THE BRITISH JOURNAL OF PHOTOGRAPHY, and carefully noting the *time* necessary for the completion of the operation.

The paper above referred to shows that, in a given time, various salts diffuse themselves into water at varying *rates*, and the dialysis of the same salts doubtless bears an observable relation to their *rates* of diffusion; and, if this *rate* were experimentally determined, the *time* in which the hyposulphite is definitely removed would thus be determined.

The term 'dialysis' may be understood to mean the separation of a crystalline salt from a non-crystalline substance by the spontaneous (?) passage of the former through a membrane, called a *septum*, which, in the case of the experiments here suggested, should be paper coated with unsalted albumen or gelatine.

'Diffusion' may be regarded as the evaporation of a salt into a liquid, just as water evaporates into air.

Endosmosis is the passage of a liquid or gas through a porous diaphragm *inwards*. Exosmosis, the same process *outwards*; but both

expressions are in the present day superseded by the one term osmose, which includes both.

The Osmose of some fifty salts has been determined, but hyposulphite of soda is not among them.

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## KEEPING PROPERTIES OF DRY PLATES.

By C. OAKESHOTT.

How long gelatine plates will retain their good qualities I am not, from personal knowledge, prepared to say, but a recent experience has shown me that in these respects they possess a very considerable vitality.

A short time since, I came across an old Paget plate, which I had had by me for eight years. Much wondering if it would be of use, I put it in the dark slide, and exposed on a church near at hand. The church was built or faced with flints and mortar, and the front covered with dense ivy and climbing roses, the foreground being grass studded with headstones. The lens used was a triplet fitted with small stop. Thinking that possibly there might be a loss of sensitiveness, I gave an exposure of three seconds instead of two, which would have been the time had the plate been quite new. On developing, the picture came out as readily, as clearly, and with as good intensity, as though the plate had but just left the makers' stores. There was perfect freedom from fog, no pinholes or markings of any kind, except a slight silvery iridescence in parts, which could be seen only when the picture was fixed and dried, and in no way showed in the printing. There was not the slightest thinning at either of the edges of the plate, and the negative was as perfect as I could wish. I afterwards tried some Ilford plates which had been in my possession for four years. These proved satisfactory in every way, allowance being made for a slight loss of rapidity.

The plates experimented with had been kept in cardboard boxes made by myself from the emptied cases in which they were sent out; these boxes were grooved with well-seasoned white pine. I take it as an important factor in the preservation of plates that they be kept, as their name implies, thoroughly dry.

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## A HINT ON TONING P.O.P. PRINTS.

By R. J. LATHAM.

In toning P.O.P. prints, I was for a long time bothered with uneven toning, owing to the difficulty I found in keeping the prints from sticking to the others in the dish, even when kept continually shaken, until I tried letting the first one put in, remain alone, face upwards, until it began to change, then turn face down and put another face upwards on the top. By the time this one was commencing to change, the first would be ready, or nearly so, to remove to the washing water. I then turn the second over and place another face up, continuing this till all are toned. I find a good deal of time and temper saved.

## ANGLE OF VIEW.

By P. EVERITT.

THE rays of light pass through a lens form a cone. The base of this cone is the picture plane, where the focussing screen or plate is placed. For our picture we may use the whole, or part of the base of the cone of rays, but whatever part it may be, the angle of view is deter-

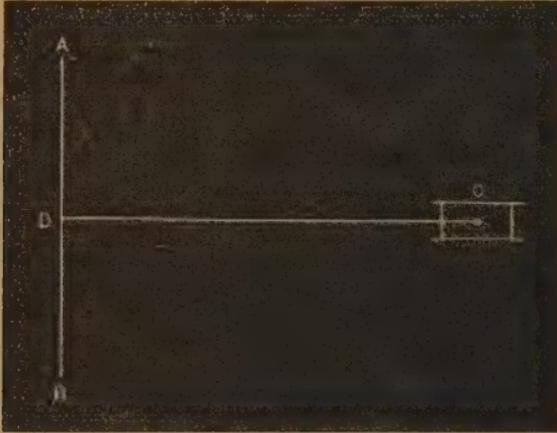


Fig. 1.

mined by the focus of the lens and the distance from the centre of the base of the cone of rays to the extreme limit of the picture.

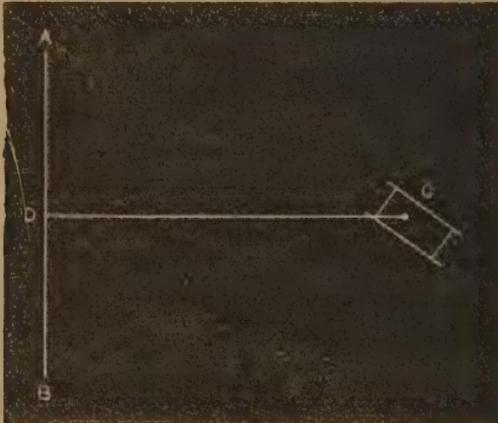


Fig. 2.

Many photographers have an aversion to arithmetic, and cannot be induced to solve a problem by calculation, however simple the process may appear to those accustomed to the use of figures and tables. The accompanying scale will enable those to solve the various problems connected with angle of view without any calculation.

In figures No. 1 and 2, A B represents the longitudinal section of a plate, and C the lens. From C, the centre of the lens, draw a line perpendicular to the plate, as at C D. If the lens is tilted, as in diagram No. 2, the tilting must be disregarded. The essential thing is, that C D shall be perpendicular to A B. The line C D we will call the *principal ray* or *focus*.

We will now view the plate from the front as in figures Nos. 3 and 4.



Fig. 3.

If the lens is central on the front of the camera, D will be on the centre of the plate as in figure No. 3. But we may wish to use the cross fronts, in which case D will be as in figure No. 4, or at any other point

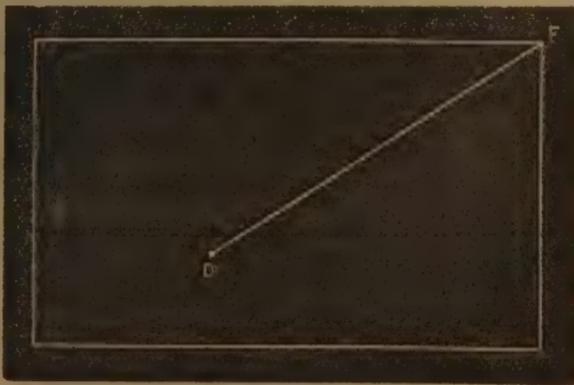
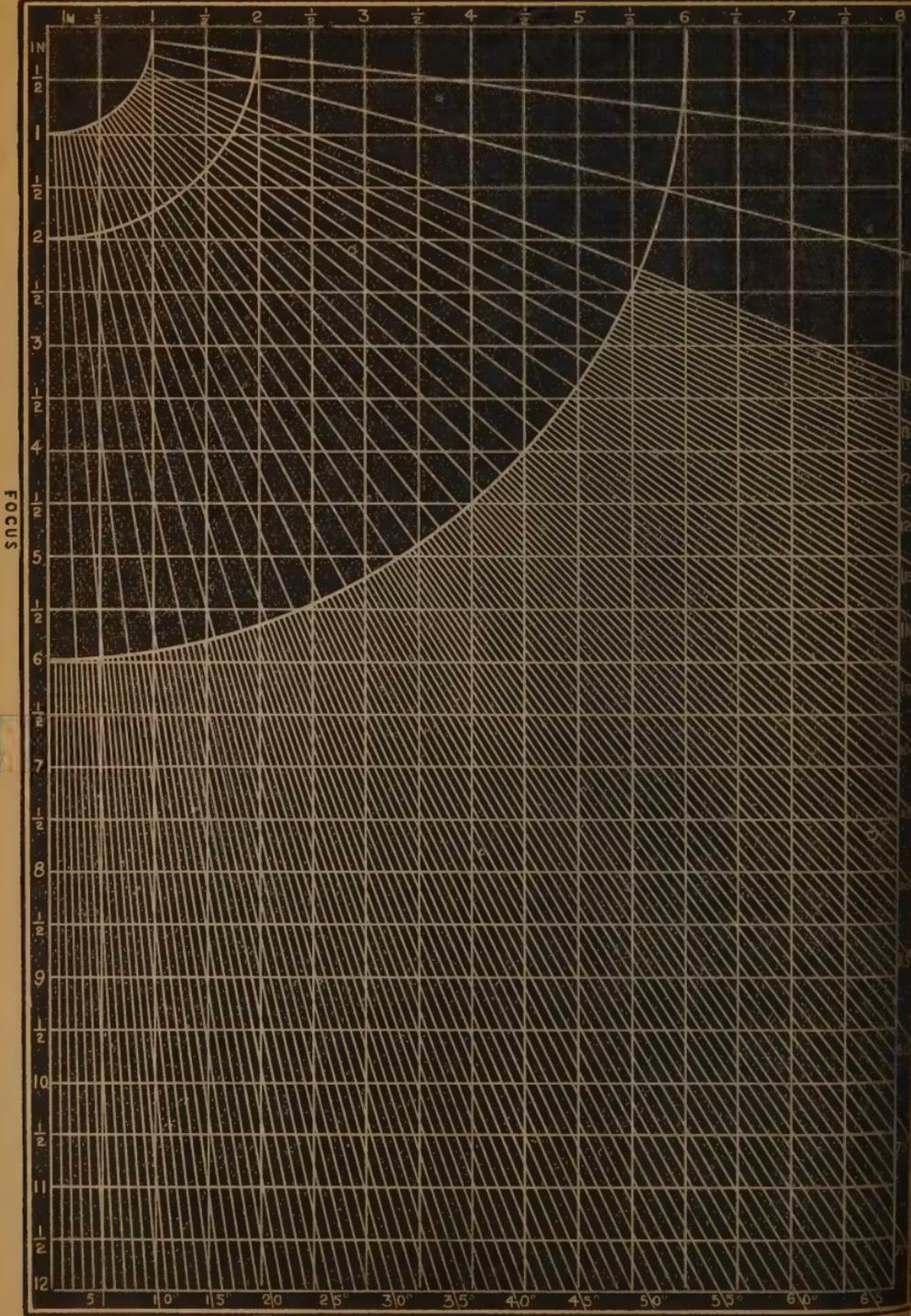


Fig. 4.

we may select. The lines D E and D F represent half the base of the cone of rays used to form the picture. We will call the distance from D to E or D to F the *radius*. Measure the focus and the radius. We will assume the focus to be  $10\frac{1}{2}$  inches, and the radius  $7\frac{1}{2}$  inches. We can now ascertain the angle under which the picture will be taken

RADIUS



DEGREES

In the column to the left on the scale, marked *focus*, find the line  $10\frac{1}{2}$ . In the column at the top marked *radius*, find the line  $7\frac{1}{2}$ . Where these lines cross each other, they are intersected by degree No. 71, which is the angle of view.

The following rules may be formulated:—

*To find the angle.*—Find the point of intersection of the lines representing the focus and radius. Read off the angle.

*To find the focus.*—Find the point of intersection of the lines representing the angle and radius. Read off the focus.

*To find the radius.*—Find the point of intersection of the lines representing the angle and focus. Read off the radius.

Should the focus or the radius exceed the dimensions given on the scale, divide both by 2, or any other convenient factor. Thus 16 inches focus and 12 inches radius. Divide both by 2, which equals 8 inches focus and 6 inches radius. The required angle is over  $73^\circ$ .

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## NECESSITY FOR ART STUDY IN PHOTOGRAPHY.

By H. A. RAILTON.

WHAT a good photograph! is a remark we often hear, followed by such questions as, What lens did you use? Whose plates, and what developer? But seldom, if ever, how much study did you devote to the subject? or, How much thinking did you do over it? Many good pictures are taken without either study or thought; but they are only chance things, and chance work is not what you ought to 'go in for' if you want to attain any excellence in photography.

The day is fine, and you think it very suitable for exposing a few plates; so out you go, stick up the camera at anything. Stop to consider if it is the best you can do before exposing. Examine the subject from several points, and when you have got the best possible, then expose.

Another matter for consideration is the light. Any light won't do so long as you can see the subject on the ground glass of the camera. Take some well-known place near home—or, if you live in a town, watch the chimney-pots from the windows—and make notes of the effect of light and shade at different times of the day, and you will be surprised at the variations. Lens, plate, and developer are only the mechanical means of producing photographs. Picture-making depends upon the man who uses the apparatus for the purpose of carrying out his own ideas and rendering things as he sees them. An exhibitor at the Royal Academy would smile if asked whose brushes and colours he used which enabled him to paint such a good picture.

Learn the proper use of the mechanical means used in photography, then study and think. If you have opportunities of attending some school of art, it will pay you; if not, read books and study nature. Turner would sit for hours watching the clouds, or the ripples of the water, rise before the lark to study the dawn of day, note every atmospheric change until the sun, bathed in crimson and gold, sank behind the western sea. Study art and learn to think. Go to Nature and study her ways, and in a short time you will be surprised at what you have learnt.

## UNITY AMONG PHOTOGRAPHIC WORKERS.

By ARTHUR FIELD.

It will be remembered that in your ALMANAC for 1890, I outlined a proposed trade union of operative photographers. In July of that year a meeting was held at the Polytechnic, at which some sixty or seventy workers attended. The formation of the union was there voted unanimously, and temporary officers and committee were elected. During the remainder of the year, rules were formulated by the Committee, and arrangements made for branches in the provinces. At the commencement of 1891 a detailed prospectus was issued. Branch offices were taken by our friends in London, Bradford, Manchester, Edinburgh, &c.; all that was now needed was the members.

And, naturally, they failed to arrive. I say naturally, because it would be out of the order of things, and subversive of the custom and precedent of our craft, for photographers to bestir themselves to better their position. A few devoted people found themselves absolutely deserted. Did I say deserted? I am wrong; there was a crowd of gentlemen of doubtful honesty, and quite remarkable inability, who were anxious for the society to start business in order that our 'unemployed benefit' could come into operation straight away. Between this superabundance of the inefficient, and the insufficiency of proficient, we put up our shutters and silently stole away.

Shortly before, a sectional union of the photographic process workers had been proposed, and sectional spirit had developed to the extent of an absolute refusal to join our movement in favour of a general union. This enthusiasm was as fugitive as it was narrow. The constitutional lifelessness, which is our curse, forced itself into evidence, and the proposal flickered out for want of oxygen.

Strange to say, several pounds had passed through our embryo union's hands, even though no branch business was done. The secretaries of the provincial branches made themselves responsible for the local expenses, while I busied myself with securing the sinews of war as events proceeded. Thus some money accumulated, and this sufficed to pay several debts, but others I had to meet myself as far as I could. The balance-sheet of our accounts will be gladly sent on application to 'Arthur Field, Maidstone,' and receipt of a stamp for reply.

Our fiasco, which seemed very serious then, but which time has softened into the aspect of a burlesque tragedy, was not hailed with great exultation by the employers. Did not the fiasco arise from the same apathy as that from which they suffer as a class? The continuous lament of the Professional Association at the supineness of the 'trade,' is proof that apathy is the badge of the entire craft. Little, therefore, could the employers exult over the apathy of the workpeople. And I think I am breaking no confidences when I say, at this somewhat distant date, that some of our strongest supporters were photographic employers. Our union would have made war on dishonesty and fraudulent incompetency among workers, as strongly as against sweating and swindling on the part of employers. I know, nevertheless, that some employers were bitter, and this bitterness fell rather hardly on me for a little time. I have been told by a prominent official of photographic

societies, that I injured my 'prospects' by advocating unionism. In regard to such tactics I claim no pity. The pity is all required for such opponents. But when all is said, the employés themselves were the only serious opponents of their own betterment.

If there be any who exult, let them learn that the movement has been going on, though on other lines and in other hands. Soon after the collapse of the union proposal, my sister, Eleanor Field, began to shape a scheme which had occupied her attention for a considerable time, viz., the formation of a co-operative productive society in photography, financed and worked by the operative photographers themselves. I did not give any extensive approval to this proposal at the time; but my well-meant advice was 'received in the spirit in which it was offered,' and placed under the table. My sister persisted in her idea, first proposing to herself start a business, and when successful, hand it over to operative photographers, but later determining to undertake the formation of a genuine co-operative concern as by rule and custom established. She obtained the support of practical co-operators like Alderman Tillett, London County Council; Mr. Lewington, Chatham; Mr. A. R. Burns, Birmingham; and others; and has been quietly ploughing ahead, while we trade-union advocates were gnawing our nails in chagrin at our fiasco.

The work has, it appears, advanced to a considerable degree. The necessary officials and committee have been appointed, rules registered, over fifty shares subscribed for, and prospectuses issued among co-operators. And last, but not least, Mr. Lewington, the chairman, has just asked me to give an expression of opinion on this movement.

My reply is short and clear. While still refusing to identify myself with the newer movement, I have certainly come to regard it as perfectly practicable, and as opening up great opportunities for good among our workpeople. These opportunities could easily be utilised by those who were associated with me in the trade-union movement. In any case we can safely say that the organization of the workers for fair wages in return for fair work is not dead, but living and moving, though conducted by others and moving in another direction. This at least should be a source of great satisfaction to the 'forlorn hope' of photographic trade-unionism.

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### MY FAVOURITE DEVELOPER.

By A. BAER (Winterthur, Switzerland).

On page 561 of the ALMANAC for 1893 I gave two developers especially suited to landscape work and interiors.

On the second of these formulæ I would now again say a few words, having since used it for all my outdoor and studio work. Too much praise cannot be bestowed upon it, for it really is a universal developer, and will prove a friend where all others fail.

Its composition is as follows:—

|                           |            |
|---------------------------|------------|
| Water (distilled) .....   | 400 parts. |
| Soda sulphite .....       | 40 "       |
| Hydroquinone .....        | 10 "       |
| Potassium carbonate ..... | 5 "        |

It will keep good for any length of time, and I have actually used the same solution for twenty plates in succession. To obtain the best results, however, a sufficient quantity of this developer has to be poured on to the plate, and the tray has to be kept rocking, otherwise peculiar markings are apt to show themselves with some brands of plates. Do not throw your old developer away; never mind how often you may have used it, or how mucky an appearance it may make, collect it all in a bottle and cork it up.

In all cases it is advisable to start development with a comparatively fresh solution, to develop until all the wished-for detail has made its appearance, or until the shadows just show signs of closing up; now throw your solution back, and finish with your old mucky stuff; this will give you any density you like. With this developer I offer to make of two plates, which have had, under precisely the same circumstances, an exposure of three and ten seconds respectively, absolutely identical negatives, at once harmonious and rich in detail. All graduations, moreover, will be preserved; there will be no clogging up in the high lights.

Try it, reader, and development will have become at once certain and easy, if somewhat lengthy. You will have a new power in your hand, and your mind will no longer be troubled with exposure-tables and such other helps, if you only will take care to expose long enough, for snapshot exposures it will not develop.

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### CLOUDS IN LANTERN SLIDES.

By WILLIAM BROOKS.

By many it is supposed to be a very difficult matter to print in clouds to a lantern slide. In my own practice I print in a great many. I always make slides on collodion emulsion, being able with the greatest of ease to either reduce or intensify after fixing and clear out the high lights, or do anything required. I always, where it is possible, print in the clouds on the film and not on the cap glass. Where a sky is required, the negative must be of fair average quality, and the sky moderately dense; if not, the sky part must be masked or covered up during exposure, for where the clouds are to be it must be unexposed.

With a negative with the sky part dense there is but very little trouble. The exposure, if by contact, is made in the ordinary way in a printing frame. The exposed plate is removed from the negative and placed on to the cloud negative very carefully, noting how far the sky is to reach down the picture. The cloud negative for this kind of work must be very thin, scarcely, if anything, more intense than one of the old glass positives of days gone by. After the plate is in position the exposure is made in diffused daylight, and with either a piece of card or a duster the subject-matter already impressed on the plate must be covered up from the light, and the cardboard or duster must be kept rapidly moving up and down the plate so as to prevent any line forming, and by this means it is vignettted into the subject, but more exposure must be given towards the zenith. The exposure, of course, must be in accordance with the exposure of the subject-matter already given. For instance, if the exposure of the subject has been short, the image will develop of a cold

grey tone, and if the exposure to the cloud negative has been too long it will develop of a much warmer colour and tone, with anything but a pleasing effect. All must be done with great care. The subject can be reduced from any size negative, and the sky printed in by contact.

A few words about negatives may not be out of place. After the negative has been thoroughly washed and dried it has a matt appearance on the surface, and if it is examined carefully with a focussing eyepiece the negative will be seen to be more or less covered as it were with fine dust. With my own negatives I always take a piece of soft rag dampened with methylated alcohol and clean them. After the spirit has evaporated the surface will have a kind of polish, and, on examination, this fine dust-like appearance will have vanished entirely. It is then ready for varnishing, and will then have a beautifully glossy surface, and is in better condition for making a lantern slide from. Most amateurs never think of varnishing.

After the slide has been developed and fixed with cyanide of potassium, if the sky appears too dense to be in harmony with the subject it can easily be reduced by pouring over the part a weak solution of iodine water and well washed, and then the cyanide solution again applied to clear it, with a final wash under the tap. If the tone is not quite right by being too red, a slight wash of platinum will set matters right. It can then be dried off and varnished with a good, pale, hard spirit varnish.

It is astonishing how the effect of a slide can be enhanced by the addition of suitable clouds—for instance, a piece of low-lying country or a stretch of sand occupying, say, not more than a third of a plate; but care must be taken to have the clouds suitably lighted, so as not to have the clouds lighted in one direction and the landscape in another. If we study the effect obtained by the painters, we shall find, in many instances, the sky add greatly to the composition of the picture by the balance produced.

All the above remarks refer to slides made on collodion as regards the manipulation. I have never yet been able to get the effect on gelatine as on the former. I have seen a great many writers say that slides do not require varnishing. With this I do not agree. If a slide is wanted to last, it must be protected with varnish. A great many try to do as little as they can. There is an old saying that 'What is worth doing at all is worth doing well.'

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## PHOTOGRAPHIC CO-OPERATION.

By ELEANOR F. FIELD.

I HAVE watched, with deep interest, the statements from time to time appearing in the JOURNAL and elsewhere from unfortunate and hard-pressed workers in photography. Tales of great sorrow some of them; most of them tell of hardships apparently undeserved. Accounts have been frequent of injustice mutely borne because no remedy offered itself. And I have then argued to myself that injustices, arising from the dependence of the worker on the employer, who has capital and needs profit, can only be permanently obviated by the self-employment of the worker without the intervention of the profit-seeker. As the dependence I have mentioned arises from lack of the capital, without which labour cannot be

put in operation productively, capital must be secured, from fellow-employers at first, and eventually from other co-operative concerns previously established.

I will not challenge criticism by delving deeper into social and political economy. I don't understand them, except so far as they run parallel with fact and common sense. The plain, evident facts of co-operation are soon told. The worker, without the necessity of providing for any non-worker (or, if not for absolutely a non-worker, then giving 'profit' above the value of the work done), can secure a livelihood from his trade from receipts or 'margin' which, from their smallness, would ruin a profit-seeker. Further, with gross receipts which would satisfy the proprietor of a business run for profits, the self-employing worker could secure higher wages, or more continuous employment at a fair average.

One thing intervenes in this survey of possibilities. What of the 'managerial ability' or directorial skill which is as necessary to the successful conduct of industry as is technical knowledge? I am far from ignoring this essential. I claim, however, that two solutions of the apparent difficulty arise at once. (1.) That 'managerial ability,' of which there is always some unemployed from lack of the necessary capital, can be hired, as labour is hired, without the necessity of providing profits in addition. (2.) That the workers in many industries are frequently possessed of considerable business ability, as is evidenced by the many successes of workmen who get capital unexpectedly and embark in small concerns.

I accept the latter position as one of the utmost applicability to photography. Photographic operators, as is well known, frequently conduct businesses for employers who possess no technical knowledge of photography and only the most elementary business aptitude. I know of a score of such cases, and feel sure that there are hundreds. Efficient operators, therefore, perhaps better than other workmen, can be expected to aid the successful conduct of a business co-operatively without this expensive 'directorial skill,' which exacts not only wages, but interest and profit. And, in any case, recourse is open to the employment of skilled managers by the workers themselves.

I spoke somewhere of the workman who secures capital somehow and starts business, very often to succeed. I know very well that he often fails. That does not weaken the argument which I illustrated by such workmen, for they fail not from lack of ability so much as insufficient capital. Unless I said this, many would believe that I was slyly ignorant of the great changes in industry which are rendering *le grand capital* a necessity and the conqueror of all. Only to a small extent has this as yet invaded photography, yet everywhere and in every trade the possession of large capital gives a 'power of resistance' which is invaluable in business. I foresee the necessity for large capital, and more than anything I write this article to attract capital to the new Co-operative Productive Photographic Society, which I shall now proceed to briefly outline.

The Society is formed, its Rules have passed the Registrar, and its first allotment will have taken place before this article is published. The Committee consists of myself and Mr. Samuel Cox, photographers; Messrs. Lewington, Burns, Beck, and Ben Tillett, practical co-operators; and Mr. H. H. Champion, of the Kentish Labour Party. The Society

desires to form one photographic business to commence with, the workers engaged therein to gain the entire result of their labour beyond the necessary expenses and the provision of funds for sickness and superannuation benefits, reserve (to supplement earnings in bad times, and to defray general expenses during such period), and extension of the business.

The capital required to be subscribed for in the first instance is not less than 200*l.*—as much more as we can get, and as little less as possible. The shares are of the value of 1*l.* each, payable by instalments of 2*s.* 6*d.* every two months. Of these shares fifty-seven have been taken up at the time of writing this article. Productive co-operation has not been tried in our profession before, but every indication points to success. The business will be commenced in February or March in Maidstone (the seat of the registered office), or in any other town decided on by the shareholders at the forthcoming general meeting, when allotment will also be made.

The shareholders will receive the sum of their shares back in the form of yearly instalments of five per cent., after which repayment they will continue to hold their shares and retain their voice in the management of the Society, but without further payment of any kind. While the annual repayments are being made the shares will be transferable, and opportunities will be given as far as possible for the taking over of shares at their value from any member who does not care to wait for the repayments. Private transfer is also possible, on approval of the transferee by the other shareholders. The repayments by annual instalments mentioned above will be made from the fund mentioned below in head (a). Let us now examine the division of all income above the necessary working expenses. (a) Five per cent. of capital to be repaid yearly. (b) Ten per cent. depreciation of fixed stock and buildings to be met yearly. Further residue of income to be divided as follows:—(c) Reserve fund, thirty-seven and a half per cent. (d) Education fund (technical and other books and lectures), two and a half per cent. (e) Co-operative Congress, Co-operative Union, and social expenses for *employés*, five per cent. (f) Remuneration of Committee of Management (to be elected by members later on, the present being only a floating Committee), five per cent. (g) For extension of business and repayment of share capital (under rules which allow for the absolute wiping off of certain capital), fifty per cent.

The first general meeting of shareholders will engage the first employees. When more workers are required, capable and deserving men (or women, as the case may be) out of employment will be chosen. Head (g), which arranges for 50 per cent. of net residue to be applied for the most part to extending the business, will enable us to take the following action: As fast as accumulations of cash permit, new businesses to an unlimited number will be opened, the most successful to be retained, and the least successful to be dropped after a fair trial. The income from the larger concerns will offset the less successful establishments. Retouching, printing, &c., to be done at one common centre. For a considerable time to come, however, our first establishment will fully occupy our attention and absorb our income. I do not doubt that eventually we shall be employing eight or ten people in our first establishment.

As to wages, it is quite on the cards that the general meeting will

adopt the system of regular 'trade-union' wages all the year round, not fluctuating with income, but remaining fixed. All further sums will be used, not in 'profit-sharing,' but as I have above outlined; that is to say, very largely in extending the business and employing more workers. The promoters are to have no preference in payments or employment; the liability of shareholders is strictly limited to the amount of their capital subscribed; the accounts will be properly audited, and open to all persons interested.

I cannot enter more fully here into our scheme, but I will be glad to forward a prospectus to any one who sends a postcard to: 'E. F. Field 24 Church Street, Maidstone.' After the above bare statement of bare fact, which is enough to rob me for ever of any claims to a poetic temperament, I think every one will see that the enterprise has been well thought out, and will be well directed. For my own part, I also think it will occupy an important position in the future of photographic workpeople.

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### THERE'S A GOOD TIME COMING.

By REDMOND BARRETT.

WITH what anxious feelings must we all, who gain our bread by the art, regard the future of photography as a profession. At the moment, the prevailing feeling is that the art is played out—its brightest days have passed. Strangely enough, the professional photographer does not know what to do to alter this state of affairs. He does not bestir himself as would the keeper of a fancy shop who found his wares were not going off successfully. No, he seems quite astonished that the golden shower has ceased for a moment, and at once looks to his fellow photographer for sympathy. He naturally gets it, provided it costs nothing, and they mutually weep over the 'good old days' gone by, when they had it all their own way. Now, I do not think it is a case for weeping, rather follow the rule of the day and adopt the *dry* process. Look at things as they are, and face the troubles like men. Opposition has increased, competition has cut profits down—a sad mistake—but still there is a bright future for photography and photographers, but the latter will have to think more of their workers than they do at present.

As is only natural, my own most serious thoughts are influenced by the prospect of the retoucher's future status. I may be wrong, but I think his position in the future will be better than it has been for some few years past.

My own personal experience distinctly shows that there is a growing demand for better class work. By this I mean work that is sounder, truer to Nature, and, as a consequence, more artistic. Now this feeling must, sooner or later, have a most beneficent influence on the status of the retoucher. There will, as a consequence, be a demand for men who can do more than simply smooth faces and produce skins, the like of which no human beings ever had upon their faces. And for this blessing, strange as it may seem, we will have to thank the amateur much more than the professional, and the provincial professional more than the London one.

A great and much-to-be-deplored loss to London photography is the

total absence of individuality. I do not know of any house that professes a strong speciality at the present moment. Although I am writing mostly from the retoucher's point of view, these remarks apply with equal force to all the other *artistic* branches connected with photography. Why has photographic colouring slowly but surely declined? Who is to blame for its unfortunate downfall? Certainly not the poor artists who produced the work; rather the professional photographers themselves. The gradual reduction of prices paid for artistic work has driven the men of real ability to other pursuits, and their places have been filled by less able hands, to whom the remuneration appeared sufficient. The quality of the work depreciated, as a natural consequence, until at last the customers would have no more of it. One time a photograph well coloured was considered worthy of a place in the drawing-room. Now it has to take the proverbial 'back seat,' for it is only a *painted photograph*. In simple fact, it is valueless. It started by being a simple photograph, and the hand that coloured it had not the power to bestow the necessary artistic merit that would render it a work of art. As an example of the difference between the past and present, it would prove highly instructive to compare the miniatures of five-and-twenty or thirty years ago with those of to-day as turned out (I cannot say painted) by our leading photographers. I do not say price has everything to do with it, but it has a good deal.

Now, I would like to see, in the struggle to make things better in the future, that an effort should be made to make every picture an individual success, and to leave it *just a little* like the person who may have sat for it. To help towards this result, the retoucher must banish the somewhat popular idea that excessive work, unlimited smoothing up, and a mechanical precision of touch, can ever be accepted as true artistic retouching. In the future, I feel sure, we will have to retouch with our heads as well as with our pencils—that the hand will work with the *head*, not by the rule of thumb. I have always tried to fight against the system of overworking, and mechanical precision of touch, which gained such hold on the profession for years, and to which I feel sure much of the present bad business is due. Photographs, as such, are not worth the price paid for them if they are not good likenesses as well. Reckless flattery pleases no one, and as we are all getting older, as we go on let us get less reckless at the same time, and we need not have much fear of the future of photography and retouching. There is a fortune awaiting the photographer who makes his mark for sound portraiture—pictures in which can be recognised the features of friends who are dear to us, and not the hard, expressionless, and lifeless photographs one sees at present about London.

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### MATT-SURFACED PRINTS.

By ALFRED I. TAYLOR.

PRINTS made on Solio (printing-out) or Nikko (developed) papers may be finished with a matt surface, which, for some subjects, gives a very artistic picture. Prints that are to be treated this way should not be over printed, or the finished picture will be dark and heavy.

Having obtained some very fine ground glass, such as is used for

focussing screens, the next thing is to make it thoroughly clean, which is best done with a damp rag and Monkey Brand soap; rub this well over the surface, wash clean, and then dry with a duster. When the glass is quite dry, dust it over with French chalk; the excess of chalk can be rubbed off with a tuft of cotton wool. The wet prints are squeegeed face down upon this surface, and backed with a sheet of paper which has been previously coated with gelatine. Let the prints get quite dry before stripping.

Should any dust have got between the print and the glass, shiny specks will show on the finished print. These may, if not too large, be ground out with a little powdered pumice-stone, rubbed over with the end of the finger. For prints larger than whole-plate, quarter-inch plate glass should be used, because of the great strain on the paper contracting when drying.

Prints finished as above are best mounted with a gelatine medium, which may be brushed all over the back, or only round the edge for a distance of half an inch.

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#### ART REAL: ART MANUFACTURED.

“Here’s to yer, Fuzzy-Wuzzy.”—

*Barrack-room Ballads*, RUDYARD KIPLING.

By H. A. HOOD DANIEL, F.S.I.

ARE we photographers going forward in the general advance in art and science, or are we retrogressing from a want of earnestness, or are we standing still, wasting our opportunities, and trying to deceive ourselves into believing we are doing something that we are not?

With regard to means and processes we are certainly not guilty of the first two, thanks to those patient and true investigators and experimentors whose ever-honoured research has done so marvellously and so much for photography. But as to what we produce, our pictures, which should should be things of beauty, and so joys for ever (and they need not fade nowadays)—are we not in imminent danger of being justly accused of ‘faddism,’ of a very commonplace and unrestful searching after novelty, of a masquerading or shoddyism? Indeed, I fear so; and let me say I truly believe, nay, am convinced, that any such guiltiness with regard to our art (and I maintain it *is* such) will bring us face to face with a bugbear, that which has now become the greatest curse to the painter’s art, I mean Fashion: that which crushes genius and starves the possessor, and makes his talent ‘a drug in the market,’ but salaams to, flatters, and even worships, novelty, and that which ‘catches on,’ to use an Americanism.

If we be photographers, why on earth must we in our productions as such try and fancy we are painters? Is not photography strong enough, rich enough, beautiful enough, without making it look ridiculous in the eyes of the public and true lovers of art by trickery, mimicry of a distinct art, and eccentricity bordering on the comicality of the productions of Egypt or Ancient Britain?

What is the art of picture-making? With regard to landscapes and portraits, is it not to hold the mirror up to Nature? Is it

not to present as faithfully as it is possible that which the healthy man or woman sees? Is it not to place in our hands, on our walls, or elsewhere, scenes, figures, and so forth, and to do so so realistically and naturally that we may (as we have often done) lose ourselves in thought and reminiscence to the extent of believing we are miles away, or are holding sweet converse with one before us? Surely that is so. But ye gods! preserve us from being guilty of familiarity with such outline as has been placed before us by some of late; let us not be convicted of such a 'falling away,' such a following of Bacchus as must have been necessary to make these said outlines (save the mark) appear natural in our eyes.

Can there be anything more delightful than the haziness of outline in a picture with warm summer mist, of distance at sea or on the horizon, of accessory or minor portions in a portrait? Assuredly not, for it is Nature. But must we always live in such surroundings, must we pretend to believe that we cannot see, until we bestow exclusive attention upon it, whether we are looking at a flock of sheep or an assemblage of wooden toy horses? And yet I am not extravagant in the simile. I myself saw at an exhibition not long since, in a photograph of a landscape, what was intended for a man driving, what?—well, it looked like a cross-legged table—but, as I imagine it was intended to be a moving object, I suppose it was a horse or a donkey; but oh! how perfect in 'fuzziness.' And this is art!

If it be so, then yet another art must be created, 'the art of interpreting photographs,' for Walker tells us that 'art' is 'the power of doing something not taught by nature and instinct;' and I defy any honest man to say he knows by nature what are represented by some of the photographs of that so-called 'school' (whose disciples surely must adopt the unintended but suitable lines of Kipling's at the head hereof), therefore to understand them may be an 'art.'

Again, why these coarse, washed-out looking, sail-cloth pictures, photographs on canvas? Is it because painters paint on canvas? Surely such were the acme of affectation and childishness. Now let us reason a moment. Why does a painter produce his picture on canvas? There is one answer only. Because of its lasting nature and lightness, and its power to support, undamaged, the paint, the picture being of large size. But the painter's canvas is prepared with thick layers of white paint first, so as almost to obliterate the grain, and in very many cases he paints pictures of smaller size on panel or millboard. Not so your 'painter-copyist.' He does *his* picture (because it is smaller?) direct on to the canvas. How charming, how delightful, to make the sweetly delicate skin of a beautiful woman as much like a potato sack as possible! How artistic to carry a good thick cord of the canvas through the centre of the eye, calling on the way at the man's nostril, and finally settling down in his breast-pocket; or in a partially draped figure, cutting up the flesh gradations and tones as if the model or sitter were made of plaster on a wickerwork frame! And this is art!

Do you like the 'chiaroscuro' which a rough paper heightens? I do, it is delightful; use it by all means. Do you like the breadth produced by shoulder lines and drapery softened off, and the features thereby made more telling and impressive? Do you like the dreamy and enticing effect of distance melting away into subdued definition? Of course;

verily it is beautiful: it is nature. And more: if a valuable enlargement, or—for the matter of that—any picture, be thought less safe, less enduring on paper, by all means print it on a fine texture Nainsook silk or some such material, such as one very pleasing example at the 'Photographic Salôn; ' there was breadth, but there were no asperities.

Let us do all these things, and everything natural, and in good taste, and pleasing; but oh! in the name of all that we have been taught is *real art*, expel all that savours of art manufactured, of pedantry, of shoddyism! Don't prostitute the use of your Ross or Dallmeyer objective with your 'fuzziness; ' don't let your pictures produce dizziness on the spectator's vision, or make him feel he is everlastingly looking at the landscape from an express train window. If we desire to convey an impression to the mind, let us do so, and not suggest a problem to be left unsolved. Let us focus our pictures, *for each part will, like nature, equally and in its turn recede from focus when the eye is concentrated on another.*

Let us improve, let us beautify; but, I would again say, don't let us try and be something else; don't make bogus 'schools,' and, above all, don't bring photography into ridicule and at the same time simulate the 'Dog and the shadow.'



## PHOTOGRAPHING THE INVISIBLE.

By W. MATHEWS.

THE revelations of the camera are extending continually. Invisible stars, invisible landscapes, invisible pencil-erasures, invisible bacilli, invisible scars upon the skin,—if not, in fine, invisible spirits of the departed,—stand arraigned and confessed before this up-to-date inquisitor. The presiding genius of our modern chamber of judgment, in lieu of a monkish cowl, wears a focussing cloth; and instead of instruments of torture, he is the proud possessor of a scientific spy-glass and some highly-sensitive films! The 'invisible satellites of Georgium Sidus;' the night-enshrouded Lake of Geneva; the insidious disseminators of an epidemic; the futile processes of a will-forger; the almost obliterated vestiges of scars imprinted during infancy; all these, which the human eye fails to note or to reveal, the modern detective, with his kodak, triumphantly drags into the light of day.

Meanwhile, the exact formularies which make for success are scarcely yet sufficiently understood. The mode and the duration of the exposure; the employment of double or triple films, differing in sensitiveness; the relay method and the bettermost of the ways of dealing with faded photographs; these have each an accredited value, but they have not yet been dealt with lucidly by the experts, nor their adaptation to given instances set forth.

It is within the four corners of our topic to remind those who have of late been devoting attention to 'identification by finger-tips,' that there are other and more accessible data than the digits. An untouched photograph is rarely without some item special to the individual sitter—to do no more than merely mention those definite measurable areas which remain unchanged during the lapse of years. These items are such as

may always be relied upon, under the proper conditions, for an infallible verdict.

Yet it must be admitted that the retouchers have much to answer for in that regard. They 'touch-out' more severely than they touch-in. Take, for example, the very numerous sittings to which the Tichborne Claimant has submitted. There are few of them that have not been more or less materially affected by this touching-out process. Had but the artists rightly divined what it was they were erasing, it might, perhaps, by this time, have been the better for the fortunes of their sitter. It is enough to say here—despite the retouching—that in almost every instance which has come under the notice of the writer, some or other relic of that which was in hiding, has survived the process.

And here it is that we expressly touch the topic of this paper. Here it is we come in contact with the singular fact—not so remarkable, however, since so great a flood of light breaks in upon the matter—that the curious investigator will seek in vain upon the living face of the Tichborne Claimant for those relics of which he is here apprised. The Claimant himself can offer no comment upon the disclosures—much less la; he sought to base upon it any proof of his personal identity. As a matter of evidence it reaches him entirely from without; and until within a very recent date, he has remained wholly unaware of the real nature of the statements which have already appeared in these pages.

It will be noted that the photographs to which we are here referring are of two epochs, separated by a lapse of about a dozen years. And it should be further noted, that at the period of the earlier of the two epochs, the Daguerreotype process only was in vogue. It results, that certain of the details present themselves with characteristic differences. More emphatically, it must be premised—and this is in consonance with the sworn testimony of the eminent specialist, Sir Wm. Ferguson, that an extensive abrasion of the cuticle has occurred at the bridge of the nose, due to a fracture from which particles of bone had exuded. Hence it can be no matter of surprise that nothing abnormal is now perceptible in that vicinity. It has been granted that this is a circumstance not without exceptional importance. For, at that very place, on the portraits of the earlier epoch, may be faintly discerned a significant heraldic device. This is no other than the Tichborne crest. In heraldic parlance, it consists of 'two wings, displayed, with a stag's head in the centre.' On the other side, there is even more distinctly apparent, the crest of the Doughty family—to whom the Tichbornes were by marriage allied. This crest consists of 'three mullets' or rowels of spurs, emblazoned upon a fillet. That these two very significant items cannot, so far, be verified upon the later portraits, is an undoubted disparagement. It can only be said that their absence is reasonably attributable to the intervention of the accident described, and which was within an ace of being fatal. Proceeding from the central particulars, may be traced elaborate festoon work of great symmetry, encircling the orbit of the eye, drooping downwards to the chin, and terminating similarly on either side of the face. This portion of the design may be verified without difficulty upon the portraits of both epochs alike. And it is of material significance that upon placing together the sections, geometrically divided, of the two epochs, the continuity of the depicted tracery and the contact of its several lateral lines, is perfect and unimpeachable. That so absolute an agreement between these hidden

particulars could have occurred fortuitously, must be placed entirely outside the region of possibility. It follows, that the absence of the emblazoned crests cannot, in reason, be deemed so vital in its consequences as otherwise it would be.

To proceed here into additional detail would be somewhat inapt, and it is not the purpose of the writer to fetter himself with special pleading of any kind. It has been from time to time his chosen function in these pages to deal with the general topic of 'identification by photography,' and this cannot be alleged to be in any way out of place among the contributed papers of these widely-read annual volumes.

In directing attention to the matters now first specifically recorded, it is the view of the writer that they come well within the scope and province of photographers to pronounce upon them; just as legitimately, indeed, as, in another field, it comes within the purview of the broad-minded archæologist to deal with coins and 'rubbings,' with Rosetta stones and Hittite inscriptions.

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### AN ERROR CONCERNING EXPOSURE.

By ALFRED WATKINS.

THERE is a simple theory running in the minds of many photographers, that, if the light reflected from the subject to be photographed could be measured by an accurate actinometer, the result would form the best guide for the estimation of the correct exposure. Over and over again I have found this opinion turn up in conversation on the subject, and even an authority like Mr. C. H. Bothamley expresses it in speaking of the problem of exposure in the *Ilford Manual*. He says: 'Not much help can be obtained from actinometers, because they only measure the intensity of the light where the photographer is standing, while what we ought to measure is the intensity of the light reflected from the different parts of the subject.' Let me remark, in passing, that the second part of this paragraph is glaringly incorrect, for the chief point I insist upon in my instructions for the use of an actinometer is that 'the light which falls upon the most lighted part of the subject in which detail is required, is that to be tested;' and it by no means follows that the test is made 'where the photographer is standing.'

Again, Mr. J. R. Courtenay Gale, in the September number of *Dry Plates*, says that 'We want badly an instrument which will measure for us, quickly and accurately the value of the light reflected from the brightest or, if you will, the duller part of any object we desire to photograph.' Now it happens that this theory, expressed with so much confidence, is, as I shall try to point out, quite false. In order to see the matter clearly, we must consider the end we aim at when we make a photographic exposure. We have a grasp of objects before the camera of various colours and shades, and our object is to utilise the light reflected from these various objects to form on the plate a series of corresponding impressions, whose opacities shall vary in exact proportion to the visual intensity of the different objects. This is what we try to get, but we know, as practical photographers, that we can only attain an approximation, and that if we expose correctly for the darkest, a most non-actinic in colour the group, we over-expose for the light objects (as sky in landscape),

and *vice versa*. It follows, then, that there is in the group of objects, one of medium colour, which, if taken as the keynote of exposure will lead to the best compromise in exposure for the whole group. In a group of chiefly dark-coloured objects, this key object (if I may use such a term) would be very much darker than in a group of statuary.

I will presume that all the difficulties of catching the reflected light from this key object (and no other), and making the necessary observation with a sufficiently sensitive actinometer, have been overcome. That (for the sake of an example) the photographer has two groups of objects to make trial on; the one dark in colour, and the other light in colour, but both illuminated by the same intensity of light. Suppose the light key object is tested first, and its reflected light discolours the paper of the actinometer to the standard depth (or performs other standard chemical work), in five seconds (or minutes), and that a correct exposure of the plate is made in accordance with this test, resulting in a negative in which the opacity of the key object is correct. Now, suppose the dark key object be tested, and the light reflected from it is found to take fifty seconds (or minutes) to do the same chemical work on the actinometer.

According to the theory I am combating, an exposure should be given to the dark key object in inverse proportion to the actinic light it reflects, and it should therefore receive ten times the exposure of the light key object.

Pause for a moment and consider the result you will get. The rays from the light key object have been proved (supposing your actinometer to correctly represent the plate), to do a certain amount of chemical work on the plate in one-tenth the time that the rays from the dark key object take to do the same work; and as you are giving exposures in this ratio, you will get on the two plates the same amount of chemical work done on the image of the dark-coloured object as on the image of the light object. In other words, in the two negatives the opacity for the dark object will be identical with the opacity for the light object.

Now, is this what you require as a practical photographer? Do you require the opacity for grass in a landscape negative to be the same as the opacity, say, for grey marble in a group of statuary? You know that if you get it so, the landscape negative is greatly over-exposed. In short, the theory is a false one. This is where the blunder creeps in, the theorist knowing that a dark object takes longer exposure than a light-coloured object, and knowing, also, that the dark object reflects less actinic light than the other, jumps to the conclusion (a wrong one) that the increase in exposure will be in inverse proportion to the reflecting power.

I am not speaking from theory only, as I have tested the matter in practice. I took two plaster casts, one white, the other painted a dark colour. I placed the white one in sunlight, and so arranged an actinometer at the back of a camera (without a lens), that only the light reflected from the plaster could reach it. In this way I tested, under precisely equal conditions, the relative amount of actinic light reflected by the two flat casts (ten to one). I then photographed the white cast, giving a correct exposure, and immediately afterwards photographed the dark cast, giving ten times the exposure (being in inverse proportion to its reflecting power). The two plates were developed together for the same

time, and, as I anticipated, they were as nearly as possible of the same opacity, whereas, of course, the dark cast requires a negative of much less opacity than the light one.

I am firmly convinced that the proper method of using an actinometer as a guide to exposure is to test the light which illuminates the subject, and to treat the variation for different coloured objects as a separate factor.

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## TRANSPARENCIES FOR ENLARGING.

By R. W. WICKS.

IN the course of my business as a Trade Enlarger I am continually receiving negatives for printing in carbon that have been enlarged by the senders themselves and are totally unfit to make good carbon prints, owing to their very flat appearance and total lack of vigour or clearness in the shadows. On pointing out the fact, it has transpired that the transparency from the original negative has been made by contact with a dry plate. The objections to make carbon transparencies appear to be the somewhat messy process of preparing the glasses with bichromated gelatine, and keeping them free from dust, &c., when drying, although it is an acknowledged fact that no process will yield a transparency so suitable for enlarging purposes as those made in carbon, and the following is a simple method that can be done quickly and without the trouble of preparing the glasses with a substratum of insoluble gelatine.

After exposing the tissue, coat a perfectly clean glass plate with thin plain collodion, and when just set, place in a dish of cold water and wash until all greasiness disappears. Squeegee the tissue on to the plate as usual, and place under a glass to press flat. Allow it to remain for ten minutes before developing. It will afford a good hold, and is in every way as satisfactory as the more troublesome method of first coating the glasses.

I do not suggest this as anything new, but to those who require transparencies it is a very simple plan, and saves considerable trouble. If made in this manner, they require varnishing, which greatly improves the brilliance of the shadows. It is necessary to print deep enough to secure every bit of detail in the highest lights of the negative, and, if correctly exposed, it will show only the extreme high lights when laid down on a piece of white paper, every other part should be well covered; but there is considerable latitude allowable in exposure, and equal results can be obtained from either a thin or dense print, providing no detail is lost.

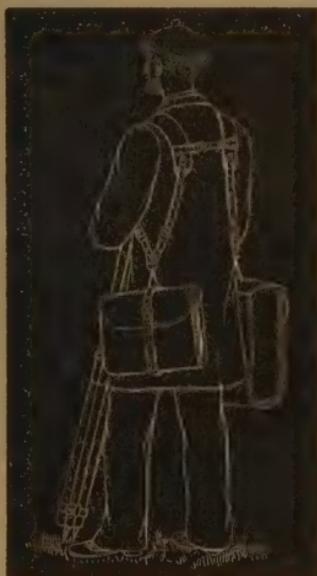
If the negative is a very thin or weak one, it should not be printed deeply, but, after development, can be intensified by immersion in a very dilute solution of permanganate of potash until the image is turned to a non-actinic colour, the permanganate acting on the image only in proportion to the thickness of the film. Thus, the highest lights being very thin or scarcely any film at all, are but slightly affected, while the heavy shadows, containing a quantity of the pigment, are rendered very non-actinic, and from this a negative of any density can be easily obtained,

The simplicity of the above method and the satisfactory results will be found to be its own recommendation upon giving it a trial, and at some future date I may have something to say concerning the production of the enlarged negative.

### EASY CARRIAGE OF APPARATUS.

By GEORGE BANKART.

THE carriage of photographic apparatus under circumstances where driving is impracticable, and especially when it is adapted for dry plates larger than 'whole-plate' size, is usually attended with much inconvenience. Being personally a worker on large plates, I have been led to devise a simple contrivance which has the following advantages. The sketch sent will explain the principle pretty distinctly, which is that of a 'yoke' suspensory apparatus made by a local saddler. Two shoulder-pieces of saddler's narrow girth-webbing (attached at the back by a short,



adjustable strap to prevent slipping off the shoulders) are fitted with straps passing under each arm. These are attached to a short 'buckle-piece,' which enables them to be shortened or lengthened as convenient. From the buckle-piece is suspended a brass spring hook, such as are used for horse bridles. The spring hooks are hitched into a narrow strap passing round the parcels, which hang one on each side of the person wearing the 'yoke.'

The load should be divided into two parts as equal in weight as possible, say the camera on one side and the double dark slides on the other. The weight is equally distributed, the pressure is directly down-

wards, the chest is relieved from all *cross pressure* (the most trying condition under which *walking* exercise can be taken), and the comfort of walking with the load makes it easily bearable for weights which would be exceedingly irksome if carried in any other way.

The materials are cheap, the construction so simple that any saddler could make the 'yoke' apparatus in a short time, and I commend it to those who feel obliged to be their own porters on various photographic excursions.

## GELATINE *VERSUS* ALBUMEN.

By A. SMITH.

DOUBTLESS the pages of the ALMANAC will be teeming this year with articles on the latest gelatine papers. Hence I shall confine myself to briefly enumerating their advantages and disadvantages as compared with albumenised paper, from a professional point of view.

*Disadvantages.*—The fact that chloride paper prints much harder is a great drawback for professional use for small work, the popular taste being in favour of soft portraits. Of course, this can be partly remedied by getting soft negatives; but the busy pro. who does a good trade from his old negatives, might well hesitate before giving up entirely our old friend albumen.

The lack of a pure white colour renders gelatine paper unsuitable for vignettes; some pretty pictures can be obtained with the pink paper and combined toning bath, but a good many of the general public will not have photographs unless they are of the old photographic colour.

The high surface of emulsion paper is not an unmixed blessing; photographs mounted in scrap albums soon become rubbed, and lose their brilliant appearance, unless tissue paper is kept between each page.

Considerably more dodging and attention in printing is necessary than with albumen paper. It is a difficult matter to keep the paper dry during damp weather; if great care is not exercised, the paper will stick to the negative. Among the minor disadvantages I may mention the fact, that owing to the paper being thicker it sinks to the bottom; thus, most of the washing machines are unsuitable for this purpose, and red stains are very apt to appear, during hot weather, in the shadows, causing, in the case of large prints, much waste.

*Advantages.*—One of the advantages of chloride paper over albumen is the great saving of time in working, owing to its being ready sensitised, the rapidity with which it prints, and to the fact that prints need not be toned the day they are printed. I know of a firm which would have had to employ additional labour this last summer if it had not been for the aid of gelatine paper. Thus, in spite of the fact that its first cost is greater than home sensitised albumen paper, and that it swallows up considerably more gold, it cannot be said to be more expensive.

It is more permanent than albumenised paper. Variety of tone and surface can be obtained with little trouble, and photographs by this process can be mounted as opalines without using the hot gelatine bath, though it is advisable for plain-edge opalines to mount the prints with a solution of albumen. It drags out all the detail in a negative, thus rendering it possible to obtain, by careful dodging in printing, a good

print from a patchy and badly halated negative; further, with its aid good prints can be obtained from thin or dense mealy negatives, which would give very unsatisfactory prints on albumen paper. Owing to the absence of the maker's name on the paper, size, and clean edges, the paper can be cut up very economically; moreover, owing to its non-liability to tear, there is not near so much waste as with albumen. This is more noticeable where large prints are turned out in quantities.

Though it may not be wise to give up altogether albumenised paper, professional photographers cannot afford to eschew this new power in photography, but must add one more process to their printing department.

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### PHOTOGRAPHERS' EYESIGHT.

By G. R. BAKER.

THE old saying of the 'shoemaker's wife being the worse shod' might be altered to 'Scientific men and photographers are often more careless about their eyes than the ignorant.' Photographic lenses that have cost them so much are cared for because it touches the pocket in a most direct manner if they get injured; but even these sometimes are not as well treated as they might be; but when it comes to spectacles or eye-glasses, anything then is good enough to wear or use.

The probability is that, knowing how to focus an ordinary lens, and get the equivalent or the back focus of a photographic lens, this knowledge is apparently sufficient for them to pick out from a packet of glasses the right (!) one for their eyesight.

If there were no such things as hypermetropia (or over-sightedness) or astigmatism, this might, perhaps, not be so serious; but when one knows the injury done to the eyes by the great muscular strain put on them in cases of the former peculiarity of eyesight by using glasses far under power, and in the latter instances of error of refraction by not having the same corrected by the right cylindrical lens, either alone or in combination with a spherical curve, it behoves all to look carefully into this matter, for an astigmatic eye cannot at any distance get perfect definition of objects.

Beyond this fact there is the great advantage gained in professional work by having glasses properly adapted to the sight, first by the improved vision obtained in examining photographs and in reading, and, second, the distinct gain in viewing linear work; for no astigmatic eye can see lines in opposite planes in true focus at the same time, for, if horizontal lines are really sharp at a given point, vertical lines will be indistinct. This, when focussing with the camera, is soon apparent, and, although neutralised somewhat, when a hand-magnifier is used by altering the focus slightly at will, the effect is nothing like it would be if a pair of spectacles were used with extra powerful convex lenses, with the cylindrical correction at proper axis that would enable the image on the focussing screen to be sharply seen. An artist's spectacles with flat top are the best for this purpose, as they permit of the eye at once seeing over the frame distant objects by direct vision. When it is remembered that a normal eye cannot focus properly and naturally at any less distance than eight inches, it will be understood how convenient (when in the restricted

limits of movement under the focussing cloth) it will be to have spectacles that enable the head to be half that distance away from the ground glass.

How many men use glasses all awry, the glasses not in proper plane, and the frame so out of shape that one lens is up and the other down? In one case there appeared some portraits of medical men in the *Daily Graphic*, and on one page two were wearing glasses, and in both instances were of bad fit, either out of truth, or not correct for centres. How often does one see spectacles worn with cracked glasses, and men in years going about without glasses, their eyes screwed up, and not seeing naturally because they have passed that degree of presbiopia when convex glasses are only wanted for reading and writing, and the lens of the eye has so lengthened in focus that it requires a low-power convex lens to shorten it to normal focus for distinct and easy vision. Let any one who has any doubt about their eyes have them tested by means of a good optometer in the hands of a competent optician or by consulting an ophthalmic surgeon, and find out what the focus of each eye is, the range of accommodation, and if there is any error of refraction existing, such as astigmatism, &c. They will then have the satisfaction of knowing they are doing what is right to preserve that great, if not greatest of all senses, 'seeing.'

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### THE WATKINS EXPOSURE METER.

By R. C. PHILLIPS.

My article in last year's ALMANAC being devoted to the Actinograph, I propose now to say a few words on the 'Exposure Meter.'

The construction and general mode of use of this instrument are so well known as to hardly require recapitulation; five scales, of logarithmic construction, are set with respect to each other, indicating respectively the actinism, plate speed, subject-character, diaphragm, and exposure required.

If the four data, or arguments, are correct, so will be the resulting exposure; and unless some egregious blunder be committed, these data can be determined quite correctly enough for practical purposes.

The causes of error in these numbers may here receive a brief comment. The determination of the actinism being found immediately before the exposure, will seldom be liable to much variation in the interim, and will always be visible; it may be allowed for by the simple table:—

| Very dull. | Dull.          | Mean. | Bright.       | Very bright.  |
|------------|----------------|-------|---------------|---------------|
| 2          | $1\frac{1}{2}$ | 1     | $\frac{2}{3}$ | $\frac{1}{2}$ |

where the Mean is taken as unit; that is, when the sun casts a faint shadow; and the relative exposures are as the numbers under them. Thus should the actinism be found when the light was 'bright,' but should it have meanwhile changed to 'dull,' a double exposure should be given. Had the light been 'very bright' at the time of observation, three times the exposure will be correct. As to the sensitive bromide paper used for the determination, it appears to be practically of uniform speed, and keeps well if the instrument be carried in the pocket, *not* stowed away in a cold, damp cupboard.

The plate speed should be, in my opinion, determined by the method of Meesrs. Hurter & Driffield; I am aware that Mr. Watkins is not of my opinion; but patience, we shall arrive.

The subject scale is, I think, entirely concerned with the prevailing colour of the object.

Where many and indescribable tints prevail, as is the case in ninety-nine out of a hundred instances, 100 is the proper argument, but when notoriously non-actinic shades have to be copied, regardless of the brighter coloured portions, a higher number should be chosen. Regarding the diaphragm scale little need be said, the stops should be marked as accurately as possible.

If the atmosphere be clear, distance makes but little difference in the visual brilliancy of an object, and may be disregarded. An objection that has been raised that some lenses are coloured and obstruct much light, admits of the satisfactory reply that if this be so, exposures through such a lens should be determined by increasing them in the constant proportion indicated by the faulty lens.

But the uses of the meter to which I would more especially draw attention, are in cases out of the run of out-door photography: In the taking of dim interiors it is very advantageous to set the stop of the lens so that by commencing the exposure, and exposing the sensitive paper of the meter simultaneously, the plate exposure is complete when the bromide paper attains the standard tint.

For this purpose a slow plate has to be used, or else the smallest stop will be too large to admit of this system of synchronous exposures; the details of which are explained in the explanations accompanying the instrument.

When an exposure runs on into hours, the existence of this check on its progress is invaluable, and the subject is such as to necessitate the use of a small stop in any case.

The meter can be utilised in many ways not yet mentioned; it is of great use as an actinometer in carbon printing, as I shall now endeavour to prove.

I made a collection of scraps of more or less developed plates, and measured their densities by a photometer of the construction of Hurter & Driffield. By marking these with the density, the *maximum* density of a given negative could always be matched. Suppose, for example, that the maximum density were 2.300. Then two pieces of the developed plates, of, say, 1.600 and .760, giving the sum 2.360, would be near enough for my purpose. Placing these glasses on the top of the exposure-meter, and exposing simultaneously with a carbon tissue under the given negative, the exposures will terminate together. That is, when the paper has changed to the standard tint, the tissue will be sufficiently printed. The meter may be rapidly examined in the shade to watch its progress, and the glasses replaced without delay.

It happens that the relative sensitiveness of the bromide paper and the carbon tissue are thus related to give the very simple result.

For platinotypes and other printing processes where the progress cannot well be observed, the same expedient may be adopted, with some constant factor, to be determined by trial, to deduce from the density of the negative the required density of the plate with which to screen the sensitive paper. For such purposes the body of the meter is not requisite

a roll of sensitive paper and the accompanying tint may easily be arranged to form an efficient actinometer, more efficient, I venture to think, than the forms at present before the public.

More accurate results could be obtained by using the mean density of the negative instead of its extreme density, but for most purposes trial shows that this last is sufficiently reliable for carbon printing, and therefore probably for the other processes to which the system may be applied.

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### RODINAL DEVELOPER.

By HORACE H. RODEN, C.E.

MANY workers find a difficulty in obtaining density with this developer. Indeed, with certain plates plenty of detail is evolved, but only thin negatives result, no matter what exposure is given.

As a developer for hand-camera shots it is excellent, and, used intelligently, brings out an amazing amount of detail, even in cases of rapid exposures in bad light. Plates may be left in it for hours without fear of either fog or stain. It is easy to use, and handy to carry about, but it has the one drawback—lack of power of giving density.

To overcome this, an excellent plan is to make up a normal one in thirty solution, and to mix with it an equal bulk of hydroquinone developer. This is used as the normal developer, and it will be found that the hydroquinone gives as much density as is required. When the developing power is getting exhausted, add a few drops of rodinal; the hydroquinone does not seem to require renewal. The developer should be filtered after use, and kept in a coloured bottle, so as to prevent the action of light. My own normal developer is of a beautiful ruby colour, but has lost none of its properties.

In practice I have three bottles going, one normal, one of strength one in sixty for under-exposure, one of one in thirty with a small proportion of ten per cent. solution of bromide added for over-exposure. The two latter have no hydroquinone with them.

I commence development with normal, and change to either of the others as circumstances require. I always finish up with the normal bath for density. All the developers should be kept in coloured bottles or in the dark, as rodinal loses its power when acted on by light.

I only recommend this developer for snap shots; for ordinary camera work there is nothing to beat our old and trusted friend pyro.

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### OUR PRINTERS.

By F. S. MINTON.

My contribution to this ALMANAC will perhaps interest professional photographers and manufacturers of photographic printing papers more than amateurs, but it is, nevertheless, of the greatest importance to all.

I do not for one moment wish to cast a slur upon the whole body of professional printers, but it is impossible to be connected for a number of years with the photographic industry without discovering the incompetence, and also the indifference, to his own welfare of the average trade printer. There are men who are industrious and persevering, always trying to improve their work, and to master its technicalities, and making themselves every day of greater value to their employers. Such men deserve much encouragement, but they are unfortunately the exception, and are not the men who usually answer our advertisements for 'first-class printers.' The object of my article is not, however, to abuse the already much-abused printer, but to look for the cause of his troubles in the first place, and in the second to suggest a remedy.

*The Cause.*—I am not speaking without my book. To my cost, brother printer, a long experience has taught me that your principal troubles arise from a want of a thorough and technical education in the work you have to perform. Certainly this is a strong indictment, but most men have learnt to print and tone, in much the same way that a parrot learns to talk, and if the least thing goes wrong with his bath, they are immediately stranded. Now, this is not as it should be, and why is it? Simply that your average printer never troubles to read, in many cases, even the printed instructions issued with the papers, and, as to studying any of the standard published works on the various printing processes, or articles in the journals—well, that is entirely out of the question. In several cases printers of many years experience have admitted to me that they did not know there were any works published on the subject of printing and toning.

Imagine for one moment that a man is employed in a firm where only albumenised paper printing is done by his employer, and that he remains five years in this situation, the probabilities are that he has never made the slightest effort to become acquainted with the working of the various other makes of photographic papers—nay, I will undertake to say, if you inquire into a hundred such cases, that ninety per cent. of them have never troubled to study the subject of carbon, platinum, bromide, or gelatino-chloride printing during the whole time, and when such men, from any cause, find themselves in want of situations, they wonder how it is they have such difficulty in getting good berths.

Masters are to blame for this state of things as well as the men, and it is to the employer's interest to see that the evil is remedied with the least possible delay. It is as wicked as it is cruel to keep these poor fellows slaving on all their lives in one groove like this, and with no prospect of improving their positions. If the master himself is unable (as many unfortunately are) to teach the men, then let him insist on their either attending classes, or reading upon the subject some of the standard works, and also give them opportunities of experimenting occasionally with the various processes. By doing this they would not only improve the position and prospects of the men themselves, but at the same time improve their own positions, and put more money into their own pockets.

It is not necessary for me to enlarge upon the troubles of the situation I have presented to the professional readers of the ALMANAC. You all know of the existence of the evil as well as I do; it has been with us from the beginning, still we have borne it and grumbled incessantly.

*Now for the remedy.* It is not an original idea, but, like many things in photography, only a 'crib.' The numerous Yankee type-writing companies in this country, by their method of doing business, have suggested the proper remedy to me. When you buy a machine of the Remington, Bar-lock, or Yost Type-writing Companies, they will also supply a lady to manipulate it at the same time. She is *au fait* at the work, thoroughly understands the machine, and, if anything goes wrong, knows how to put it right. I am of opinion that it would be to the interest of all parties concerned if the manufacturers of photographic printing papers adopted a similar course. Let the men attend classes, and give a little time to the manufacturer in return for the instruction they receive.

Here is a grand opportunity for the N. A. P. P. to come to the front, and meet the leading manufacturers with a proposition of some such scheme as I have proposed, and if they can be induced to give instructions on two or three days a week to professional printers in the working of their various processes, we shall soon have better prints and printers, less grumbling at supposed defects in paper, better wages for the men, and larger profits (on account of increased trade) for the masters. The Eastman Company has done something in this direction with their demonstrators, and all honour to them for their push and perseverance; but what is wanted is more of it. Let the employer see that his assistant takes advantage of any little concession that may be made in the future by the manufacturers, then the lots of the professional photographer and his printers will be happier than they have been in the past.

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### IMPROVED HYDROKINONE DEVELOPER.

By W. HANSON.

A FEW years ago I published a modification of a well-known formula for the Hydrokinone developer, which, if it was noticed at all, may have astonished some workers by appearing to contain a far too large proportion of bromide.

However, experience of its working induces me again to recommend it for the production of negatives, in which strong contrast and transparent shadows are needed. For copying it is excellent. The formula is—

1.

|                         |             |
|-------------------------|-------------|
| Hydrokinone .....       | 160 grains. |
| Sodium sulphate .....   | 2 ounces.   |
| Citric acid .....       | 20 grains.  |
| Potassium bromide ..... | 160 „       |
| Water .....             | 20 ounces.  |

2.

|                     |             |
|---------------------|-------------|
| Sodium hydrate..... | 160 grains. |
|---------------------|-------------|

Use equal parts of each solution.

Potassium carbonate (2 ounces) may take the place of the sodium hydrate preferred.

## AN ADJUSTABLE STAND FOR TALL BUILDINGS, ETC.

By AUGUST BAER.

THE illustration shows my four-footed adjustable camera stand for photographing architectural subjects, street scenes, and such-like. It explains



itself, and has been built according to the suggestions of the Editor in one of the back numbers of the JOURNAL. It is wonderful what a difference the employment of such a stand will make in the perspective of a large building.

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## HOME-MADE ISOCHROMATIC PLATES.

By E. RAWSTORNE.

As the isochromatic or dyed plates have now proved their value, I thought perhaps a few remarks upon the subject might be of use to some of your readers.

I have experimented upon a great many commercial plates during the last few years, and have found nothing better than erythrosine for the purpose of rendering them colour sensitive, and consequently enabling them to give nearly true light values. As the method of drying them is very simple, anybody so inclined can easily try the experiment for himself. As a rule the most rapid are amenable to this treatment, and I have found their rapidity increased, while at the same time the quality of the negative was improved.

The solution used is erythrosine, one grain; and common methylated spirit, three ounces; soak the plate for one minute in this solution, and allow it to dry; then wash in about half a pailful of water by striking the emulsion side smartly on the surface for a short time. This I have found the most effective way of removing the surplus dye. The plates should be thoroughly dry before using. An old box may be used for this purpose after being made light-tight, but freely open to the circulation of the air.

In conclusion, allow me to strongly advise keeping all water out of the solutions, as it has a strong tendency to make them uncertain while making the plates more or less marked, and very difficult to dry.

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### COPYING PAPER POSITIVES.

By G. H. E. SUTTON.

The reproduction of photographs forms no small item in the ordinary business of the average photographer, and to make the best of this class of work is an object worthy of his ambition. All manner, sizes, and qualities, come to swell the regular routine of his labours, and with necessary care and skill even the worst cases may be made very presentable; in many instances superior, and in most others of a quality scarcely, if anything, inferior to the original. It is a common thing to give this class of work to a learner, and even to the last boy, and to sandwich it in at any odd time when the studio is denuded of visitors. A happy-go-lucky system is a very reprehensible one, as the best work possible is not only the most creditable and honest, but is sure to bring more grist to the mill. To avoid the grain of the paper in copying, to hit upon the correct exposure, and to develop with an intelligent appreciation, are all absolutely necessary. The two latter items should be within the province of every one, and therefore it is only with the first of these three points that I purpose to deal. I have had much experience in copying of every description, and under all conceivable circumstances, and I invariably suit my developer to the subject and conditions, and if the exposure has been ill-timed, I make use of another plate.

With regard to the preparations necessary to produce the best results, we are necessarily more or less circumscribed in the way in which we may be able to set about it, for the photograph is presumably the property of another, and may not be tampered with. In such a case I always fix it up in a printing frame that is fitted with plate glass, which not only keeps it perfectly flat, but improves the effect in all ways. It is

astonishing, with the light rightly guided upon it, how it hides, or seems to fill in, the grain upon the surface of the paper. If the photograph to be copied may be so used by permission, I attach it to a piece of glass with a gelatine solution, in the same manner as the so-called opalines are mounted, which creates a perfectly homogeneous surface; and, with ordinary care and skill, the copy will have as fine a grain as the original, the difference, if any, being only discernible by an expert. Never work in a feeble, non-actinic light, and equally avoid a light that is full of glare and intensity. That which comes from a northern aspect is the most steady, reliable, and serviceable; and it is a matter of conditions to be judged of by the intelligent operator in the circumstances of each case whether it should fall directly from the front, be altogether a side light, or partly reflected, for there are conditions and circumstances surrounding every individual subject which he must necessarily decide for himself at the time of his operations. There need be no fear of any halo, for if the camera be fixed squarely on with the photograph to be copied, there will be no reflection whatever from the glass that is in the front of it into the eye of the lens.

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### OUNCES AND DRACHMS.

By THOS. GULLIVER.

IN the rather dim light of the dark room these are not easily seen in the usual ounce measures, particularly when developing rapid plates. I have found it a great advantage to proceed thus:—Well clean the measure with dilute nitric acid to take off every trace of grease; then, with the tip of the finger, rub in a small portion of good black Japan varnish (such as used by coach-makers); then, after it has stood for an hour, strain a bit of rag over the finger, just moisten the rag with turpentine, pass it over the glass to take off the superfluous varnish. This will leave the figures plain and visible, and add greatly to the comfort and certainty of developing in the dark room.

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### THE GOOD OLD DAYS.

By MARK OUTE.

I AM very tired of hearing of the good old days,  
 Weary of the plaudits that are sounded in their praise;  
 Faint reflections of a glory that is dead and gone,  
 Buried in the tomb of time—far better left alone.

If we could but bring them back again—these good old days—  
 I fancy that they'd startle, and strike us with amaze;  
 Progress has so rapid been—things are not what they seem,  
 And lauded past perfections are pretty much a dream.

Take the 'wet plate' and 'exposure' of the good old days;  
 Collodion has received from all its share of honest praise;  
 But to lengthen the exposure would prove a perfect craze,  
 And would never be adopted in these good new days.

Who pines now for the silver bath of the good old days,  
 With its pinholes, and its streaks, and its own peculiar ways ;  
 With stained fingers and stained clothes, and black stains over all ?  
 For the sake of decoration should we the bath recall ?

The lenses were like cannon in the good old days,  
 Weighty matters, truly ; but there arose a craze  
 For lighter, handier, instruments of scientific brand,  
 So on the shelf as monuments the aged optics stand.

Very solid were the cameras of the good old days,  
 So firm in their movements and rigid in their ways ;  
 With our advancing notions, away we've let them glide,  
 And these patents of the past have gone out with the tide.

The sharpest picture was the best in the good old days ;  
 Not so now, if you believe what the fuzzy photo says.  
 So each one bills his little show, and each his ware displays,  
 And by-and-by they'll all belong to the good old days.

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### MODERN DARK SLIDES.

By HENRY COOPER.

AMONGST the many practical points dwelt upon by your contributors during the past thirty years, I do not remember any specific reference to the necessity for attention to the springs of the modern double back.

In the old 'wet plate' days, so full of pleasant memories to some of us, the single dark slide was usually provided with a stout spring worthy of the name. When the wet plate was shut up in the slide, we never had the least doubt that the plate would be 'to the front.' But in the modern dark slide, even of the best make, it is often far otherwise ; the spring, made of the softest metal, readily gives way, and when the plates are inserted, and the outer clasps fastened, a slight shake given to the slide at once reveals that the weak spring usually employed is quite inadequate for the purpose intended.

This may appear a small matter, but the most highly finished camera, a high-class lens, and the most careful focussing, are often rendered useless by inattention to this point.

I often receive from a friend in the country beautiful little prints taken by him in an ingenious little hand camera of his own construction. The plates are used without dark slides or sheaths, and are pressed up to the rabbet of the camera by a spring. The remarkably good focus of his pictures always impresses me that here we have the solution of the puzzle why so many negatives, though otherwise good, are not as well defined as the photographer intended.

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### TO MATT GELATINE PRINTS.

By T. G. HIBBERT.

THE simplest way I have come across is to prepare ground glass or xylonite sheets with a *very* little lard. Warm plate against fire, when lard will begin to spread ; then with tuft of cotton-wool rub well all over, and as much off as possible ; then squeegee print. After once preparing,

I have squeezeed as many as six prints, the first two generally coming off themselves, and the remainder as if on ferrotypes.

#### TO MOUNT AS ORDINARY PRINTS.

Take the lot out of washing water, lay face down on wax paper, and drain; then paste as usual, again using wax paper to rub them down, which prevents them sticking and saves time, not requiring the alum bath.

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### ENLARGEMENT FROM PARTS OF THE NEGATIVE.

By HERBERT S. STARNES.

As the long winter evenings are coming on, and most of us will be looking over our stock of negatives for those suitable for enlarging, I thought a good subject for my annual contribution to the ALMANAC would be to draw attention to the number of little bits suitable for enlargement that can often be selected from one negative. One or two of the figures or animals from a group, the porch from the negative of a church, a tree or stile from a landscape, &c.

There are many amateurs who would like to do a few enlargements, but who do not care to go to the expense of purchasing a condenser of sufficient diameter to cover the full size of their negatives. But for enlarging from small portions of a negative, only a small condenser would be required; indeed, with a good lamp, it is probable that the part needed of the negative could be sufficiently well and evenly lighted not to require a condenser at all, only a piece of fine ground glass, to distribute the light.

Even those who have large condensers do not care to be always enlarging up to  $12 \times 10$  or  $15 \times 12$ . To all, I would point out, what a mine of subjects they could select from parts of negatives that are suitable for enlargement up to half-plate, or  $7\frac{1}{2} \times 5$ .

All being well next year, in hand-camera work I intend to trouble far less about the composition of the subject to the full size of my plate than I have done. I have often lost a good snap-shot by waiting until the principal figure was near enough to group properly on the whole of the plate.

Then again, often in a street scene, we have a large figure in the foreground, sharp, with a number of smaller out-of-focus figures behind. In such a case it would be often better to stand further back with the camera, and get all in focus, and then enlarge from any part of the negative required.

A friend of mine was showing me some negatives of the audience surrounding the niggers on the sands at Margate. As pictures, they were perfect failures, but each negative contained at least twenty little gems as life studies for enlargements. There was nothing out of focus or distorted through the lens being unduly strained. In future, for such subjects, shipping, &c., I am going to keep far enough back to get all in focus, fire into the mass, and sort them out after.

For enlargements, the best way is to buy the bromide paper in large sheets, focus the selected part of the negative to the size required, then cut the paper to the shape and size best suited to the subject. This is a far better plan than buying the paper cut to any settled dimensions.

## THE LANTERN STEREOSCOPE.

By JOHN ANDERTON.

THE idea of projecting upon a screen pictures that can be seen in relief is now about half a century old. It was in the year 1838 that Professor Wheatstone astonished the scientific world by his theories of binocular vision, and delighted it by his invention of the reflecting stereoscope; and since that time many scientists, and scientific instrument-makers have turned aside from their ordinary labours and endeavoured to obtain from their lanterns stereoscopic screen pictures. Lately I have met with many men who without the accurate knowledge of the former, or the practical experience of the latter have tried their luck with their lanterns, presumably in the vain hope that something in the way of relief would turn up to reward them for their promiscuous and misdirected labours. It does seem so simple in the stereoscope; there are two pictures, two lenses, two eyes and the thing is done, but transfer the pictures to the screen and the sweet simplicity takes itself off straight away. For the problem to be then solved is this. Upon the screen are two equally bright pictures, and it is required that one of those pictures shall be permitted to pass to the right eye of the observer, but that that organ of sight shall be as the eye of a man stone blind to the equally bright second picture; and upon the other hand, the left eye shall take the picture rejected by the right eye, and be blind to the one the right eye sees clearly, and these results must be obtained not only when the spectator stands on a specified square foot of space, but from any point of view he chooses to occupy, from which an ordinary lantern view could be seen. Therefore the ordinary stereoscope itself gives no assistance in carrying out the idea; its principles only being available, for in the instrument named the view, the lenses and the eyes must be in fixed positions, no one can be moved without the others, but in stereoscopic screen projection the screen is a fixture, and its views must be available for all spectators no matter what their position. Here, then, is the difficulty in a nutshell, but in a husk a trifle hard to crack; so hard indeed has it seemed to some who having unlimited faith in their own especial crackers and having failed to get at the kernel, have with self-assurance that approached sublimity declared that the thing was impossible.

In the system now under notice the stereoscopic effect is obtained by taking advantage of the peculiar properties of polarised light. Fortunately, perhaps, for the writer, this is not the place in which an explanation need be given of the phenomena obtained from light when in this condition, but to give a general idea of the working of the lantern stereoscope it will be necessary to say something about polarised light in order to make the matter intelligible. I will ask my readers, therefore, for the sake of simplicity, to imagine a ray of light to be shaped like the vanes of a weathercock, that is, having undulations in one line running north and south, and a second set going east and west. Under certain conditions this ray of light can be made to part either with its north and south, or east and west undulations, and yet travel along cheerily, appearing to the unaided eyes of mankind after its bereavement just as if nothing had happened to it although now bereft of one-half of itself. This robbery from the ray of light can be accomplished in more ways than one, and in

the lantern stereoscope this light larceny is made by a bundle of thin glass plates. Perhaps it would be more polite to the polariser (for so this bundle is styled) to liken it to a politician with strong ideas of partisanship, and not to a plunderer, and so we will consider it. This polariser is placed at a proper angle before the objective of a lantern, and it will now allow say the north and south undulations to pass through it, but the east and west undulations it sternly turns back. Now a polariser is like a politician, inasmuch as it can be turned round; and when it is turned round through but a quarter of a circle it becomes incensed against its former friends of north and south, and ruthlessly turns them back, whilst its old enemies the east and west are now its delight and are allowed a free pass through it. Whichever it be, on the transmitted light goes, and forms upon the screen an image of the lantern slide. To the unaided and sometimes easily taken in human eye this appears to be an ordinary projected picture, nothing more or less, but it is anything but that. For if we take a few plates of thin glass and look through them when held at an angle, we shall find that while all objects in the room are visible the picture on the screen has disappeared, if we now turn the plates round through a quarter of a circle the picture appears and is seen as brightly as without the glasses.

Instead of a single lantern let us take a biunial, and place before each objective a polariser. That in the lower lantern we will place in a vertical plane, and therefore by it no east and west rays will be permitted to pass. The polariser in the upper lantern we will place in the same plane, and with a similar result; but now we turn the polariser in the upper lantern through a quarter of a circle and as we have already seen its views are at once altogether changed for now it will pass east and west rays only, and turn aside those of north and south.

We have now upon the screen a picture projected by each of the lanterns, and again taking a few plates of thin glass in the hand we hold them before the right eye in a similar position (vertical) to that of the polariser in the lower lantern. This bundle of glasses seeks to act as its fellow polariser has done, *i.e.*, turn aside the east and west rays of the picture, but in this desire it has been anticipated, for all these rays have already been stopped by the polariser and so the picture from the lower lantern passes unmolested to the right eye, but it is a very different thing with the picture thrown by the upper lantern, for this is composed wholly of east and west rays, and these it sturdily refuses to pass, consequently of the two equally bright pictures on the screen one only reaches the right eye. Now taking a second bundle of thin glass plates we hold it before the left eye in a position similar to that of the polariser in the upper lantern. This will permit the picture from the upper lantern, to pass to the left eye, *i.e.*, the one composed of east and west rays, but that from the lower one it effectively rejects. We therefore get a different picture of the stereoscopic pair received by each eye, and as the two are superposed upon the screen as nearly as two slightly dissimilar pictures will, each falls upon a corresponding portion of each retina, and the irresistible impression is conveyed to the mind of one picture only, and that with all the attributes of solidity and relief.

I have assumed that the screen on which the pictures are projected is one that will steadfastly mind its own business, and writing from a trying experience I am bound to confess that screens resemble some well-mean-

ing human beings, and decline to do it, for all, made of ordinary materials as paper, linen, plaster, &c., receive the image polarised and before giving it back, supply the part that is missing and so upset the whole arrangement. This is possibly done by the screen with the very best intention, yet many and many a time I have been irritated past the excusing point, and have wished they had gone to carpet the way that is said to be paved with good intentions.

Discarding these interferers with polarity, I set about discovering a new material, and at length found it. It would have acted fairly well if the stereo lanternist were a centurion and took his five score followers about with him to help to put up his screen. A steam crane would have been an absolute necessity as a part of his outfit, and a few battering-rams would have had to be included to go before through the walls of a building to make a clear passage for the screen.

However, a screen was discovered that as it were shuts its eyes to the deficiencies of the beams of light reaching it, and gives it back as received without going out of its way to assume the role of benefactor. What is more it makes a very good screen for ordinary lantern work as it gives a far brighter picture than any paper or linen can possibly manage, and as it will roll up nicely, the ordinary screens have no advantage on the score of portability; further it requires no cleaning, for being well lacquered, dirt and dust find the fatigue of clinging to it dead against a continued rest in comfort. It will be apparent that the lantern stereoscope is not an elaborate apparatus that will do but one thing, for it is an ordinary biennial boasting the addition of two polarisers which being set firmly in a tube need no adjustment. These are pushed into the objective tubes and the lanterns are then ready for projecting pictures that appear with stereoscopic effect when viewed through a pair of analysers that are mounted to resemble a miniature opera glass. The experts of the daily and technical papers in their kind and clever notices of the lantern stereoscope have raised no objection to these little analysers or eye glasses, but from other quarters murmurs have arisen. The objection is a perfectly fair one, but is it quite fair to make much of it? No one without squinting most horribly and to a great nicety can see an ordinary stereoscopic picture in relief, and the stereoscope must be brought forward to assist the eyes. Here, then, we have a picture of a very few inches square, and every one wishing to see it must have a picture and a stereoscope all to himself. With the lantern stereoscope there is a twelve feet—or larger—picture which becomes the property for the time being of scores or hundreds, and the instrument required by each is about one-twentieth part the size of an ordinary stereoscope, and of about one-tenth the weight.

Further, as the lantern stereoscope may truthfully be described as an arrangement of bits of plain glass—no lens or prism being used—the little eye glasses need no adjustment; they have merely to be raised to the eyes and the blur upon the screen instantly changes to a clear picture in relief.

In the early days of my experiments I used ordinary stereoscopic transparencies, but as some of these were not sufficiently sharp to stand enlargement to ten feet, and others that were admirable in this respect were too dense to make good lantern slides, I wrote to a manufacturer who possessed a stock of good stereo negatives asking if he would kindly

print me two or three lantern slides. Seemingly this gentleman pitied my ignorance and dispised my efforts, for in his reply he modestly said, 'I don't know what your theory is, but whatever it is I know I could upset it in five minutes.' Feeling snubbed, but yet determined, I again wrote politely asking for the slides. Presumably with the kind intention of preventing me from wasting time and money, he sapiently wrote: 'The only way to see lantern views stereoscopically is to shut one eye . . . I advise you to read a work on binocular vision as applied to the stereoscope.' Another gentlemen, a maker of lantern slides, to whom I personally applied, said with a mournful shake of the head, 'Everybody's tried it. *I've* tried it, and it can't be done.' Later when I sent for one or two slides he had promised he sent word by my messenger, 'Tell Mr. Anderton with my compliments that he's chasing a shadow.' But 'a change came o'er the spirit of my dream,' when my old friend and science master, Mr. C. I. Woodward, B. Sc., of our Birmingham Technical School of Science came to a private demonstration. He was pleased at the effects obtained, and without delay wrote to Professor Stroch, F.R.S. The latter gentleman penned me a most encouraging letter and kindly sent with it three pairs of beautiful stereo lantern slides made by him from his own negatives. Mr. Alfred Watkins acted in a similarly kind manner and thus helped me; whilst a much valued friend and experienced amateur lanternist—M. W. Bayley Marshall, M. Inst. C. E., did much by constant expressions of his good opinion of my invention to take the sting out of the snubs received from other quarters.

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### TONING PLATINOTYPE PRINTS.

By J. S. TEAPE.

THE rage for black tones, which were the aim and desire of photographers for a considerable time, is certainly giving place to tones or colours of warmer hues. A short time ago printing papers were valued by their adaptability to the production of platinotype black, either by development or by toning; now, it appears the estimation is made by the ease with which a nice warm or sepia colour can be obtained. I think it is somewhat difficult to ascertain the reason for this change, unless the ideal in view is the production of a print which shall vie with a wash sketch in sepia. That some few have achieved considerable success in this direction you are well aware.

There are a large number of prints produced in which the aim has been to imitate a sketch in sepia, but has failed for want of some little beauty in line or gradation. The language of breadth few photographers understand, and seem surprised that the result does not please as does the sketch in sepia by a good artist. Pardon me for this deviation, but to our tone or colour: I am of opinion that some subjects look much better in a more or less warm brown than they do in black.

There is some advantage in using a paper which admits change of colour after the print is finished. I have found that platinotype prints in the ordinary black can be changed to some beautiful warm colours, varying from cold sepia to red brown, and I may call your attention to a somewhat valuable use to which this process may be put; that black

prints which are rather poor and weak in image, will often result in a print of very passable quality when toned to a warm colour. Should you not like the colour of the print when toned, you can bring it back to its original black by washing in running water for about an hour, or more. The print can be toned after drying—that is to say, an old print may be toned—or it may be toned directly after washing the fixed print. If dry, put print in water for a few minutes. This is the formula I have used:—

|                              |            |
|------------------------------|------------|
| Red prussiate of potash..... | 60 grains. |
| Uranium nitrate.....         | 60 „       |
| Acetic acid.....             | 50 minims. |
| Water.....                   | 20 ounces. |

When all is dissolved, you will find a precipitate forming; let it rest for an hour or two. For use, pour off a portion of the clear solution into your dish, put in print which is wet, and the action will commence in from five to ten minutes. Let it remain until it is of the colour required. Wash in running water for three minutes; if you find that the whites are slightly tinged, and you do not like the appearance, wash a little longer until removed. This tinging of the whites only happens occasionally. Pour your bath back into the same bottle, and let it settle for future use. I have prints treated in this way which after nearly two years show no change.

### ON MAKING IMPROVED DUPLICATES FROM DEFECTIVE NEGATIVES.

By J. LEISK.

MUCH has been written on the subject of correcting over or under-exposure by development, and much can be done in that direction by judicious treatment, more particularly if one knows beforehand that the plate in hand has not been correctly exposed; but there is a limit at each end of the scale, beyond which the faults of exposure can not be remedied by development at one operation; but should the subject be worth the trouble, and except in the case of such serious under-exposure that parts of the detail are altogether wanting, it is astonishing what can be done in the way of making a duplicate negative, in the production of which the shortcomings of the original may be largely overcome by intelligent exposure and development.

Suppose, for example, that a portrait be taken of a girl having bright golden hair with a tinge of red in it; such a subject will probably have a fair white skin, and if the plate be somewhat under-exposed, the chances are that the face will, under ordinary development, acquire normal density before the non-actinic hair shows the slightest detail, and, before the latter can be obtained, the face will have become so dense that, in printing from the negative, all light and shade in the hair will be lost long before the features can be printed out, and the resulting print will represent a person with raven locks! Such would not please the sitter, while neither reduction nor intensification will help in such a case.

Now, if a slow, or transparency plate be exposed under such a negative in a printing-frame, close to a strong gas or lamp light, so as to

insure the light penetrating through the denser parts of the negative, purposely over-exposed, and the plate then developed with a developer *weak* in pyro, having the full strength of bromide at the start, and sufficient ammonia to prevent development lagging, a rather 'fogged' looking transparency will be got, having full detail, but little density anywhere. A second slow plate is now to be exposed under the transparency, this time at a *distance* from the light, somewhat under-exposed, developed with a developer strong in pyro and bromide, but weak in ammonia, which is to be added slowly as development proceeds, when, if the foregoing be properly carried out, the resulting duplicate negative will have got back sufficient printing density, but will have lost the excessive contrasts of the original.

The following will indicate the reverse treatment, or that necessary for a negative—thin, through over-exposure.

Being in the vicinity of the Forth Bridge shortly after it was completed, I set out one bright day to photograph it, but on arriving at South Queensferry, I found the Forth covered with a light blue, very actinic haze, through which the distant end of the bridge and shore, though visible to the eye, could not be successfully photographed, but it was my only chance then, so I exposed a plate, determined to see what I could make of it, and in due course I proceeded to develop it, using a well-restrained developer weak in ammonia, but hardly were the details of the bridge visible, when the haze began to assert itself in the shape of general fog, which would soon have obscured the distant details, so I washed, fixed, and dried the plate, having got a negative full of detail, but too thin to print from.

I next placed the negative over a *slow* plate in a printing-frame, the front of which was covered with tissue paper, and gave a short exposure, about six feet from a paraffin lamp. In developing this plate I used an extra amount of pyro, the full amount of bromide, and began with a minimum of ammonia, making a very slow development, but obtaining a fairly vigorous transparency, which, when placed over a second slow plate and exposed and developed exactly as last described, yielded a negative of full printing density, and having the distant details sharp, without a trace of the haze or fog.

As a rule it is easier to 'work up' density from a thin negative by the foregoing method than to obtain proper gradation from one with excessive contrasts, and it has the very distinct advantage over either intensification or reduction that, if the first attempt fails, one can try again; here is not the danger of spoiling the original negative.

I will conclude with a hint to the stereoscopic worker who wants a number of prints from a stereoscopic negative, and knows the care and trouble required in reversing and correctly cutting each print, and of pacing the same on the mount—that is, if he wants his pictures to be seen to perfection, and not with one eye only.

Make a transparency from the negative by copying in the stereoscopic camera, having first placed the negative *upside down*, and *film side* towards the camera, taking care, by means of the centre sliding division between the lenses in the camera-front, to adjust the images to the proper distance apart; *e.g.*, not exceeding two and seven-eighths inches between the nearest objects in the foreground. From the transparency thus obtained, make a negative by exposure in contact, when, as the

necessary reversal and adjustment of the images were brought about in making the transparency, the second negative will give prints ready reversed, centred, &c., which can be trimmed and mounted as easily as cabinets. Suitable masks or discs can be used in printing to make a margin round the pictures according to taste.

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## AN ADVENTURE AT FUTTEHPOOR-SEEKRI.

By HUSSAR.

BEING quartered at a station within a practicable distance of Futtehpoor-Seekri, that wonderful creation of the Emperor Akbar, I determined to go there and have a good day's photographing amongst its palaces. I sent on a horse to Achnera Junction, to meet me there, as I had eleven miles to go, partly over a fearfully bad road. I took one of my servants, my bearer, in charge of my whole-plate camera, lunch-basket, &c., and we started at 4.30 a.m., and reached Achnera about sunrise. Here I found my horse waiting for me, with his syce. Sending on the bearer and syce in an *éká* — a light native cart, drawn by a pony, which generally gets over the ground, however bad, in a surprisingly short space of time — I left Achnera and had three miles of bad road before I struck the high road from Agra, which is a very good one, with trees and grass on each side, so that I had a most enjoyable gallop on that early January morning. Soon passing under a fine gateway, I saw Akbar's palaces, a vast range of buildings, on the summit of a hill in front of me.

Putting up at what was formerly the Record Office, but now turned into a bungalow for the use of visitors, with my bearer carrying my camera, I went first to the large enclosure called Dargah, where I exposed plates on that 'dream of white marble,' Salim Chishti's tomb, and on the Mosque, which is a duplicate of the one at Mecca. I then determined to take a view, from the outside, of the magnificent Gate of Victory, which towers 130 feet above the upper plateau. Now, on the crown of the arch hang enormous nests of wild bees, which, as long as they are undisturbed, are harmless enough; but, in some way or another, they had been interfered with, and I had hardly put my camera in position when I heard some natives shouting out to me, and down swooped the angry bees like an avalanche on me. There was nothing for it but to take to my heels and run as hard as I could for the nearest place of shelter, beating the insects off with my handkerchief. My bearer followed with the camera, and wisely used the focussing cloth to defend himself. I was stung all over my face and down the nape of my neck, as well as on my hands. Unpleasant remembrances of tales of people who had been done to death by wild bees flashed through my brain, and I was very glad when, breathless after a run of what appeared to me of many miles, though only in reality a few hundred yards, I reached the bungalow. The doors were immediately shut, and my enraged pursuers crashed against the glass, so determined were they to get at me; but at length, finding they were cheated of their prey, they departed. The only available remedy I had was my whisky flask, which I emptied into a dish, and rubbed the whisky well into the stings with good effect, as it took away the pain; but my face was so swollen and inflamed that for a

fortnight I did not care to show myself in society. My bearer was also badly stung, but the whisky also worked wonders with him. He was a Mohammedan, but evidently he did not consider that the Prophet's injunction against spirits extended to an outer application.

The next thing I had to do was to change my plates. There was no room that I could turn into a dark room, but, fortunately, there were several large 'purdahs' or thick native curtains. These I arranged round the low bedstead, effectually blocking out all the light; then I crept underneath with a lantern covered with folds of Turkey red, and managed to refill my dark slides. I cannot say I was altogether comfortable, the stings in my face giving me a good deal of pain from my head being bent down. I also did not see my way to crawling out again. However, my faithful bearer, Pir Khan, again came to my assistance, and, taking me by my feet, fairly hauled me out. Afterwards I secured several more good negatives of the palaces, amongst others the Ibadat-Khana, the scene of Lord Tennyson's poem, 'Akbar's Dream,' and I returned home after a long and tiring day.

While I was at Futtehpoor-Seekri I heard that the old guide who shows the place had been attacked the day before by the bees, and, in trying to escape, had fallen down and broken his leg.

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## ISOCHROMATIC PHOTOGRAPHY.

By W. T. WILKINSON.

PLATE-MAKERS tell us that for ordinary work with isochromatic plates, a screen is not required. To ascertain the truth, or otherwise, of this dictum, I made a series of exposures one evening, using 1st., ordinary plates; 2nd, isochromatic plates without screen; 3rd, isochromatic plates with screen. The view chosen embraced foreground and distance, with a slight haze. The exposures given were—1st and 2nd, five seconds; 3rd, twelve seconds, using a screen of my own make. The results were as follows:—On ordinary plates, although the sun was shining, the evidence was wanting; but, in No. 2 the sunshine asserted itself by an increased sparkle; in No. 3 the print shows a beautifully lit picture with far more sparkle and relief.

In order to have a still further test, I chose a subject with heavy shadows on one side, the centre of picture being a well-lit river and wooded banks. The plates used were isochromatic with screen, and a Sandell; the exposure for both was ten seconds. Here the isochromatic plate was much superior, giving detail, not only in the deep shadows, but also the delicate clouds, which are not only visible in the negative, but print out well; with the Sandell the clouds show in negative, but cannot be got to show in the print. This experience shows that to get the full effect of the isochromatic quality of the plates, a screen is necessary. These screens are not easy to obtain suitable for landscape work; all I have seen have been too dark in colour; those I use are thin patent plate coated with collodion, dyed with a light yellow aniline dye. In using a yellow screen always focus when the screen is in position, then there will be no danger of any out-of-focus effect, or of getting undue sharpness in the extreme distance

## THE CAMERA IN MOUNTAINEERING.

By C. RAY WOODS.

(Royal Observatory, Cape of Good Hope, Member of Mountain Club,  
South Africa.)

SOUTH AFRICA consists, for the most part, of a high table-land, but to reach that table-land one has to pass through a region of mountainous country, and along roads and passes rising above fertile valleys, around which are congregated peaks of no contemptible height (varying from about 2000 to 7000 feet), rugged in outline, wild in aspect, and steep in character. Like the Scotch M.P., when the Access to Mountains Bill was under discussion, Cape Town boasts its own mountain, peculiarly its own, the celebrated Table Mountain, which, rising to a height of nearly 3600 feet, a few miles behind the town, gives to the seaport an appearance quite unique. As the ascent is from sea-level, and exceedingly steep, unless by a long, roundabout route, as a mountain it is by no means to be despised; to the artist and photographer it is the conspicuous feature of the landscape for miles.

Of the large army of amateur photographers here, one-third spend their energies in taking it in all directions from below; one-third in climbing its slopes and taking it above; the remaining third say, 'Oh, give us a rest! We are tired of your old mountain!' but will read this article all the same. It is difficult to find a subject to write upon for the ALMANAC which will also be read; but the writer is not without hopes that the subject will be of interest to many at home; the advantage of a summer spent at a Swiss climbing centre may make a few of his suggestions useful.

First, as to the Lens, about which I need say little. Weight is a serious consideration, and accidents to apparatus may happen, in spite of the greatest care. It is not advisable, therefore, to burden oneself with a battery of lenses. The article of most all-round usefulness is a symmetrical combination, of fairly wide angle, one lens of which may be removed at will, leaving a single lens of long focus. Armed with such a lens, one is free to photograph the quaint architecture of a Swiss hamlet, the ferns and waterfalls in the confined limits of a wooded ravine, or the distant peaks of surrounding mountains.

Second, as to the Camera. The hand camera being so portable, I mention it first. Although a quarter-plate view of mountain scenery looks mean, it is exceedingly handy when enlargements and lantern slides only are contemplated. It should be used on a stand, however, for, apart from the ordinary difficulty of holding it perfectly steady to get a sharp negative, human nerve and muscle is more susceptible to tremor after great exertions. A convenient rock and one or two wedge-shaped stones will sometimes supply the stand. Where there is ice and snow, I should think a convenient substitute would be a short piece of stick that could be fixed or tied on to the ice-axe, and provided with a screw with ball-and-socket joint. For an ordinary camera, half-plate or  $7\frac{1}{2} \times 5$  is quite cumbersome enough. I prefer the latter size, as, whether for an extended view or an upright picture of rock or waterfall, its shape lends itself easily. Light, strong, and simple should be its main features. A

front which can be considerably raised or lowered is indispensable; but a swing back is only mischievous, and calculated to give effects untrue to nature. A swing back, used in combination with a swing front, both being vertical, nothing can be said against; but those who use such a combination overlook the fact that they are using only a more complex form of raised or lowered front. The great object in having a rising and lowering front is that the camera may be kept horizontal. If the camera is pointed up or down, the effect is puzzling and unnatural. I have a lantern slide of a view where a camera was pointed down on a Swiss village; to the audience it appears, not as if they were looking down on flat-roofed houses, but as if they were looking up at cottages with high mansard roofs. A convenient bellows camera for mountains work, designed and made by Mr. T. W. Cairncross, our city engineer, was exhibited at a recent meeting of the Cape Town Photographic Club. The back portion, to hold the dark slide, contains, when closed for carrying, the bellows and front, and screws directly on to the tripod; the front is supported on both sides by two slotted pieces of brass, which, with the camera back, form a triangle, the apex of which is the centre of the swinging front, a tailboard being thus dispensed with. A strong clamping screw is required to keep such a front vertical, but the slots allow sufficient adjustment of the front up or down. The weak point of such a construction is that it does not allow for the use of a lens of long focus; but, as made, it serves well the purposes of its designer.

Third, the Tripod. The question that arises here is, How is the camera, &c., to be carried? Here the climber prefers his hands to be perfectly free; even the flowers he has gathered he will often tie on his back, and the walking-stick he sometimes carries is little used in climbing. With the hands free, the descent is a rapid combination of run, hop, skip, and jump. If the camera is to be carried knapsack fashion, a folding stand, also strapped on the shoulders, is handy. A knapsack, however, when weighty, becomes tiring, from the very monotony of its position. If the camera is to be slung in its dark cloth, a stand which only closes to half-length is preferable. The dark cloth not being sufficient protection to the camera in case of its falling, it is as well to cut a sheet of corrugated cardboard packing so that it will fold over the camera like a box; the dark cloth and strap over that, it will be protected from pretty hard knocks. Whatever form the tripod takes, it should have sliding legs, so that not only may it be easily adjusted for height, but slopes and rocky ground may present no obstructions. I have never tried the Alpenstock stand, nor, for that matter, have I ever tried an alpenstock, which, however useful in walking along slopes, is an encumbrance in climbing.

Fourth, the Case. It is only necessary here to say, Do not burden yourself with the weight of a big leather bag. If you are afraid that a light canvas bag is not sufficient protection for either camera or dark slides, adopt the hint given in the preceding paragraph. When making a difficult climb on one occasion, an improvised protection to a hand camera, which had often to be hauled up the rocks at the end of a string, was a rush bag, such as paterfamilias sometimes brings home from Smithfield Market. Had the bag not been handy, a few small branches of brushwood and some grass would have sufficed.

Lastly, the Sensitive Films. To enter into the various merits and

demerits of plates *versus* films would too much extend this already long article. I have tried both. I like the light weight of the films, and I have got good negatives on them. For a small camera and lantern-size work I prefer glass.

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### POLISHING SILVER FILMS.

By PROCELLA.

WHEN silvering a few silver on glass telescope mirrors which I had ground, figured, and silvered myself, I was troubled much in the polishing of the silver film by minute scratches. The usual way of polishing is to take a ball of cotton wool, enclosing it in a piece of fine chamois skin, grasping the ends of the leather with the fingers of the right hand, thus making an exceedingly soft pad. The surface of the leather is touched with a little of the finest rouge or peroxide of iron, and the pad is gently rubbed over the silver film with circular strokes. This was just the method used in the old daguerreotype days to polish the silver film then used in that process. I have seen very few daguerreotypes, however, on the surface of which there were not a greater or less number of scratches. As glass coated with a deposit of silver on the face is used by photographers instead of a prism to take reversed images in the camera, it may, no doubt, be useful to some one to know how the silver films may be polished without scratching. The thing is easily done and I was surprised myself at the perfection I attained by its means. When silvering and polishing a flat for my telescope one evening, after the pad was prepared and touched with rouge, I simply turned round and rubbed it vigorously on the surface of my dressing-glass mirror for a short time before applying it to the silver, and the thing was done. This had the effect of bruising down all the asperities on the pad, and it was then almost impossible to scratch the silver with it. This seems, no doubt, a very simple thing to do, but so far as I am aware it does not seem to have occurred to any one before.

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### NEGATIVE INTENSIFICATION.

By J. BIRTLES.

THOSE who have failed to intensify satisfactorily by the mercury methods should try the following, which is both simpler and gives bright, clean negatives. After well washing, as usual, immerse the negative in the following bath :—

|                          |                      |
|--------------------------|----------------------|
| Sulphate of copper ..... | 2 drachms.           |
| Ammonium chloride.....   | $\frac{1}{2}$ ounce. |
| Water .....              | 10 ounces.           |

This bleaches the negative like the mercury bichloride does, and, when bleached through, should be again well washed. Then apply alkaline developer again, and redevelop until darkened through. A final wash and clearing with dilute acetic acid will give a good printing density, with clean shadows, if ordinary care be taken.

## PHOTOGRAPHING THE KING GEYSER.

By ARTHUR LASCELLES.

On the night of the 20th May, 1893, the natives living at the settlement or village of Arakei Korako, near Taupo, New Zealand, were rudely awakened by the bursting into active eruption of the new geyser, now recognised as the King Geyser. In dire alarm they took such of their goods as were most portable, and made their way to a valley about three miles from the scene of disturbance, placing a large range of huts between it and themselves.

In most countries such an event as the bursting forth of a geyser, perhaps the largest in the world, would have excited public attention, and the new visitor would have been interviewed, and reported upon at length by those ubiquitous gentlemen, the representatives of the Press; but an eruption or two more or less excited little interest in New Zealand, and public attention was not called to this wonderful phenomenon until early in July, when the Maori linesman in charge of that portion of the telegraph line, that passes directly through the settlement, reported to his superior officer the occurrence, and the attention of the wondering public was drawn to the last addition to the marvels of this wonderland.

The native village of Arakei Korako is twenty-two miles from Taupo (well known to tourists), twelve miles of which are by regular coach road from Taupo to Kotorua; the remaining ten miles are over a hilly country covered with ferns, but are what would be considered in the colony as a fairly good track. In consequence of the reports that I had received, and the conflicting accounts that were published of the doings of this last arrival, I determined to visit the spot with the view of photographing the geyser, and although the season was winter, and most unfavourable for travelling, I determined to lose no time, as the concensus of opinion, both native and European, was to the effect that in all probability the action of the geyser would be materially modified, if not checked altogether, by a return of warm, dry weather. The river Waikato that drains all the district, and all the small streams were abnormally swollen, and the other lesser geysers and hot springs throughout the country were unusually active, owing to the unparalleled quantity of rain that had fallen during the last few months.

The 2nd of August, therefore, found me at Taupo with all necessary appliances, and I started forthwith for the scene of operations in a trap with two horses, and a couple of attendants with a pack-horse. On arrival at the turn off from the coach road, the trap was left, saddles were put on the horses for self and attendant, another rode one horse and led the pack-horse, and here commenced our trouble in the shape of thick drizzly rain. However, we duly reached our destination in four and a-half hours from Taupo, and, although somewhat wet and cold, yet the prospect of what awaited us banished all other thoughts.

The natives very courteously vacated one of their huts, and spread clean mats across the half of it for us to use as beds. On visiting the scene of disturbance, the only thing to be seen was one of the usual bathing pools; a quiet, inoffensive-looking place, scarce large enough to drown a kitten in, and it was evident that some hours would elapse before

any active action. There was little or no steam, and very slight ebullition, so we adjourned to make ourselves comfortable for the night. We had a few provisions with us, the natives grew plenty of potatoes, and we hoped that the contents of a large bottle that we had brought would improve the tea (made in an iron kettle by the simple expedient of dropping in a couple of handfuls, and then making the kettle boil), although we had no milk, and little sugar.

The rain increased, and utterly defied any attempt at photographing any of the other wonders that abound in the locality, so we contented ourselves with a smoke and turned in, or, rather, rolled ourselves up in our rugs and mats, rather early. About 10 p.m. I was awakened by what I took to be distant thunder, with occasional claps apparently close. One of the party who had been on the scene previously, jumped up, exclaiming, 'She's off!' and we then recognised the fearful noises as emanating from the object of our visit, which was about 300 yards off. There was a slight moonlight, but it was pouring rain. However, we were not to be beaten, so we hastily donned the few things we had taken off, and rushed down to the scene. Directly we opened the door of our hut, we found that the whole valley was full of sulphurous steam, whilst a couple of dozen large steamers blowing off steam would not have made more noise than did the innocent-looking little bathing pool that we had seen so quiet in the evening. The wind was blowing strong against the usual jet of the geyser, which is at an angle of nearly 40 degrees to the north-east, and we were drenched by the spray, or, rather, by the heavy shower of hot water that assumed that guise. A very short visit sufficed to send us back to our quarters, wetter and wiser men, and the roar and splashings continued until after 1 p.m., when we all attempted to get to sleep again.

At 5 p.m. we were roused again by the fearful noise, and as it had ceased raining we anxiously waited for light, and hoped that we should have a good view by daylight; but the rain and wind returned with the dawn, and although we had a splendid sight about 7 a.m., it was much too gloomy and foggy to attempt an exposure. Our plans had been laid to return to Taupo this day. We had only brought horse-feed for one night (there was not a blade of grass or ear of corn at the settlement), and our own provisions would be exhausted. Our Maori hosts, however, settled the latter difficulty very speedily, by catching one of the numerous pigs that were running about, and in a marvellously short time piggy was scalded in the geyser hole, and chops were served for our dinner at 1 p.m.

We were thinking about engaging in that fashionable refreshment, five o'clock tea, when a stranger turned up in the shape of a tourist, who had come from the other direction, and, having heard of the geyser, had come across country, and arrived just in time to share our meal and avoid being benighted; and we had scarce finished, and were having a smoke, when another party of two gentlemen and a lady arrived, drawn by the accounts they had also heard. Our domicile not being made of india-rubber, would not stretch; we were already reduced to sharing the two seats (hard logs), and to taking our meals in relays, so we were compelled to turn them over to another hut, but we supplied them with hot tea, potatoes, &c., to eke out their own supplies.

At 7 p.m. again commenced the unmistakable rumblings, growlings

and gushings that culminated in a grand eruption that lasted for two hours, and which left us to get to sleep as we best could, vexed and annoyed at our ill-luck.

About 1 p.m. I was awakened by unusually loud reports, and having nothing betwixt myself and mother earth but the aforementioned Maori mat, I was disagreeably surprised by a very distinct trembling of the ground, that served to remind one very emphatically of the fact that the whole of the valley is a huge subterranean furnace, and that stamping on the ground causes a reverberation for some distance. Cautiously getting on some of my clothes, I crept to the door of the hut, and there waited the next 'hint to make tracks' (in colonial parlance), for I confess to feeling that I was a bigger fool than I had hitherto believed, to have put myself in a position of such danger. However, the alarm passed off, and I sought my mat again, but not, alas, to sleep. I had brought one rug with me from Taupo, and our Maori hosts had very hospitably supplemented it with another of ample dimensions and excellent texture; but scarce had I lain down when I found that I had taken this instead of my own to wrap round me, and I was in torments with the fleas, which had evidently not had such a treat for some time, and were determined to make the best of the opportunity. Rest was impossible, so the remainder of the night was spent tending the fire, with occasional visits to see if there was any change of wind that might betoken better weather. But the morning broke with heavy rain and a gale from the N.E., and after consultation with our Maori hosts, it was determined to return to Taupo without accomplishing the object of our journey, and we accordingly reached Taupo at 3 p.m., drenched to the skin, and only too glad to rest our wet, aching limbs in the delicious natural hot baths at the hotel, and to forget, in the comforts of a first-class inn, the discomforts of a Maori hut twelve feet square, not weather-tight in the depth of winter.

Such of your readers as have made a two days' journey in bad weather, over a very bad road with similar results, will realise my feelings as I sat for the next three days in the hotel, listening to the gale, and watching the rain descending in sheets; but at length, on the morning of the 8th, there was a partial break, and I determined to make another attempt, and I accordingly left Taupo, taking only one man to assist in carrying the apparatus. I carried a 15 x 12 camera and tripod, and part of a whole-plate outfit, and the attendant carried the large slides and some other things, and we reached Arakei at 3 p.m., having only experienced slight rain on the road.

The Maories were amazed to see us again, and could not understand our enthusiasm for such an object, but they made us welcome and gave us a good dinner of roast (wild) pigeons and potatoes. The geyser, we found, had been most irregular in its action, and had been in full eruption almost all day on Sunday, not working at all on Monday, and only once the preceding night. At 9.30 p.m. there was a short burst, lasting only about an hour, but at 1 p.m. it was simply terrific. It was a calm, bright night, the loud booming resounded through the valley, and the earth tremor could be distinctly felt.

The morning of the 9th broke bright and clear, and the whole valley appeared on fire, scarce an acre of land but had its steamhole, and from every bush proceeded clouds of vapour that ascended slowly in the still

morning. Some of the larger boiling springs sent up the steam in huge columns, and there could not have been less than four or five hundred steam jets visible in the clear morning light.

At 7 a.m. the steam began to rise in the big geyser, then it began to boil up in places, then to spurt out for 6 or 8 feet, and finally, at 8 a.m., it was in magnificent work, sending a column of water and spray 130 feet high to a distance of nearly 100 yards. The sight was very grand, sufficient to repay one for all the discomforts; but now the question was, how and where to photograph the wonder? I had of course looked at the place from every point, and had marked good standing places, but I failed to reckon upon a slightly shifting breeze, which twice brought the column of water right on to the camera just as I was uncapping, and obliged me to shift. At last I got No. 1, and No. 2 speedily followed, then 3 and 4, all with as speedy exposure as was practicable without a shutter. I then took with the whole-plate, giving two seconds, as the water was more stationary, and a couple more views of the surrounding scenery and the village, and we started on our home track, reaching Taupo at 3 p.m., having accomplished the object of our journey.

During my twelve days' absence from home there were only eight hours' sunshine, and twelve hours in all without rain. I succeeded in getting two good and two indifferent views of the geyser (large size), the small were much too long exposed, and I secured two good large negatives of the locality, &c. I baptized this wonder of the world the King Geyser, and determined that if the action continued in the summer I would pay it and the other marvels in the neighbourhood another visit when the days were long and the roads less disagreeable.

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## ALPIANA.

By DR. J. CARTER BROWNE.

So many tourists—with cameras—now find their most exhilarating holidays in the Alps, that I feel sure a recommendation how to spend a three weeks' vacation with the camera will not be out of place.

Starting from London at 9 a.m., we dine in Paris, and those who wish to hurry to their destination find the 7.40 p.m. train at the Gare de Lyon (P.L. & M.) awaiting their presence. This runs us into Vallorbe about 5 a.m., where the baggage is examined, and, if containing sensitive plates, a small fee has to be paid. On to Lausanne, and by the funicular railway to Ouchy, which is reached about 6.30, when, after a wash and breakfast, we find ourselves on board one of the Lake Lemane steamers bound for Montreux. Disembark, and you will find several good views ready to hand, specially one or two of the Château de Chillon. On by an afternoon boat to Bouveret, thence by rail to St. Maurice, a picturesque old town with narrow streets, for the night. Here are some good afternoon views of the bridge over the rapid Rhone, and the castle. Next morning on to Visp, and by the climbing railway to Zermatt. There are some very pretty morning views of this quaint old village, with the Matterhorn in the distance looming large and grand, but they are best taken from a knoll on the other side of the river. Near at hand is the beautiful Gorner Gorge, with its hanging gallery over the

roaring torrent, and worthy of two or three plates; expose well, for the gorge is dark. Now comes a choice of two routes, the one to the Schwartzee, the other to the Riffelberg. The former brings you nearer, but the latter gives the grander idea of the massive snow-clad Matterhorn, with his glaciers, and surrounded by his compatriots, Monte Rosa, Weishorn, Dent Blanche, Breithorn, &c. Half a dozen plates can profitably be expended on this magnificent panorama. Returning from Zermatt, I would strongly advise those who can do it to walk the valley to Visp, and on by train five miles to Brieg. Thence the diligence starts about 6 a.m., reaching the Hospice, at the top of the Simplon, shortly after 11, where the monks most kindly treat the traveller. I regret to say that many persons neglect to give anything approaching a return for the hospitality received, the average per head being three francs for lunch, dinner, wine, bed and breakfast, and attendance. The traveller will find the alms-box in the chapel; this is a beautiful apartment, and well worthy of a picture, but should be taken about 8 a.m. The Hospice itself, at the base of the splendid Schönhorn, is an afternoon picture, whereas the grand Rauthorn should be secured earlier in the day.

And now for a good walk. Sending on the luggage by the diligence, a walk of eighteen miles carries us through the villages of Simplon and Gsteig, into the ravine of Gondo, a gorge of the brawling Doveria, by far the most rugged and wild in the Alps. Any number of pictures may be taken, chiefly in the afternoon, of the Doveria, the Ponte Alto, the Brig, and the cascade of the Fressinone below the ninth refuge; and do not miss the boundary pillar, a granite column marking the entrance into Italy, and after a mile or so you find yourself at Iselle. The Douaniers here take no notice of plates. There are two or three nice views of the little village worthy of remembrance.

Another trudge of sixteen or eighteen miles brings us to Domo d'Ossola, three miles previous to which is a fine river scene from a bridge 100 feet in height, but it is an early morning picture. The Piazza del Mercato is well worth one or two pictures, but instantaneous, owing to the number of people about. Ascend Mount Calvaire, with its unique fourteen stations of the Cross; and superb views of Domo and the valley with the distant mountains, may be had somewhat higher up.

An hour's ride by rail, and about the same by omnibus brings us to Pallanza, which, with its fine quay and campanile, its oleanders and magnolias, the Borromean Islands (for these leave has to be obtained from the count, who lives on Isola Bella), and its own beautiful situation, is full of interest to the amateur.

Do not miss Stresa, with its handsome Rosminian monastery, the Villa Bollongaro, and the beautiful cypresses in the churchyard. But if you should row over the lake to Baveno, you would be disappointed on landing at the difficulty of photographing the Villa Clara, where Her Majesty stayed in 1879. It is too much hemmed in by trees.

Those who return by the same route should take the diligence from Domo d'Ossola to the Hospice, stay the night, and next morning walk down to Brieg, only about fourteen miles. On the way down, the Kaltwasser gallery, with its lovely cascade foaming over the roadway, and pretty little Berisal, where erst a few hundred rifles from the Canton de Valais hurled back several thousand Italians, who had crossed the pass to invade Switzerland, will demand their own plates. Almost

every turn in the road opens out lovely scenes of valleys, and if the morning be propitious, fine views may be obtained of the Raut Glacier and Rauthorn, and so on to Brieg.

*En retour*, stop at Sion between trains and expose two or three plates, thence to Vernayaz, with its world-renowned cascade, the Pisse Vâche, and so to the Lake of Geneva, Paris, and home.

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## MOUNTING GELATINO-CHLORIDE PRINTS.

By WILFRED EMERY.

SOME photographers, finding a difficulty in mounting prints in large quantities if printed on P. O. P. or Solio, discard the use of these beautiful papers as commercially unsuitable. If my method proves of any service to them, that will probably prove sufficient excuse for occupying a portion of one of the invaluable pages of THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC.

After having toned, &c., and thoroughly washed the batch of prints to be mounted, I make a solution of alum (two ounces of alum to the pint of water) and place the prints in this, keeping them continually moving for about five minutes. (This alum bath is in addition to any alum that may have been used in previous toning and fixing operations according to the instructions sent out by the manufacturers with their paper.)

The prints are now taken out and well washed in several changes of water. They are then taken out of the water, placed face to back one on top of the other, and the entire batch laid in a pile on a piece of wet glass or blotting-paper. A piece of blotting-paper is laid on top, and the surplus moisture squeegeed out. They are then pasted with starch paste, laid on the mount, and pressed into contact, and put on one side to dry. By this method the prints do not stick to the blotting-paper or to one another, fluff and dirt does not stick to them, they can be mounted as easily and quickly as albumen prints, and, most important of all, they are less susceptible to atmospheric changes, and consequently more likely to be permanent.

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## SULPHITE OF SODA.

By FRANCIS COBB, F.R.A.S.

SINCE Mr. Berkeley drew attention to the action of sulphite of soda in the developer, the use of this chemical has become a recognised factor in the formulæ of all important developers; but to obtain the best results it is important that the crystals be clear and free from any efflorescence or white powdery appearance upon the outside. Exposure to the air effects the conversion of the sulphite into sulphate, with the result of there being in the developer an unsuspected but powerful retarder of the development.

A simple method of avoiding this trouble is available for amateurs who do not mind being extravagant with their chemicals, and that is, to give the crystals a good washing under the tap, when the sulphate is easily

washed away, leaving the crystals clean, clear, and translucent, but they must be made into a solution at once.

A test case arose last summer in a town where a local chemist had laid himself out to supply photographic chemicals. A large glass jar contained the sulphite of soda, and probably at one time had been quite full, but at the time of the writer's application was not half full; the soda was shaken from the jar into the scales, in other words, the air in the jar well changed and well mixed with the remaining crystals. One developer was mixed with the sulphite well washed previously, the other with it in the condition as received.

With the first, development was complete in eight and ten minutes; with the second solution, twenty and twenty-five minutes were required. The first two plates were brighter and clearer in the shadows than the other two. The moral seems to be that pure chemicals are apt to be corrupted by evil communications, and that they are quite ready to combine with an unprincipled element like oxygen, even at the loss of their original good character and proper analysis.

### REDUCING OVER-PRINTED PROOFS.

By F. YORK.

In the spring I received a large order for  $12 \times 10$  prints required in a fortnight. The weather at the time was very fine, and, being anxious to take advantage of this, it was decided to put all hands on the job, and use ready-sensitised paper, and leave the toning for the last. This arrangement was correct, as dull weather set in when the quantity was done.

The trouble now commenced; the majority of the prints, when dry, were much too dark. There was no time for reprinting, so it occurred to me to try and reduce them. I tried various published means, but failed. I hit upon a plan which was a great success, and helped me out of a serious difficulty.

The reducing agent consisted of:—

|                                  |                      |
|----------------------------------|----------------------|
| Ferridcyanide of potassium ..... | $\frac{1}{2}$ grain. |
| Hyposulphite of soda .....       | 1 „                  |
| Water.....                       | 1 ounce.             |

The prints were placed singly in this bath for about a minute, or until the desired reduction took place, and afterwards washed. The tone was not quite as rich, but the prints were accepted; and thus ended what appeared a most unfortunate circumstance.

The following is the the formula for stock solutions:—

|                                  |                      |
|----------------------------------|----------------------|
| Ferridcyanide of potassium ..... | $\frac{1}{2}$ ounce. |
| Water .....                      | 1 pint.              |
| Hyposulphite of soda .....       | 1 ounce.             |
| Water .....                      | 1 pint.              |

Take an ounce of each, and mix with a pint of water.

## CLEAR WHITES IN PRINTING-OUT PAPER AND SPOTS IN NEGATIVES.

By J. BARKER.

HAVING noticed that several workers have experienced a difficulty in obtaining clear whites in printing-out and similar papers, it may be acceptable to point out that this muddiness, or pinkiness, of the whites, as it has been termed, may be avoided by simply adding a little common salt to the water that the prints are placed in after toning and before fixing. This obviates the necessity for so much washing before toning, and it is certainly advisable to use the salt however much the prints may be washed, as it removes every trace of free nitrate by converting it into chloride, which, if the prints be properly fixed in good fresh hypo, is entirely removed, and clear whites thereby ensured.

With reference to spots and stains upon negatives, these are often caused by using the bottles of pyro, and I would suggest as an instructive experiment that an ordinary ounce bottle of pyro be taken, and all the loose pyro be emptied out of it, allowing all that adheres firmly to the sides and bottom to remain; then add one or two ounces of water, as may be judged suitable to the quantity of pyro left in the bottle; next add the ammonia and bromide, and proceed to develop a plate, and, if that bottle has been any time in stock, there will result a dark-coloured, turbid mixture in splendid condition for creating spots, &c. This certainly points to the undesirability of mixing the pyro solution in its original bottle, as is usually the case. I have often thought that blue was the wrong colour for the glass bottles pyro is usually sold in, and would suggest that dark orange, green, or red be substituted for the blue glass bottles now used, as this would probably prevent, or at any rate retard, the action of light upon the pyro.

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## PHOTOGRAPHY FOR BOYS.

By ELLERSLIE WALLACE (Philadelphia).

AN enthusiastic boy who takes up the art of photography soon finds out that there is more or less fun to be had by indiscriminate mixing, of solutions, and haphazard 'snap-shots' at all sorts of subjects. But it will soon be seen that trifling of this kind is unsatisfactory, and wastes an amount of time and material which might just as well have been converted into good pictures.

There is a homely old saying that might be laid to heart by those taking up photography, and it refers particularly to the dark-rooms and work-rooms. It is this: 'A place for everything and everything in its place.' Now, of course, this applies to other things than the work-rooms. For instance, in our own case we know so well the places for our five lenses, with the stops belonging to them (all of which fit snugly in the inside of the camera box), that a glance before starting out to work shows whether everything is in its place. The focussing glass, finder, and extra screws for the reversing panel of the camera, also have their places, and are always to be found there. When we are photographing

away from home, we even carry our love of order so far as to keep one pocket for the stops and cap of the lens, another for the focussing glass, and still another for the reversing screws, the focussing cloth being always carried between the legs of the tripod. When work at one spot is finished, we repack these different articles in the same order as when we left home, and consequently are sure of finding anything when we want it.

Success will often depend upon what might seem to be very trifling matters. We suppose our young readers know that a photographic plate is an exquisitely sensitive thing, and that if there be any small cracks or holes in the camera or double backs, through which daylight can pass, the picture will show it in a very plain and ugly manner. In buying a new camera, or if the one in use be suspected, it will help to clear away doubts on the matter if a plate be put into the camera, the door drawn, and an imaginary exposure made without taking off the cap of the lens. By now developing the plate, fog will be seen if there is any stray light in the camera. The focussing cloth should always be thrown over the camera while the door of the dark slide is being drawn, so as to prevent light from getting in the chink. We always do this ourselves, and so are never troubled with plates fogged by stray light.

The pretty little outfits which so many young people now buy are often deficient in one thing. The interior of the metal work of the lens, and the inside woodwork of the camera, are not well blackened. Stray light is then reflected off from these surfaces on the sensitive plate, and the result is a foggy, indistinct picture.

Now, all that is necessary to get over this trouble is to mix a little shellac varnish with common lampblack, and paint it on with a brush neatly where required. Enough lampblack is to be added to give a surface free from gloss when the varnish dries. This is easily found by one or two trials.

Whenever double backs are used, the young photographer must be careful to see that they are *distinctly numbered*. Every double back will have to be taken into the dim red light of the dark room, and a letter or figure that would be plain enough in broad daylight would not be seen in the dark room, and disastrous mistakes might thus be made.

One of the most important helps to good photographing is the *note-book*. Quite elaborate styles of these books, in sumptuous bindings, containing tables for exposing the plates and other information, may be had at the stock dealers. Now, our advice to boys and girls—and, indeed, to grown-up people too—is not to use these note-books, and especially not to depend upon any of the methods or rules given for estimating the exposure. Attempts to lay down rules for exposing sensitive plates are like big *bugs* that fly with a loud *hum*. Is our meaning clear?

Do not begrudge a little time in getting up a note-book, and do it somewhat in this way. Provide a small blank book, with stiff sides, one that opens *longways*, and will go into the pocket easily. Rule five spaces down each page, three narrow ones at the left for 'Make of plate,' 'Lens,' and 'Stop' respectively, and two wider ones at the right for 'Subject' and 'Remarks.' In using the book the photographic memoranda would be made somewhat in this way:—In the first narrow space at the left would stand the name and number of the plate exposed, for instance,

'Carbutt, No. 1.' In the second space, just a letter to designate the lens, for instance, *R.* for the Ross symmetrical, *W.* for the Waterbury single, &c. In the third space either the number of the stop (whatever it might be) or the fraction, *f-25*, &c. In space four, or 'Subject,' we should make a rather full entry, as, for instance, 'Perma. Railroad Depôt, Philad., Broad-street front. Time, 12.15 p.m. July 1st, 1894.' In space five, full remarks like the following: 'Half sunlight. Long cast shadows in front of building, but no high light except white awnings over windows. Light rather yellowish from smoke and dust raised by a strong S.E. wind. *Exposed 5 seconds.*'

Now, it may be seen that such a manner of keeping records of plate, lens, stop, subject, and particularly of the kind of light and time of day, will give all necessary information to the person who develops the plate. If the plate in the example supposed came out very much over-exposed, but satisfactory as regards the light on the building and the point selected for the camera, we should try again, reducing the size of the stop to *f-50*. By giving the same exposure of five seconds, the plate would then receive only one-fourth the amount of light, and would probably turn out about right. The advantage of a very small stop on a subject of this character would be seen in the sharp definition that the lens would give all over the plate. Those of our young friends who have advanced far enough in the study of natural philosophy to understand the *law of inverse squares* will see how the reduction in size of the stop from one-twenty-fifth to one-fiftieth, or, in other words, using one of only *half the diameter* reduces the total area of the stop-opening to one-quarter, thus admitting only one-quarter the amount of light, and therefore how the exposure must be four times increased. Or, what amounts to the same thing, in our example given, the first plate having been over-exposed, we reduce the size of the stop so that four times more exposure would be required to produce the same result, and then leave the actual exposure the same.

Now, if scientifically-educated persons should tell the young operator that this is a rough and rule-of-thumb way of calculating photographic exposures, let him reply that it always has been, and still is, the custom of the best practical photographers.

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## A NEW DIAPHRAGM FOR IMPRESSIONISTS.

By CHARLES WHITING.

SOME ten years ago, while experimenting with orthochromatised wet plates, I hit on the idea of using a composite diaphragm, made for the purpose of my experiment of cardboard, and having a rather large aperture in it, and on one side of this was cemented a yellow collodion film, with a smaller opening in it. I thought this diaphragm would enable me to dispense with the yellow screen, and would give me sufficient sharpness at the same time. But in this I was mistaken, as I found that immediately the diaphragm was inserted in the lens the sharpness was destroyed. So for the time being the diaphragms were laid aside, and the idea was forgotten.

During last winter I mentioned the subject to Mr. Howard Farmer, who suggested it might be a good way of producing the so-called natural-

istic or out-of-focus pictures; and I again tried them, but this time with the result that I obtained too much sharpness. However, I soon found out the cause of this anomaly, for, in the first case, I tried them with orthochromatic plates, and, in the second, with ordinary. My later experiments have given me much greater success, through my having used a collodion without any yellow stain in it, and I venture to think that the following method of producing softness or fuzziness in a photograph may be of interest to some of the readers of the ALMANAC. And, to a certain extent, if the effect is not carried beyond the proper limit, there is something so pleasing in the softness obtained in these pictures, if the negatives are made with the diaphragms I am about to describe, that, I believe, cannot be obtained in any other way.

I find I can produce any degree of softness or blurring desired, and the means are so very simple. It is to use, in the place of the ordinary diaphragm, others made of cardboard, with apertures ranging from  $f$ -8 to  $f$ -16, or thereabouts, and on these are glued rather thick collodion films, with apertures equivalent to about  $f$ -30. I also find the thickness of the collodion film a most important factor in giving to the diaphragm its fuzzy-producing qualities. If I wish to give only a soft, pleasing effect to the picture, I use a diaphragm with an opening in the cardboard of  $f$ -16, together with an opening in the collodion film of  $f$ -30; and if I wish for more fuzziness, I increase the area of the disturbing element (the collodion film), by enlarging the hole in the cardboard to, say,  $f$ -12 or  $f$ -8, and keeping the hole in the collodion film the same, or making it smaller. If I wish to carry the effect to an extreme limit, I use a thicker film of collodion, or two films combined, on the same diaphragm. And it may also be done by using one film, but without any hole in it at all.

Having described the kind of diaphragms I have used in my experiments, and the conditions to be observed to produce the different degrees of blurring, I will now describe what I consider to be the best way of making them.

A  $12 \times 10$  glass, free from scratches, is thoroughly cleaned with a little Tripoli powder and methylated spirit, and polished with a chamois leather. It is then French-chalked, and care should be taken to rub the chalk well into the glass, or the collodion film may perhaps refuse to leave it. It is now laid on a levelling stand, and with the aid of a spirit-level and the adjusting screws of the stand it is made perfectly level. The plate should now be carefully dusted with a flat camel's-hair brush. and five ounces of collodion poured on—ordinary enamel collodion, with a little castor oil added, will do for our purpose. The amount of oil to add can only be determined by experiment. I have used with success about one to one and a half drachms to the pint of collodion, but find the proportion vary according to the nature of the collodion. If the oil were omitted altogether, the resulting film will be found to be very brittle, and easily broken when handled. If too much is used, the film will be too limp, almost like a piece of rag.

When the plate is coated, it is allowed to thoroughly set, and it may then be stood on edge to dry.

The cardboard diaphragms, which have been previously prepared, are now carefully glued and neatly laid on the collodion film, which, mind you, is still on its glass support, and the whole are put under pressure until perfectly dry.

Before removing the diaphragms from the glass, it is advisable to cut the hole in the centre of the collodion film of each, and the best way of doing it is to lay one of the ordinary diaphragms (one with a small opening) on each of the cardboard ones in turn, and carefully mark out the hole with a fine pointed pencil. Then with a sharp knife cut out the hole, and also cut round the outside of the diaphragm, and by inserting the point of the knife under the film, the diaphragm with the collodion adhering to it, can be easily raised from its glass support. It is only necessary now to black the diaphragms with some suitable colour to render them ready for use.

The effect gained by the use of these diaphragms is very peculiar; there seems to be a mixture of sharpness and blurring combined, and with judicious use, they will give to the picture a pleasing softness, I believe, unattainable by any other way. Possibly, if the collodion film were slightly stained by some of the aniline dyes, it might perhaps be an improvement, but I have not yet had time to experiment in this direction.

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### IN LAZY LUXEMBURG.

By WILFORD F. FIELD.

'LETRES pour monsieur!' and I espy, racing down the river-bank, the trusty butler, boots, and general utility of the Hôtel des Ardennes. And here, let me add, that does one need a peaceful sojourn in a pleasant land, he will find it at Echternach in the Grand Duchy of Luxemburg. Life passes merrily enough, too, here, and, but for the reminder from our Editor that he is expecting a few lines for the Annual, I should have been lazing away by the babbling stream, for this lovely Luxemburg is sufficiently beautiful to make one audaciously lazy. No one appears to be in a hurry; there is none of the bustle and toil, the poverty and wretchedness, of the big city here. One can bring his camera and a gross of plates, and he will find a suitable subject for every one of them; indeed, it is really a case of *embarras des riches*, and my faithful *compagnon de voyage* who accompanies me is in despair that he cannot take back pictures of half. A pleasant tour in lazy Luxemburg is as follows:—

London, Antwerp, Brussels, Liege, Spa, Vielsalm, Trois-Vierges, Kautenbach, Ettelbrück, Diekirch, Wasserbillig, Roodt, Oetringen, Luxemburg, Arlon, Namur, Brussels, Antwerp, Harwich, and London. The fares are: First class, 4*l.* 7*s.*; second class, 3*l.* 0*s.* 5*d.*, and the tickets are available for forty-five days.

Such a trip teems with interest, and although I cannot, in the limited space allotted to me, dilate fully on this itinerary, I beg readers of the ALMANAC to dot this down for their next excursion. At Larcchette, at Vianden, and at Echternach, one rambles for miles through veritable fairyland. There is no question about it, the Luxemburg Ardennes are worth doing. I may add— Here comes the faithful servitor for my 'copy,' so I refrain from saying more. I believe, Mr. Editor, I have caught the infection. I am outrageously lazy!

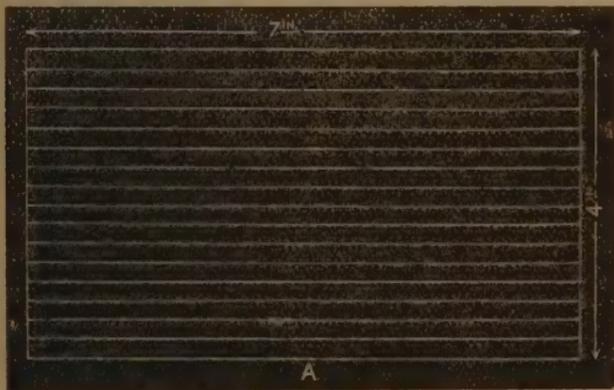
## ON TRIMMING AND MOUNTING STEREOGRAPHS.

By T. W. DERRINGTON.

A FEW words on the above subject may not be entirely out of place, as in conversation with brother amateurs, who have taken up this fascinating branch of our art, I have been struck with the rough-and-ready, careless methods some of them appear to adopt in the mounting of their prints. No more care seems to be taken than if they were mounting an ordinary print. The adoption of the method mentioned below will entail very little extra trouble, and they will be more than recompensed by the different appearance of their prints, and the greater ease with which the stereoscopic effect will be obtained by the various observers.

I assume that a large camera with paired lenses, allowing of the simultaneous exposure of the two pictures on the one plate, is used.

The first requisite is that the two lenses shall be mounted properly, perfectly horizontal on the camera front. This should be seen to when mounting them. The second is that the camera be carefully levelled horizontally when taking the view *with a spirit-level or plumb*. Both these conditions being fulfilled, the mounting of the prints accurately is a very easy matter. Two trimming shapes are used, as sketch; which is looking down on them ground side downwards. Both are ground on one side.



A is divided by horizontal lines as shown, parallel to each other and to the edges,  $\frac{1}{2}$  in. apart, and on the ground side of the glass. These marks should be made as fine as possible. B is divided similarly to A, except that the lines are  $\frac{1}{3}$  of an inch apart, and numbered. At the bottom a piece of paper, the same thickness as the prints, with the edge (a) cut straight, is pasted on, with (a) at right angles to the sides of glass, and distance from the top shown. The length of A will depend upon the size of plate used. The above sizes are suitable for half-plate or  $7 \times 5$  prints.

When ready for trimming, presuming they have been made in the one piece from each negative as it was obtained in the camera, A is used first. This is laid on the prints, and, when the best position is found, it is adjusted so that one of the lines runs through exactly the same point

n both pictures. The top and bottom are now trimmed off. At this point the prints are turned over, and marked L and R on the back as they stand, for convenience in mounting afterwards. They are then turned back, and the B shape is taken in hand. The print is laid face up, and in the right position; the shape is laid on the right-hand side of the print, which will, of course, be the left hand when mounted. The



edge (a) is pushed up against the bottom edge of the print, and a mental note is made of which number line runs through some prominent point in the foreground of the print. A couple of cuts, and the one side is trimmed. The shape is now laid down on the left-hand side of the original print (right hand when mounted), the same as at first, with (a) pushed up level with the bottom, only with this side the line one less in number should run through the point in foreground; another two cuts, and both are ready for mounting.

In mounting, a line is drawn a short distance from the bottom edge of the mount and parallel with it. A mark is made in the middle of the line, a print is pasted on the back, and laid in its place  $\frac{1}{32}$  of an inch its proper side of the middle mark, and with its bottom edge touching the line drawn on mount. It is then rubbed down into contact, taking care that the bottom edge does not move from the line. The corresponding print is then pasted and laid into position, the same as the first. If done carefully, the two prints

will be  $\frac{1}{16}$  of an inch apart on mount, and when looked at through the stereoscope the picture should appear to stand out behind the mount, the mount appearing as a frame to it.

The idea of the cutting shapes I am indebted to a writer in the *American Annual of Photography* for. Be careful to number B the same way as shown, as, if numbered in the opposite direction, the line one more in number must be the one used to trim the original left to.

### A FEW SIMPLE HINTS.

By REV. B. HOLLAND.

PHOTOGRAPHERS of large experience, perhaps, may not glean much information from the following brief notes, but others not so far advanced in art and practice will probably find them helpful.

First, a word or two about the tripod. In these days of hand cameras some may imagine this useful piece of apparatus is too antiquated to demand consideration, but, undoubtedly, superior work is done when it is employed than when it is altogether discarded. Even for snap-shots

it is of great assistance, for it is not every one who can hold a camera steady always. To impress the necessity of its being firm is needless—the more rigid it is the better; but for all ordinary work short legs will be found more handy and useful than long ones, and if they do not exceed three feet six inches, there will be no loss in utility. Let those who are sceptical try it this height, and if they do not see a marked improvement in their foregrounds, the writer's experience certainly leads him astray.

With regard to plates, there are so many good ones in the market that to indicate a particular brand would be unwise, to say the least of it. It is far more important to emphasise the need of sticking to one kind. When one is familiar with his tools, he can be pretty sure of his work, and a plate is a tool that improves on acquaintance. Put a mixed lot in the changing box or dark slides, and the probability is that many of the negatives will be inferior; but use solely the special brand you thoroughly know, and the result will be far more satisfactory.

Developers are numerous, yet the last introduced is not necessarily better than its forerunner; indeed, our old friend pyro is still to the fore, and likely to be, though eikonogen runs it very close. The latter works best with a slight trace of bromide, and certainly gives negatives of an exquisite character, and for bromide papers and lantern slides it can scarcely be beaten.

For printing, gelatino-chloride papers have come to the front, but it is not in all cases that they are an improvement on good albumen. There is a great tendency to yellowness, especially after they have been kept for some time. This, of course, is very unsightly, particularly if one desires to secure a vignette with a pure white ground. The defect may be minimised by good washing before toning and the use of absolutely pure water and chemicals; but when, as too often happens, the sensitised film is yellow, there is little hope of eradicating the evil. It is wise, therefore, to purchase the paper first-hand from the makers, and so lessen the risk of buying it stale.

These hints contain nothing very profound, but, if acted upon, they will possibly save a certain amount of disappointment; for it is often as beneficial to know what to avoid as what to do.

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## THE SPEED OF PLATES.

By H. J. CHANNON.

THERE has been much discussion during the year on the important practical matter of estimating the relative sensitiveness of different batches of dry plates, and, in the course of it, the Hurter & Driffield method has been exposed to some criticism. No serious objection, however, appears yet to have been discovered as to the soundness of the principles on which that system is based, and, if proper allowance is made for any differences which may arise from variations in the method of development, it will probably prove quite trustworthy for the purpose for which it is intended, viz., as a guide towards judging of *correct exposure*. That the method of develop-

ment adopted must be taken into consideration seems now to be admitted; even Messrs. Hurter & Driffield's opinions on that point (which are shared by very few other photographers) have already undergone some change, and will, I believe, in time, be still further modified. This matter, however, does not greatly affect the question of the value of the Hurter & Driffield plan of estimating rapidity, for the plate makers who have adopted it have wisely agreed to use a *standard developer*, under fixed conditions, for testing, so that the speed numbers, in all cases, have a definite meaning and are to be depended on, and any differences which may result from employing other developers may probably, in most cases be allowed for, after a little experience. At any rate, any difficulty arising from the varying action of developers does not affect the Hurter & Driffield system alone, but applies to all others also. It may perhaps be advisable, as photography becomes more exact and scientific, for plate makers to give a *series* of speed numbers showing the rapidities given by a number of different standard developers. Messrs. Cadett & Neall have already taken a step in that direction.

The Hurter & Driffield speed numbers then will, I believe, be found, as a rule, to be trustworthy when correct exposure is aimed at. They show the relative speeds with which various plates, other conditions being identical, *will give technically perfect negatives*. For the bulk of photographic work that is certainly the information required, and it is evident that when exposure meters, or tables, are to be successfully employed, it is such knowledge which is necessary in regard to the rapidity of the plates used. There is, however, a large class of photographic subjects in regard to which this system is not satisfactory, as, in taking them, the comparative rapidity of the plates to be used *cannot* properly be judged from the above point of view. That class includes all those cases in which the exposures are, from the nature of the subject, necessarily too short, and the plates, therefore, more or less under-exposed; such subjects as, for instance, most instantaneous pictures and snap-shots, as well as many of a scientific nature. In these cases the true test of rapidity seems to be the power of *giving the greatest amount of detail with a very short exposure*. Now it by no means follows that numbers, which rightly represent the speeds of various plates according to the former principles, will also prove correct under these conditions, in fact, Messrs. Hurter & Driffield's experiments appear to show that they will not. A 'perfect' negative will have no gradations which are included in the 'period of under-exposure,' and, therefore, that very variable and uncertain part of the scale is not dealt with in their method of testing, but, in subjects of the class I have referred to, the whole value of the negative frequently depends on the quality [of those very gradations. I think, then, that the relative speeds of different batches of dry plates depend partly on the use which is to be made of them; that, when sufficient exposure can be given according to Messrs. Hurter & Driffield's principles, their method will be found trustworthy, but when that is not possible, other means of estimating rapidity should be employed. Taking this view of the matter, it appears that the experiments described by Mr. G. F. Williams, last spring, may be explained, without casting any serious doubt on the practical correctness of the Hurter & Driffield system when applied to the purpose it is principally intended to fulfil—that of helping towards correct exposure.



E. J. BECK.

NR. ODDA.

*Negatives made with the Frena No. 1 Camera.  
Collotype by Waterlow & Sons Limited, London, E.C.*



H. BECK.

NORWEGIAN PEASANTS.



## A TRIP TO BRUGES.

By LIEUT.-COL. J. E. GUBBINS.

AFTER having wanted for several years to get to Bruges, I this year managed to do so, and 'did' it, superficially, in the three weeks I spent there. To begin with, there are at least two ways daily of getting there; one by the G.E.R. *via* Harwich, Antwerp, and Ghent, and one by Dover and Ostend, but the return ticket to Ghent (the G.E.R. does not book further) by the former is less than the single fare by the latter, a matter of some importance to a good many of us.

Bruges is a charming old-world place, with a very fair collection of hotels; my own experience of them is very limited, as I stayed at a private house, with a friend, but for comfort, civility, moderate charges, and liberal treatment let me recommend the 'Panier d'Or,' at which the proprietress speaks English. This house faces the gem of Bruges, the celebrated beffry, which grows on one, till at last one sits and gazes at it, as if nothing more were wanted. It *is* lovely, by some lights a little more, or less, so than by others, but a picture at all times.

Some of the finest buildings in Bruges are the churches. Belgium is a distinctly Roman Catholic country, and Roman Catholic churches are, as a rule, far ahead of ours photographically. The Bruges churches are particularly fine, being the splendid relics of a glorious past; the present state of the town would not justify such being built now. I found the priests, one and all, most charming and obliging gentlemen. Although some of the inhabitants can speak a little English, the knowledge of French is almost a necessity, and certainly a great advantage, but our 'British' French is not of much use. Chaucer says:—

'And Frensch she spak full faire and fetysly,  
After the scole of Stratford atte Bowe,  
For Frensch of Parys was to hire unknowe.'

An accusation which is painfully applicable at the present time to many of our countrymen and women. Of the Bruges churches I saw a good many, and took the interiors of several. The Cathedral (St. Sauveur) Notre Dame, and St. Jacques are spoilt (photographically) by having a screen (and organ on it) dividing the nave from the chancel. St. Sauveur is very fine otherwise, highly coloured, and, like the rest of the Bruges churches, very lofty inside.

All the churches are picture galleries in a way; numbers of works of art are hung round the walls, with the artists' names and dates attached. Notre Dame has a beautiful spire, with (what looks like) a crown round it about one-third of the height from the top. This church is the only one at which I found a fixed, and high, tariff for photographing the interior, 5 francs for taking one picture, and 7.50 francs for taking two; at the others I went to I was told that I might put what I liked into the box 'for the church.'

Ste. Walburge and the Jesuits' churches are the best I found for photographing; at the former the pulpit is peculiar, and the whole interior very fine; but at the Jesuits', which is a new church, and a splendid one, the work is beautiful. At this church I asked for permission to take the interior, and the large triptych over the altar was, through the courtesy of the priests, opened to enable me to take it.

Lamps hung in front of some of the chapels, and, if I had had time, I should have availed myself of the kind offer made me, of having them pulled to one side, to enable me to take the chapels, the view of which they completely spoil. A peculiarity of this church is the 'Calvaire;' high up in a recess above the reredos, is a representation of the Crucifixion, not in relief, but with absolute detached figures, statues, apparently life-sized and coloured.

St. Gilles is another fine church, recently restored, but very dark inside, and of a bad (photographic) colour.

But, apart from the churches, Bruges has numbers of subjects for the camera. If you possess a hand camera, by all means take it there. The 'dog' carts (from one to four dogs being harnessed to one cart, abreast as a rule, but sometimes one in front of the cart and one behind) are certainly a feature of Bruges, as are also the waggons, strange-looking affairs with three wheels, no pole or shafts, and the horse nearly his own length ahead of the wagon. Another feature of Bruges is the extraordinary number of 'estaminets,' or drinking houses.

The gates of Bruges are disappointing; none are of any architectural pretensions, but many pretty bits can be got amongst the canals, with which the town abounds. The Hôtel de Ville, Ancien Griffes, Chapelle du Saint Sang, all alongside of each other, are worth seeing and taking, and there are numbers of street views, which make pictures when the proper light is on them. Ghent is also worth paying a visit to; there are some houses well worth taking pictures of, notably one on the Quai aux Herbes; but Ghent is more busy, more awake, and more crowded, so that it is not so easy to set up the camera and take a view there as in Bruges.

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## LANDSCAPE PHOTOGRAPHY—A RETROSPECT.

By HARDING WARNER.

THE reflections of past days are pleasant if success has attended your efforts. Whether we review them from articles in the old BRITISH JOURNAL PHOTOGRAPHIC ALMANACS, from albums, or from memory, each seems to recall the old familiar faces, some of whom have passed away, while others still remain with us. All were clever, skilled landscapists, men one was proud to call 'my friend.' Solomon says, 'The heart knoweth its own bitterness, and a stranger doth not intermeddle with its joy.'

There are two aspects in the photography of the past which stand out in great prominence. They are nominally the same as to-day—'the professional' and 'the amateur.' The former was one who stuck to his work, who never desired to be considered an amateur; he was proud of the title. Such were thorough gentlemen of education and cultivated minds, of pleasant and polite manner, always ready to afford information, but excessively conservative as to their own methods of working. The amateur was one who, being conscious of his own deficiencies, was in his diffidence content to rely upon his professional brother. Oftentimes the former worked for his publishers, or supplied prints direct to the booksellers. These men took up photography for the love of it, and,

having reached almost to possible perfection, looked for the payment of their productions according to their merit, not allowing the 'loaves and fishes' to be the summit of their aspirations. There were a host of small fry who worshipped them, and thought them giants who must know everything; while the amateurs, in their own sphere, were looked up to and sought after in a similar way. Both classes of men were actuated by the one desire, 'that of giving to the world the highest efforts of their genius and skill, thus glorifying and honouring the Creator who made them.' *Is it so nowadays?* It should be; why is it not so? Hence the decline of the art. The reason is not very far to seek. With wet plates we worked slower; we prepared them ourselves, we knew their composition, we were sure of our results beforehand. We had more time for reflection, and we developed and finished the plate on the spot—a great advantage over the dry plate of to-day, to my thinking, though that may be treated in a similar way, leaving the fixing to the return home, as shown in an article on the 'Hypo-fixing Bath' published in THE BRITISH JOURNAL OF PHOTOGRAPHY, April 6th, 1883. The writer assumes that the dry plates or films would approach somewhat to the wet plate of the past, both in the flatness of the support and the homogeneity and thickness of the film. These are two grand essentials to good work.

In comparing the two, we have fine work and certainty, with a little trouble with the one. With the latter we get rid of much impedimenta, and more often than otherwise meet with more failures than successes, the unknown rapidity leading to random exposure, and the pleasure of having a snap-shot is so great as to overbalance the idea of careful reflection. Of the two, give me the former. We knew when we got home that our work was done, and done well, that there was no more mess to go through; and, on going to our couch, we rested in peace.

Next morn we were up bright and early, to clean plates, make up developer, and filter the bath, which, being accomplished, we sat down to an eight o'clock breakfast, and enjoyed it. Thus we had less worry and bother, and when the negatives were varnished they formed the best plates for the printing of platinotypes, so the late H. B. Berkeley told the writer, while for albumenised paper any number of prints could be readily obtained from them, richer and finer, to my mind in every respect, than from dry plates.

Dry plates for interiors are excellent; give them a good exposure, and they will quite equal the wet plate.

Many will differ from me, I dare say, but, after nearly forty years' experience, I still stick to my first love.

THE BRITISH JOURNAL PHOTOGRAPHIC ALMANACS referred to are: page 125 for 1874, page 45 for 1875, page 156 for 1876; and that of THE BRITISH JOURNAL OF PHOTOGRAPHY for April 6th, 1883.

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### A SIMPLE LEVEL.

By R. L. MADDIX, M.D.

As brevity is asked, may this beat the record. Always carry a well-made marble as an aid to quickly level developing dishes, baseboards, &c.

## ON WEIGHTS AND MEASURES.

By FRANCIS G. ELIOT.

THE subject of weights and measures is one that has always been of the greatest interest to photographers, and our present system, in which in the smaller quantities there is no relation the one with the other, has been proved a stumbling block, and numerous suggestions have been made in order to simplify matters.

The metrical system is highly approved of by many, and most pharmaceutical works, especially *Attfield's Chemistry*—a text-book for students entering that profession—highly recommend its use; but until it is alone authorised, and physicians and surgeons write all their prescriptions in grammes, &c., our present weights will still be used. Photographic receipts are now frequently given, when published, in both the English and metrical weights and measures.

Now, the great fault of our present system is that we cannot make up a receipt in small quantities given in parts. Thus, although one ounce avoirdupois, the only authorised ounce for chemical manipulation, in ten fluid ounces of water is one part solid in ten parts of water, one grain solid in ten minims of water is not one part in ten—the grain being about one-tenth heavier than the weight of the minim of water. If a standard English decimal system is ever authorised, I imagine the ounce, both fluid and solid, would both be divided into 500 parts—1000, except for analysis, would be too small; but I am not much in favour of the decimal system, it does not allow of much subdivision by halving, the fluid ounce division into 480 being much more convenient.

I have with very little trouble arranged a set of weights which allow me to use any receipt, either in parts or the metrical scale, and which any one can readily make for himself, without any manufacturer may think it worth his while to make them for photographers. At any respectable ironmongers standard brass weights of one ounce, half ounce, and quarter ounce avoirdupois can be purchased, and I was taught in table books in my early school days that there was a drachm avoirdupois weight one-sixteenth of an ounce; but I have never seen one, and do not know whether they are ever made now. I require for my plan both an eighth as well as a sixteenth of the ounce. I proceed as follows:—I take some well dried and sifted silver sand, which I always keep a stock of for laboratory sand baths, &c., and weigh carefully in good glass balances a quarter ounce; then, taking out the weight, I transfer half the sand to the other pan, until both balance equally. Now, turning out one side and cleaning the scale, I put into it a piece of brass, to be filed down until it exactly balances. Before doing so, it is as well to engrave its weight and name upon it, and the question is, what is it to be called? Why, clearly the same as its fluid equivalent, sixty ms. or sixty minims. The word *minim* is not the exclusive property of fluids; it is derived from the Latin *minimus*, and simply means the smallest or least, and there is a great convenience in calling both alike, in the same way as warts are applied to both weights and measures. I proceed in the same way with halving the sixty ms. of sand, and make thirty and fifteen ms. weights.

I now cannot halve any further, but what I really want is a ten m.

and five m. I find that a thirty m. weighs a trifle over twenty-seven grains, so that, by placing nine grains in one pan, I divide the thirty ms. of sand into three carefully weighed parts with a very little over. I adopt the plan used by chemists and druggists when dividing small quantities of harmless medicines. Place the excess sand in a folded sheet of glazed notepaper, shake up into a tiny heap, shut the paper and give the folded edge a sharp tap on a hard table or counter, when it will be found to lie in an even short line, easily divided by a thin penknife into three parts. Add one to each nine grains weight of sand, and weigh one against each other. If properly done, it will require one of Oertling's celebrated balances, turning with a thousandth of a grain, to detect the difference. I now make several ten ms. weights, and also five ms., by the above plans. I do not require smaller weights, as I have only to take five in place of one in any receipt—of course, increasing all other figures five times, or add a cypher to each quantity when the ten ms. weight would be the lowest to be used. I think the number of weights required w be found less than those for the metrical system.

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### CLEANLINESS IN DEVELOPMENT.

By T. CHARTERS WHITE, M.R.C.S.

WHEN visiting the dark rooms of some of my friends, and watching their developmental processes, I have not been surprised that questions are asked, and samples submitted to our Editor, seeking an explanation of sundry and certain mysterious spots and stains on negatives. We have all heard of the 'sloppy photographer,' and his race is not by any means extinct.

Developing solutions of various kinds are poured on and off the plate from the measure, the measure in the interval being placed on a sloppy table, saturated with the decomposed remnants of former developers, and when it is used again these stale and decomposed slops drip into the developing trays and on to the negative, hence these puzzling stains and spots. The remedy for this is standing the measure on a sheet of clean blotting-paper, which, absorbing slops, prevents the drips being accidentally introduced to the developing negative.

Another hint. Many persons are so alarmed at the thought of putting their fingers into mineral acids, and when nitric or sulphuric acid is in question it is decidedly better to give them a wide berth, but an exception can be made in the case of hydrochloric acid, in which a short immersion is not productive of any harm to the fingers, but often an advantage in the removal of stains. It might justly be reckoned one of the photographer's most useful agents, as developing trays and measures, may, by its use, be thoroughly freed from those stains and incrustations with which we are all familiar, and which, left on, may probably so alter the constitution of the developer as to interfere with its activity. One caution may be given with reference to the use of this acid: Its fumes will rust any bright steel if the atmosphere is allowed to become impregnated with it, so that proper precautions must be adopted to prevent this. With these two suggestions my short contribution may end.

## ON SUNDRY MATTERS.

By THOMAS EARP.

SINCE the issue of the last ALMANAC I have been able to do but little photographic work, so must speak chiefly of the results of past experiences and some more recent observations.

Firstly, with regard to the much-exaggerated statements with respect to the fading of prints on albumenised paper, I would state that out of some hundreds of such prints in my possession only a small proportion show signs of degradation, and these in many cases evidently owing to something in the mount or the mountant. Some enlargements on this paper which have been hung on my walls in very sunny rooms for ten years are as bright as ever, but these were mounted on mill board guiltless of bleaching agents in the pulp. For small album work a glossy paper is, no doubt, most suitable, and is very pleasing as long as it is not disfigured by scratches or other surface injuries.

Those who desire prints fitted for framing will find plain paper most suitable, and there is no difficulty in keeping the picture on the surface if the paper be soaked in the salting solution and, when dry, floated for a limited time in the sensitising bath. The addition of gelatine to the salting bath is quite unnecessary, and renders toning less easy. Rapid printing by development may be performed by soaking paper in a bath containing 60 grains pot. brom., 15 grains pot. iod., and 50 grains pot. citrate in 12 ounces water—then sensitising on a bath of aceto-nitrate of silver, 20 grains to the ounce, and exposing under the negative for about one minute in a good light. The picture is developed by means of a saturated aqueous solution of gallic acid, and is of a sepia tint, which may be modified by varying the exposure or by other means.

Secondly, the mania for employing short-focus or wide-angle lenses, when lenses of greater focal length would have yielded much more satisfactory results, has been forcibly brought to my notice by the ludicrous result of the practice in a recent instance. Seeing from a distance a photograph of what might be some unknown cathedral, I found, on closer inspection, that it was merely a representation of the drinking fountain at Stratford-on-Avon, the wide-angle lens having dwarfed the surroundings to an extent which was positively ridiculous. No doubt the photograph was perfectly clear and wonderfully sharp—so much so that, with due optical aid, one might perhaps have seen that the fly on the summit of the structure was 'winking the other eye'—yet I could have foregone the pleasure of making that important discovery if a truthful picture of the object had been presented to me.

During the last few weeks I have been engaged in preparing some studies of trees, weedy banks, and the like, in the lanes near my residence, and have been led to compare the results obtained by the use of lenses of different focal length. I find that, pictorially, the advantage of long-focus lenses for this purpose is very evident. A single lens of 16 inches focal length used for a half-plate picture has given some very pleasing results, as good in detail, and far more satisfactory as pictures, than those produced when a rapid rectilinear of 8½ inches was the lens employed. In landscape work the views produced by the latter class of lens frequently give the impression of being portions cut out from larger pictures, and

these are unsatisfactory to the eye, which seems to look for something more than is presented to it. I would suggest to the amateur, who is desirous of producing pictures by photographic means, the employment of the back lens of his rapid rectilinear in landscape work as frequently as possible, reserving the shorter-focus combination for architecture or views in confined situations. I would further point out, to those who desire to obtain the greatest possible gratification from the practice of photography, that the preparation of their own materials, solutions, sensitised paper, &c., the devising and constructing little pieces of apparatus to meet some passing requirement, and the like, will much conduce to this end, and, as one whose first attempts in the photographic line were made nearly fifty years ago, I may be considered competent to offer advice in this matter. Those who practise photography as a pastime can rarely attain that almost mechanical and uniform perfection of finish which results from daily work; but they may excel in producing real pictures, if only in one particular line, provided they choose that line for themselves, and do not confine themselves to slavish and probably bad imitations of the productions of others.

### ORDINARY VERSUS HAND CAMERAS.

By W. T. F. M. INGALL.

WHAT subject is there to write about that has not been written on over and over again, except it be an old photographic amateur's thoughts upon the young one's ways in relation to the camera he uses?

At first it would appear as if our old square and other cameras were becoming things of the past, with all our lenses—short-focus, long-focus, and medium—that we were so proud of.

Unquestionably, there are some great mechanical advantages in the hand camera.

1. No need of focussing.
2. That it can be used, and is used, almost always without 'legs.'
3. No double backs, but accommodation for (in one instance, at least) forty films.
4. No glass plates.
5. Not least, perhaps, being always ready at an instant's notice.
6. Rapidity in shifting films, and sundry other advantages, and compactness.

But, on the other hand, the rapidity and ease with which the subjects can be 'snapped' does not tend to that consideration for artistic work for which the old camera gave ample time.

Again, I do not think, from what I have seen of the negatives, that they get the beautiful half-tones that the larger lenses give, and I think, also, the perspective, where there is a great distance between the fore and back, or rather middle, ground is not so correct.

If I were not so near the three score and ten, I should be disposed to get a hand camera made of dimensions  $7\frac{1}{2} \times 5$ , with all the metal parts of aluminium, to compensate for extra weight, with an attachment for legs, if needed, to attach something on the 'bayonet joint' principle.

I hear a  $5 \times 4$  hand camera is coming out next season. I objected to

my informant that he would lose the advantages the  $3\frac{1}{2} \times 4\frac{1}{4}$  hand camera gives in printing direct lantern slide, with the whole of the subject, and was met with the remark that you could print from any part of the negative, which, to my mind, is not an adequate compensation, while, with a  $7\frac{1}{2} \times 5$  hand camera, you can reduce to lantern slides very satisfactorily, I think, with greater advantage than direct printing, getting the whole of the subject if you wish; as I have proved in my own practice, or you can enlarge, or you can leave the negative as it is, and get a very nice artistic-sized print from it, sufficiently large to be comfortably seen, full of detail, contrast, and half-tone.

The hand camera has its field and its special uses, no doubt, and our old cameras could be improved on its principle, I dare say, but I think it will not entirely supersede the old camera, notwithstanding the present rage for it.

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## THE LIGHT-ABSORBING POWER OF SENSITIVE FILMS.

By CHAPMAN JONES.

It is obvious that a sensitive film must absorb the light that falls upon it during exposure, and theoretically it should absorb *all* the light that it receives so far as this is able to affect it. However brilliant the most luminous part of the subject may be, the absorbing power of the film ought to be sufficient to enable it to take up all the active light that the exposure allows to fall upon it. It follows, therefore, that a more extended range of luminosity in the subject, or any increase upon the minimum necessary exposure, demands a greater absorbing power in the sensitive film in order to secure a perfect result. Although this absorbing power is all important, it appears never to have been made the subject of measurement. There are now supplied commercially plates varying enormously in this matter, yet every maker puts forward his own as fit for all subjects that are capable of being photographed. Most makers profess to issue plates of different sensitiveness, but there appears to be only one that provides plates of different light-absorbing power. It is to be hoped that now this matter has been brought prominently forward by the introduction of the Sandell plates more attention will be paid to it.

Other things being equal, the more emulsion there is upon a plate the more tedious will the fixing and washing of it be, and so it happens in many cases that the plate that is more richly coated, and consequently allows a greater range of exposure, is judged to be inferior, because the user does not allow it the extra time in treatment that it requires. It is a great mistake to select a plate because it fixes quickly and requires but little washing. Although slow fixing is not a direct proof of great light-absorbing power, the two do go more or less hand in hand, as no maker considers slow fixing an advantage. It is a disadvantage that must be put up with in gelatine plates as practically inseparable from other most desirable qualities. But the prolonged treatment necessary need not increase the actual time required on the part of the operator to fix and wash when he has many plates to deal with, if he provides a few more dishes, and manages his work intelligently.

## MOUNTING LANTERN SLIDES.

By G. E. BROWN.

WHEN a number of lantern slides have to be mounted, the shapes of the pictures in which are all different—such a case occurs in the reproduction of book illustrations as slides—the ordinary trade mounts are useless for the purpose. Cutting out a separate mount for each subject is a tedious operation and is not satisfactory.

The following plan, which was shown to the writer, is an admirable one, and is carried out very simply: Procure some black needle-paper from a wholesale stationer. It is sold in sheets of 25 × 20 inches at about sixpence per quire. This quantity will be sufficient for many gross of lantern slides. By suitably folding these sheets, cut them into pieces measuring three and a quarter inches in length, and varying in breadth from half an inch to two and a half inches. Each of these pieces is then placed on a sheet of plate glass, and by means of a cutting mount and a sharp knife is divided lengthways into two pieces, each possessing a perfectly clean and sharp edge. It does not matter whether the division be parallel to the edge of the strip or whether it be exactly in the middle. A narrow strip with one sharp edge is all that is required. A stock of these strips is made and kept for use. To mount the slide, lay the lantern slide upon a sheet of white paper upon which two lines at right angles have been ruled in bold black ink. Place the slide, film side up, in such a position that one of these lines cuts off a portion of the slide desired to be hidden from view. Then moisten one side of a paper strip, and place it upon the slide so that the clean edge coincides with the line on the paper below. The moistened paper will adhere firmly to the gelatine on the two being rubbed in contact. Now turn the slide through a right angle so that the clean edge coincides with the other line, and proceed as before to apply a second strip coincident with the first black line, and so on until all four strips have been secured. The necessary spots are then placed on, the cover glass superimposed, and any projecting paper trimmed off round the edges with a pair of scissors. The binding strip is then applied in the usual way. The whole process takes a fraction of the time it takes to describe, and by it any rectangular-shaped opening can be obtained with the greatest ease. If desired, the corners can be crossed with tiny gummed strips in order to detract from the somewhat severe rectangle, but for scientific subjects this is not necessary.

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### A RAPID RISE.

By HECTOR MACLEAN.

‘UP to the present I have gained twenty-three medals—gold, silver, or bronze—also a bundle of diplomas.’

‘And, pray, how long have you practised photography?’

‘My first plate was exposed only two and a half years ago.’

Even in this age of superficial reputations this is indeed prodigious photographic precocity.

The above talk took place in what is without question the most mag

nificent studio in the world. It is one which contains no sham properties or ludicrously artificial backgrounds, but boasts real, solid set pieces, whose arrangement has been the labour of forty generations. It was in the stony solitude of the North Ambulatory of Westminster Abbey that I came upon the subject of this article, Mr. —, while he was in the act of preparing for an exposure on the steps leading into Henry VII.'s Chapel, a very exquisite corner of the building, the pictorial and archaeological interest of which are both much enhanced by that famous iron grille surmounting Queen Eleanor's tomb, respecting which tradition (*i.e.*, the verger) states that it was made by a village blacksmith for the curiously inadequate sum of one guinea.

While the exposure was in progress Mr. — favoured me with the following answers to my interrogatories:—

'My intention is to obtain a set of 12 × 10 photogravures for an album *de luce*, portraying in daintiest fashion whatever is most notable in and about the Abbey.'

'Yes, I know it has been done before, but never as I mean shall be the case. Each plate, of which there will probably be fifty, will be distinguished by the possession of emphatic architectural, archaeological, pictorial, and technical features, so that no one, be he architect, photographer, artist, or historian, but will find in each particular one something to enchain his attention. That is what I aim at.'

'How long have I been at it? Well, I began in June, so up to the present it has taken me about three months, working on and off, and I have not done yet. I do not expect to finish my task until well into 1894.'

'You must understand,' he proceeded, 'that suitable light has to be waited for, and most of the exposures are very long; in many cases I have to sit by the camera for hours in order to cover the lens when any white-clad figures chance to stand about in the foreground.'

'Do I find them affect the plates? Certainly. Perhaps the worst damage I have suffered is through incautiously overlooking the effect of a bald-headed old man. He stood with a stream of sunshine falling on his shiny pate in rapt contemplation of a piece of carving, and his polished bulb-like cranium acted like a mirror.'

'Yes, the exposures are very variable, ranging from about one hour up to two days, that is, working at *f*-32 or *f*-45, according to circumstances. You see, I am obliged to stop down, because the front of the camera, being rarely perpendicular, in order to obtain perfectly parallel uprights, I have to make free use of the swing-back so as to correct distortion.'

'Now we have got to questions of *technique*, will you enlighten me yet a little more as to your methods?' I asked in some trepidation, for I know that it is not every one who cares to explain how he does it.

'With the greatest pleasure. To begin, I am using "Imperial" plates, extreme rapidity, backed with caramel and burnt sienna. With a long exposure on *clear* leaded glass window I get a negative free from halation.'

Subsequently I saw the negative alluded to, which bears out the above.

'Orthochromatised plates I do not care for when doing this class of work; the first *desideratum* should be rapidity.'

'As to developer, I work entirely with amidol. Why? In the first

place, because there is, even with the development, a complete absence of stain. Then its action is quicker than pyro, and in my hands gives me the precise kind of negative I desire.'

'Yes, I know it does not keep well, but I don't mind that. I mix a fresh stock solution (Andresen's formula) every day; with this I use 1 to 10 of water; the ghost of an image being out, I finish with a stronger solution, 1 to 4 of water; with this I obtain density. The main thing needful is not to over-expose the negative.'

'I am using nothing very special in apparatus; my camera is, as you see, one of Hare's, fitted with a spirit-level, which for work of this kind is a *sine qua non*. For lens I depend very much on a 7½-inch W. A. R. Euroscope, supplemented by a 12-inch rectilinear.'

'And now, have you really unearthed anything which has not been already made public?'

'I think so. Not only have I found original points of view, but fresh objects; for instance, I have secured many mosaic or tiled floorings which have hitherto not been done, because they are invariably covered by carpets and mattings; but, by special favour, these have been temporarily taken up for me. Then, again, certain unique historical relics, which, for some occult reason, have not up to now been photographed as drawn, will be included in my series. Besides which, there are quite a number of extraordinary oddities of the past ages which have received my attention; here is one.'

Mr. — showed me an example of an ancient manner of castigation, which one would, of all places, least expect to find thus illustrated in our national valhalla. The subject is one calculated to most grievously horrify Mrs. Grundy, and is almost sufficient to create a panic at a lantern entertainment. By the way, Mr. — contemplates running a slide show in the fall of 1894, when 'Our Abbey of Westminster' will be displayed, and explained in a manner intended to beat all records.

'Before I leave, I should like to know to what you attribute your so far rapid advance?'

'Being well grounded in *technique*, and working like a horse.'

As regards the first point, it should be mentioned that Mr. — sat under Mr. Howard Farmer in 1891, when he took a first-class ordinary grade City and Guilds. The year following he gained a second in honours, and now holds a first honours with full teaching certificate, of which last he avails himself this year by delivering two courses of lectures at the 'Poly' on enlarging and on lantern work. Respecting the second point, no eight hours' day for Mr. —; his time is usually from 6 a.m. until 11 p.m.

If asked to particularise what is his special *forte*, I should have difficulty in answering. His medals have been awarded for marines, architectural, *genre* snap-shots (gold medal), and lantern slides, besides others. Perhaps the most satisfactory of his pictures, certainly his most solid success, was a humorous rendering of bath-time in the nursery. The copyright of this has been purchased by Messrs. Pears, so before long we shall all be well enough acquainted with the urchin hiding behind the screen, and the old purblind nurse who seeks him in vain.

That there still remain a few more rungs of the ladder for him to climb, none know more surely than does Mr. — himself. Any way,

his so far phenomenal career is an unmistakable object lesson to those who wonder why they do not get on. To all these, as yet languishing in the cold shade of neglect, no better advice can be given than that the road to success is through 'technical knowledge and hard work.'

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### A HANDY WAY OF MEASURING THE FOCUS.

By R. H. Bow, C.E., F.R.S.E.

ON the wall of a room, at a height of about five feet, and opposite to a somewhat narrow window, I have a strip of white paper fixed horizontally. On this is a scale which gives at once the equivalent focal length of any convex lens or combination of lenses, the scale measuring the width of the image of the window, thrown upon it by means of the lens.

The divisions of the scale giving the foci may be arrived at mechanically by means of spectacle lenses, the focal lengths of which have been otherwise ascertained.

If the window or other object were at a very great distance from the lens, the divisions of the scale would be approximately in simple proportion to the focal lengths. But in the actual case, in which the distance between the object and the image is fixed, and the distance from lens to object variable, the divisions of the scale will increase more rapidly than the corresponding focal lengths; in fact, the ratio will increase inversely as the square of the distance of the lens from the window.

It is advisable to attach a small star, cut out of dark paper, to the glass near the top of the window, and to focus this seen against the sky upon the paper strip; then, one side of the image of the window being made to touch the zero of the scale, the division coinciding with the other side gives the focal length.

The results for single lenses may be relied upon, and the plan is a very convenient one for finding approximately the equivalent focal lengths of lens combinations.

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### PHOTOGRAPHY IN THE CHANNEL ISLANDS— NOW AND THEN.

By CHAS. STEPHENS, M.A.

Two recent visits to Guernsey led me to make comparisons between the present possibilities of camera work, and those of twenty-five years ago.

My first visit was to Jersey in the summer of 1866, when, to the best of my recollection, I was using only dry collodion plates, prepared by myself with tannin as a preservative. With these I got some fairly good negatives with long exposures, the chief difficulty being to prevent the films from slipping bodily off the glass. I then had the pleasure and advantage of making the acquaintance of Mr. Thos. Sutton, whose writings on photography in his own journal and others, many of the older devotees of the black art will remember; and he kindly allowed me

to develop several plates in his dark room, and under his valuable supervision. Of course, at this time one's efforts had to be confined to inland views, water in motion and cloud effects being as yet unknown (at least in my limited experience). My next visits were to Guernsey in 1869, and Guernsey and Sark in 1870—still with dry collodion plates of the 'Liverpool' make, which were terribly slow. However, under the circumstances, one got a good deal of enjoyment out of the work, perhaps more than in the present day, when there is a certain amount of feverish excitement in endeavouring to catch a steamer or yacht just in the right position (my wife says that on such occasions it is dangerous to go near me!). We had a very pleasant stay of ten or twelve days in Sark in 1870, with our old friend, the late Paul Naftel, who was working all day at his drawings for the Old Water Colour Society, while my wife, who was a pupil of his, watched the process narrowly, and I hovered around with a camera, taking leisurely shots at the rocks down by the shore, or bits of lanes and old farm houses in the interior, and I have several prints from these negatives now hanging on the wall by my side, which though twenty-three years old, are far better preserved than many of more recent date.

Well, after a long interval, we revisited Guernsey in October, 1892, and again in June, 1893, finding much of its appearance unchanged, especially all about the harbour, but what a difference in the method of working and kind of subject available!

For those who are fond of marine subjects, there are few better places than Guernsey Harbour, and an hour or two may be well spent any fine morning on the 'White Rock' Pier, from about 9.30 to 11 o'clock, when the two mail packets arrive from Jersey and leave for Southampton and Weymouth, while, during their stay, there is plenty of life and action on the Quay, with the loading of innumerable fruit baskets, &c. After they have left, all is pretty quiet, but there are generally some colliers or other craft in the inner harbour, which show up well in a photograph backed by the old town rising behind them. I have come to the conclusion, from the experience of these two visits, as well as many others to various ports at different seasons of the year, that in the autumn—sometimes well into November—better effects can be got than in the height of summer. For three weeks last June we never saw a cloud, which was much against getting satisfactory pictures.

Besides the harbour, there are plenty of lovely bits all round the coast, which may be visited either on foot or by excursion car, though the latter mode of progression does not allow much time for anything but snap shots. I will only mention two of the many points worth going to—viz: Rocquaine, where a short distance beyond the inn or 'Picnic House' are some splendid rocks, and the Hanois Lighthouse beyond, which, especially with a good sea breaking, make a fine subject. And there is a sweet little place called Bordeaux Harbour, which is, I fancy, but little visited; this is a short mile to the north of St. Sampson's Harbour, and there are generally some fishing boats dodging in or out among a labyrinth of rocks. There are some few subjects worth a plate in the interior of the island, but a great part is now spoiled in appearance by miles of glass-houses, which produce tons of vegetables, grapes, &c.

Sark should be visited at least for one day, and steamers run there daily in the season, allowing six hours on shore. I got some fine bits of

rocks and waves in a tolerably rough sea from the steamer, but to do this requires practice and good sea legs. A few years ago I described in the ALMANAC my method of working from steamers or open boats with a large camera, which is to have a strap attached to a button on each side of the camera front, and passed over the head, resting the tail-board against the chest, and sighting by means of two brass knobs on the top of the camera. If one has the luck to get a fairly smooth passage, the Casquet rocks make an interesting subject from the Southampton Packet about midday on the homeward journey—a very rapid shutter is necessary, as the boats go at about twenty miles an hour, and the vibration is considerable. The best result I have got was on November 7th, 1892, a lovely clear day with fine clouds.

I will only say, further, that I am sure that no one who goes in for sea-scapes, and once takes a trip to Guernsey will ever regret it, but, on the contrary, will go again—as I hope to do, some day. The air is most salubrious, and in the hottest weather, such as last summer, by no means oppressive. There are two principal hotels—besides others of less importance—the Royal, on the Quay, and Old Government House, higher up—commanding a fine view of the harbour and neighbouring islands. The former I have heard well spoken of, and in the latter I have had long experience of the civility and attention of the proprietor, Mr. John Gardner, who has presided over the establishment for some thirty years.

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## STUDIO ROOFS.—HOW TO PREVENT THEM LEAKING.

By F. WHALEY.

THERE has been a great deal said at one time and another on leaky roofs, although we all have our own ideas about it. Some say give the putty two or three coats of paint; some tar it, and a great many other ways; but my experience is, leave the putty from above the glass altogether, as it is the evil of all the mischief; it is bound to crack in hot weather.

Now, if those building new studios will try the following, they will not be troubled with leaky roofs. First of all, putty the sash as usual, then take care the glass fits close up to each sash-bar, and bed it well on to the putty, taking great care to tack the glass so that it cannot slip, and, after you have got all the glass on the roof, give it three or four good coats of paint. By carrying out these instructions, there is no putty exposed to the air, only paint, which takes the place of putty.

I might add that I built two studios three years ago, and had them glazed in the above way, and am never troubled with a leaky roof.

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## FILMS VERSUS PLATES.

By W. J. STILLMAN.

THE question of employment of celluloid films has become one of the most important amongst the details of photography, and is one which some of our intelligent and disinterested amateurs might well devote themselves to clearing up. I do not propose to suggest to others some

research with intention of claiming credit for it when some one else has worked it out, on the ground of having suggested it, and I have neither the time nor the facilities of experiment which are required for the solution. What we want to know is, first, if the celluloid film exerts a deleterious influence on the gelatine emulsion with which it is coated? and, second, if any device can be discovered by which such influence, if proven to exist, can be obviated? Amateurs who have the qualities for coating their own plates (which I have not) are those best prepared to investigate the questions. The celluloid films are now in the market uncoated, and such amateurs can easily put to the test the first part of the problem by coating plates and films with the same emulsion, and then trying one against the other at intervals for at least three months.

So far as purchasable and trustworthy material is concerned, I have been, and will continue, to work out the solution in my limited range, and thus far I have collected a few facts relating to the subject. During the coming winter I intend to study the question more fully by the comparison of plates of the most reputable manufacturers of films, with the films of the same nominal grade, and which, I take for granted, are coated with the same emulsion.

What I have already mentioned, is that certain films deteriorate rapidly, and in a most singular manner. As I desire neither to advertise nor disparage any wares, I shall call the different films I have tried, A, B, C, D, premising that I have always had several brands under trial at the same time. A I found to be, compared with other films, of maximum sensitiveness when fresh, but to deteriorate, so that in the course of three months they required three times the exposure as compared with such standard glass plates as I had use of, being those well known in commerce. Furthermore, I found that exposures made in the beginning of the summer, and developed after my return to head quarters, were weak, foggy, full of defects, and worthless as negatives, while those made shortly before development made fairly good ones, as a rule, showing that deterioration went on more rapidly after exposure than before it. Exposures made six weeks before development turned out absolutely worthless.

Of B I had orthochromatic and plain, and found that the former fogged much sooner than the latter, of which I have good negatives from films a year in hand. C, orthochromatic, was infested by irregular insensitive blotches to an extent that stopped any use of them, while the plain films were of maximum film sensitiveness and quality. D shows the highest freedom from defects and quality of working, with superabundant intensity, but a tendency to fog with keeping.

But A, B, C and D alike, when compared with a high quality of plate, such as those of Schleussner, of Frankfort, though bearing the highest figure of sensitiveness in their respective makers' scales, were far below the plates in point of rapidity, requiring, in fact, from two to three times the exposure. But Schleussner's own films were less sensitive than those I got from England. Being on the Continent and in motion, I was unable, without great inconvenience, to get English plates of the same manufacture as the films, so that there is no exactitude in the comparison of film with plate on the whole, but I am reluctant to believe that a German house can turn out plates twice as sensitive as the best English, which is the only alternative to the conclusion that the most rapid films

are greatly inferior in rapidity to the most rapid plates. This winter I shall carry my experiments out in a more exact comparison, by getting plates and films of the same English houses, and comparing them rigidly together, and the fresh films with those I have now, of which I shall reserve part for the same purpose.

My experience, therefore, leads me to conclude that films are less sensitive than plates, and deteriorate more rapidly, but this conclusion is based on partial examination. As perfection of the portable and unbreakable film is the highest desideratum at present in field photography, those who can contribute to either of the two points indicated being made clear to us, will be rendering service to photography of the highest kind. These points are, the effect of the celluloid on the emulsion; and, supposing this to be deleterious, what remedy can be found for the deteriorating influence?

It is well known that the duration of emulsions, even on glass, varies very much, some plates fogging in a few weeks, and others remaining good a year, and even more. I have tried a very famous continental brand, which has borne the reputation of being several times more rapid than the best English maker, but I have found them to fog invariably, even when fresh from the agent of the house which makes them, and films of the same house were already worthless when received. I have found no deterioration in Schleussner's plates so far, and they are to be got of any dealer on the Continent, while English sizes are unobtainable. This is the reason why I have not used English plates in comparative trials. During the coming winter I shall remedy this deficiency, not anticipated in my summer arrangements. But there are English amateurs far better situated than I am for working out this problem.

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### CHILDREN'S PORTRAITS.

By J. A. C. MURRAY.

Few things photographic are so charming as a child's portrait, 'all glowing' with interest and delight; it is not often an easy matter to secure such results. One of the best means I know of for attaining them is a tobacco pipe, some small indiarubber tubing and a piece of soap, or any of the solutions for soap bubbles, mentioned in the *JOURNAL*, &c.

Break off the pipe stem to about two or three inches long, attach the rubber tubing—a yard or so, as may be convenient—with a mouthpiece attached, and prepare your soap solution.

Having everything ready, and arranged the child satisfactorily, proceed to blow a bubble; it is really wonderful to watch, in the majority of cases, the exquisite delight exhibited on the child's face; select the proper moment and press the bulb of the pneumatic shutter, and the thing is done.

The advantage of the rubber tubing to the pipe will be obvious, as the bubble can be blown high or low, or moved anywhere about.

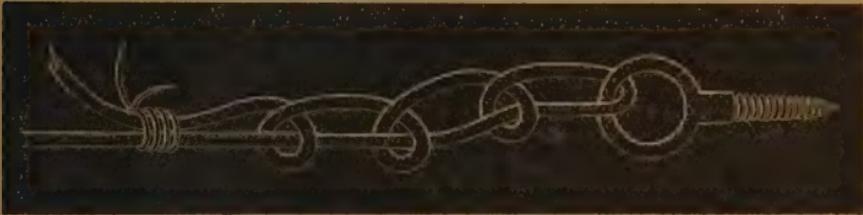
I may add, that in groups, &c., the soap bubble has a wonderful influence on the expression of the older babies in the shape of grandpapas and grandmamas, and others.

## SECURING LANTERN SCREENS.

By C. G. NORTON.

LANTERN exhibitors occasionally find a difficulty in fastening securely the ends of the ropes supporting the screen after they have been passed through the screweyes in the floor. They generally twist the end round and round, again making a number of intricate but useless knots, with the result that the requisite strain on the screen is entirely absent, and when they proceed to take all down after the exhibition is over, a knife has to be used to free the ropes, as most hall-keepers have an inconvenient habit of turning out the gas almost before the audience have left.

To make a fastening that will be at once secure and easy to undo is a



very simple matter, much simpler than to describe how it is to be done. First pass the end of the rope once through the screweye, or round anything available, and then once round the standing rope, at a distance of three or four inches from the screweye or other support; then pass the end once through the loop thus formed, but, instead of pulling it down towards the floor, and so making a fast knot, pull it upwards towards the ceiling as hard as the strength of the materials will bear. This will slightly bend the standing rope, and this is the secret of a secure fastening.

Repeat this three or four times, and then either fasten off the end by making a knot in the form of a bow, or by securing the end to the standing rope with a piece of twine round both. The latter is the safer plan if any one is at all likely to meddle with it.

The drawing will make the matter clear.

## AN EASY WAY TO MOUNT GELATINO-CHLORIDE PRINTS.

By D. GARDINER.

THESE may be mounted by the following process (backing papers are not required):—Have your prints perfectly dry, coat the mount with thin starch paste, place the picture evenly thereon. Now take a sheet of the waxed paper in which your dry plates are packed, and place it on the picture, then pass a squeegee or roller over it a few times; now grasp the waxed paper at a corner of the sheet and draw it off.

Care must be taken to prevent any paste getting between the waxed paper and the picture. Any portion of the edge not adhering to the mount can be pressed down with a paper knife or the finger.

Clean off the paste from the waxed paper with a damp cloth, and it is ready for the next mount.

## REVERSED NEGATIVES.

By W. BISHOP.

IN the early part of the year I had occasion to make some experiments which were communicated to THE BRITISH JOURNAL OF PHOTOGRAPHY, tending to show that reversed negatives on glass could be made by direct printing without the necessity of any special developer, and in as simple a manner as the production of ordinary transparencies or lantern slides, by making use of the now well-known action of prolonged exposure to light in causing reversal of the image. The negatives so produced are primarily of use in carbon or pigment printing, as avoiding the necessity of double transfer, with its attendant risks and loss of time, but there appears no reason why, when the original negative is a suitable one, the reversed negatives should not be equally available for collotype and other kindred processes in which such negatives are a prime necessity. Subsequent repetition and extension of the experiments referred to have confirmed the view then taken, and I have now no difficulty in making reversals from any fairly good negatives (which alone are worth the trouble), with certainty and rapidity.

Thinking the process may be of interest to readers of the ALMANAC, I venture again to describe it, premising that I have since become aware that others have been working in the same field, I having seen results, produced apart from anything that I have done, in which it was impossible to tell which negative was the original.

For the purpose in view, I have used Ilford ordinary plates, exposing them in a printing frame in contact with the original, precisely as in printing lantern slides, except that I have exposed to daylight. The time of exposure to morning light, with a north sky, has been, in ordinary cases, from five to ten seconds, according to the density of the negative and the condition of the light, and it is in this respect that some judgment is required. It does not, however, amount to more than is necessary in ordinary bromide printing or lantern-slide making, and can be as easily acquired.

The plate, of course, has to be developed, and for this purpose I have found pyro-ammonia, hydroquinone, and metol so equally satisfactory in their results, allowing for the peculiarities of each developer, that any one who may try the process had better adopt the developer he most prefers for ordinary work. If properly exposed, the image will come up just as in the development of an ordinary negative, and is to be fixed and finished as usual. I have said, 'if properly exposed,' and it is in the judgment (by results) of correct exposure, that some confusion may at first arise. It needs to be considered what it is that takes place. The light that passes through the most transparent portions of the negative, ordinarily making the deepest shadows of the print, has to act for a sufficient time to produce complete reversal, while at the other end of the gradation sufficient light has to pass the densest portions of the negative to produce an actinic effect. Between these two extremes the half tones will look after themselves, the action taking place gradually until the complete reversal is reached. In the ordinary conditions of developing, if the image flashes up suddenly and rapidly veils over the plate, the negative has been over-exposed, while if the picture comes up slowly and incompletely, we say 'under-exposed.' This is not, how-

ever, the case in reversals; the too rapid development means under-exposure (reversal not complete) while the incomplete image without detail means over-exposure (reversal carried too far), and the next trial must be regulated accordingly. In the case of negatives having very great density in what should be the high lights of the print, it is often useful to expose the whole plate momentarily to very weak, diffused daylight before placing in the printing frame, the after-exposure being somewhat reduced. The work is then already done for the densest portions, and the reversal in the other parts has something to start from.

It is not desirable to push development too far. The action of the light has gone so completely through the film, that density seems to come very readily, and if the development be long, there is, of course, the usual tendency to veil or fog. The negative should be as clear and crisp when complete as the original, and sometimes may be even an improvement.

It is naturally impossible to reduce such a process to hard and fast lines of formula, recognising, as we must do, the varying qualities of daylight, and the variations of negatives, but I can confidently recommend any who need reversed negatives to try what I have described, assuring them that, if they will bring into operation the same amount of judgment and interest which every photographer who deserves the name puts into details of his ordinary work, they will meet with most gratifying success.



## SHADOWS.

By S. E. KELF.

In looking through some old numbers of THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC, although I could find papers on 'lighting' in the 'studio,' I came across very few dealing with 'shadows' in the 'field.' This by way of apology for writing on so apparently simple a subject. Every one of any experience knows from practice, not only the best season of the year, and the best time of day, but the best atmospheric conditions to secure a desired effect. The new adherents, the snap-shottists up-to-date, who blaze away regardless of either sunlight or shadow, do not give this or any other photographic matter much consideration, and to the inexperienced who do, these few lines are addressed.

We have hand-camerists, with quick shutters and small apertures, trying to do the impossible; and then we have the 'tripodist' sallying forth, equipped up to the hilt, in the middle of the day, in brilliant sunshine, arriving on the scene of his labours in a tired and weary state, and more fit for a sleep under a tree than for photographing.

Some are under the impression that if only the sky be cloudless, and the sun shining brilliantly, they must be photographing. They then get chalky effects, ranging from brilliant light to shadow, or extreme contrast, something like a black-velvet and white-lace effect in the studio. If they are not 'snap-shottists,' they should try morning and evening, when the shadows are longer. They might observe that the clouds brighten up the shadows, and diffuse the light, thereby softening the picture. Some, too, think, because there are clouds about the exposure must be lengthened; but the converse holds good. It is possible

to secure better-lit pictures with less exposure on cloudy days, particularly in the spring.

It was, I think, Vernon Heath, the eminent landscapist, in a paper published in one of the ALMANACS, who observed that he 'never worked with the sun directly behind him.' An operator of considerable experience in out-door work, in speaking of this subject, said he always got as near 'danger-point,' as he termed it, as possible. By danger-point he meant the sun shining directly into the lens. The sun to the right of you, the sun to the left of you, but not behind you, but rather in front of you, if you can shield the lens by any manner of means. By the sun being directly behind you the objects appear flat, while on either hand you get solidity or breadth.

Looking through some stereoscopic views, where the sun was shining right upon the object in the foreground, the objects had a bright metallic, or snow-like, appearance, yet in the distance, where 'shadow' came in, and where the atmosphere intervened, and the light was more diffused, there was a gradation that lent softness to the picture. I should imagine that, for this reason, with hardly any atmosphere between the lens and the object, portraiture out of doors, with nothing to screen or cut off what is termed 'top light,' looks hard and unpicture-like, and the head of the individual, or heads of the group, have the same snowy or metallic-like appearance as before described.

Therefore, if it be not always possible to have perfect days, when we are at a certain place, and intent upon securing a desired view, it is possible, by observing carefully, to get a passable effect. The majority of us have very little command of our time, but we are often asleep or at meals when the best effect, under the governing circumstances of the place, season, and weather, can be secured. We might partly follow up the dog, mentioned in Æsop's fables, but only as far as to drop the bone, and catch, if we can, the shadow.

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### LIGHT IN THE DARK ROOM.

By REV. F. C. LAMBERT, M.A.

THERE are few things which contribute more to one's comfort in the dark room than plenty of safe light and fresh air. As one or two friends have recently expressed, firstly, surprise at the quantity and *lightness* of my light, and, secondly, gratification from the comfort of being able to see what is being done, perhaps it may not come amiss if I mention the nature of my lamp and its fittings. The lamp was made for me several years ago by a working tinman. It is made of tinned iron throughout, and riveted as well as soldered. It consists of a metal box a foot square, and six inches deep, *i.e.*, from front to back. At one end the gaspipe enters and is a fixture, but connected with the household supply by rubber tubing. The tap is, of course, outside the lamp. At the opposite side is a door, not hinged, but sliding in a groove like the shutter of a dark slide. The front (a foot square) is left open, and along the sides and bottom is a groove sufficiently wide to admit two thin sheets of common glass. Ventilation is provided for at top and bottom. The points I wish to draw attention to are, firstly, the reflector, and, secondly,

the 'medium.' The reflector is a sheet of pot opal, 8 x 6, and from time to time is cleaned with a wet rag or sponge. Metal reflectors have been tried and found wanting, as they so quickly tarnish. The opal glass diffuses and reflects the light in a satisfactory and agreeable way.

The 'medium' I find most comfortable (and practically safe when reasonable care is taken not to expose the plates too near the light) consists of a sheet of Canary medium—a stout, smooth paper of a bilious yellow-greenish tinge—and a sheet of the ordinary orange paper. In order to make the two thicknesses as translucent as possible, they are each well rubbed on one side with either salad oil or glycerine, and brought face to face, rubbing out all air bubbles which happen to be enclosed between them. The two thicknesses are now enclosed between two sheets of thin, common glass, and then it only remains to slide this composite yellow-orange window into its groove. To further add to one's comfort, a sheet of stiff card (an old box lid) is suspended by a string at each of its four corners in such a way that it shields the eyes of the operator and reflects the light on to the developing sink. When the eyes are protected in this way, one is surprised at first to see how very low the gas may be turned down, and yet a flood of safe light is cast over one's work. *Verb. sap.*

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## ON THE COLOUR OF GELATINE EMULSION FILMS.

By R. CHILD BAYLEY.

THERE is a belief current—at any rate, among many photographers more accustomed to use than to make emulsions—that the colour of the film upon the plate forms a reliable indication of the proportions of silver bromide, and iodide respectively which it contains. That this is a fallacy there is no need to tell the plate-maker; but, like many other fallacies, there is a certain amount of truth in it. There is no doubt that a bromide film, under certain conditions, can be as yellow, or almost as yellow, as one which contains a quantity of iodide in its composition, although what those conditions are do not seem to be quite clear. On the other hand, I have never met with a bromo-iodide film which could be called white; the very lightest has had a decidedly creamy colour. Consequently, while we may be quite certain that a perfectly white film contains practically no iodide, we must not jump to the conclusion that a yellow or creamy film must contain iodide as well as bromide of silver. It may or may not.

The change in the colour of a film by reflected light is very remarkable, and is quite as worthy of attention as the colour by transmitted light, upon which so much stress is laid, the alterations appearing to proceed to some extent hand in hand. That both appearances are due to the physical condition of the sensitive salt in the film is generally accepted, observations made with the microscope showing that, as one or other method for exalting the sensitiveness is employed, the size of the particles increases. The connexion between the colour and the size of the particles is well shown when a series of emulsions are prepared, identical in composition, but which have been exposed to the action of heat or ammonia for varying periods, and immersing plates coated with the various emulsions side by side in the same hypo bath.

The rate of solution will be found to vary; the lighter the colour of the film, the quicker the opalescence disappears. Even in the case of commercial plates, in which the amount of silver present varies very considerably, as a general rule, the yellower the film, the longer it will take to fix, although in this case the results are affected by the varying proportions of the bromide and iodide. This is easily accounted for on the supposition that the yellower films contain the sensitive salt in larger particles than the whiter films, and consequently not so rapidly attacked by the hypo, an explanation which is borne out by microscopical examination.

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### THE PLAGUE OF CHEAPNESS.

By F. J. A.

In these days of competition, there is a tendency, one might almost call it a frenzy, 'to unduly cheapen everything.' The photographic market is simply glutted with cheap cameras, cheap sets, cheap lenses, cheap backgrounds, photographic frames ('made in Germany'), cheap amateurs, cheap professional assistants, and lastly, but by no means least, cheap work. Where, may I ask, is all this cheapening, this cut-throat, unfair, dog-in-the-manger competition leading to? Cheap work means cheap labour, and cheap labour means mediocre or bad workmanship, and in saying that, I think we have the whole question in a nutshell. How many really first-class camera makers, photographic opticians, background painters, card and mount manufacturers, and producers of other branches of photographic industry, have we? I answer, with little fear of substantial contradiction, *very few*; and these men—these producers of really first class articles—do *they* sell their goods at a cheap rate? Certainly not, *i.e.*, not as the average individual understands the word 'cheap'; but, on the other hand, they are the truly cheap after all, because, being of sound workmanship, and made by fairly paid and skilled workmen, give universal satisfaction, and are being used and appreciated when those of the cheap and nasty order have been discarded with the contempt they so well deserve. We need only give passing mention to the cheap 'so-called' amateur, the cheap-set gentleman (?) who underquotes the struggling professional, and who does them for 'merely what they cost me, don't you know;' to the cheap first-class operator and retoucher who can also work up in black and white, besides various other accomplishments which he throws in 'with the abandoned recklessness born of genius' for thirty shillings per week, and to the individual who produces and sells his finished work at the price of a pound of cheap tea. Unfortunately, the three last-mentioned eloquent advocates of 'cheapness' we have always with us; they are 'the old men of the seas' in the sense that professional photography acts the part of 'Sindbad.' Although we have no power to stay the vagaries of such disreputable competitors, photographers, one and all, have at least the power of assisting to stem this tidal wave of 'cheapness' which threatens to overwhelm us, by not buying cheap and shoddy apparatus, chemicals, and accessories, and by not employing undue cheap labour, or selling their own work at unreasonable or unfair prices.

## GELATINO-CHLORIDE VERSUS ALBUMEN.—A PLEA FOR AN OLD AND VALUABLE FRIEND.

By J. H. SMITH.

GELATINO-CHLORIDE printing-out paper having come very much into favour with both professional and amateur photographers alike, perhaps a few remarks may be acceptable in the ALMANAC as to its advantages and disadvantages over our old friend albumen, which, up to the present, has held its own as a printing process of first rank against all its rivals.

In the first place, we will consider the advantages of gelatino-chloride paper as follows:—Firstly, quick printing; secondly, rich, plucky prints from decidedly over-exposed negatives (and negatives must be fully exposed to get the finest results); thirdly, its freedom from blisters; fourthly, its non-liability to stretch, or, at least, not to the extent albumen paper does, thereby doing away, in a great measure, with distortion; and fifthly, its adaptability to opalining and enamelling, without having to resort to a medium of gelatine and collodion.

Some of its disadvantages are, inability to blot between blotting-paper (and this is a great drawback), liability to be affected by damp, although protected by a sheet of indiarubber (another fatal objection to its use); more difficulty in spotting, difficulties in toning, *i.e.*, yellow prints, double tones, especially round the edges of vignettes. Then, again, the retouching and spotting of negatives must be finer, as any defects will show up much more readily than with albumen. Till all these difficulties have been overcome, I feel sure that our old friend, albumen, will not be so easily displaced.

Whilst admitting that gelatino-chloride is capable of giving a first-class print from a good negative, I also maintain that, with best double albumenised paper, a print can be obtained equal to its rival chloride, and at much less expense and trouble. The following calculations will show at a glance the cost of one process over the other.

| <i>Albumen.</i>                                                                               |     |     |     |     |     | £ | s. | d. |
|-----------------------------------------------------------------------------------------------|-----|-----|-----|-----|-----|---|----|----|
| 1 quire of best double albumenised paper, at 7 <i>l.</i> per ream                             | ... | ... | ... | ... | ... | 0 | 7  | 0  |
| 9 drachms nitrate of silver, at 2 <i>s.</i> 8 <i>d.</i> per ounce                             | ... | ... | ... | ... | ... | 0 | 3  | 0  |
| (This will sensitise one quire, each sheet taking about twenty-two grains of silver nitrate.) |     |     |     |     |     |   |    |    |
| 1½ tube of gold, at 1 <i>s.</i> 8 <i>d.</i> a tube                                            | ... | ... | ... | ... | ... | 0 | 2  | 6  |
| Total...                                                                                      | ... | ... | ... | ... | ... | 0 | 12 | 6  |
| <i>Gelatino-chloride.</i>                                                                     |     |     |     |     |     |   |    |    |
| 1 quire sensitised paper                                                                      | ... | ... | ... | ... | ... | 0 | 15 | 0  |
| 48 grains gold, at 1 <i>s.</i> 8 <i>d.</i> per tube                                           | ... | ... | ... | ... | ... | 0 | 5  | 4½ |
| Total...                                                                                      | ... | ... | ... | ... | ... | 1 | 0  | 4½ |

Cost of gelatino-chloride over albumen, 7*s.* 10½*d.*

Of course, where large quantities of work are done, the cost would be materially less. As will be observed, I have only quoted a single quire, showing the comparative cost for such quantity. As to the permanency

of gelatino-chloride over albumen, this question I must leave to others older and wiser than myself to decide, as at present it is an open question. As to albumen, we know that a properly toned, fixed, and washed print is as near perfection as to permanency as it is possible to make it.

To sum up the matter finally, I am of opinion, although at the present time there is, perhaps, a greater demand for gelatino-chloride than for albumen, photographers will eventually fall back again (not so much on account of expense as on albumen being more suited to the all-round requirements of their negatives, and being more certain in its results) on their old, well-trying, and valuable friend, albumen.

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### SATURATORS FOR DISSOLVING VIEWS.

By J. HAY TAYLOR.

DURING the past year I have received a great number of letters asking various questions with regard to the employment of ether or other saturators for double or triple lanterns. I mention this to show that it is at present a subject of great interest.

A properly constructed saturator is an excellent means of obtaining an illuminant for a single lantern. Then, if for a single lantern, why not for a double or even a triple lantern?

One of the chief difficulties has been that hitherto one saturating chamber has been used to supply more burners than one, and, by reason of the volatile fluid becoming more or less exhausted, the troublesome element commenced as soon as an attempt was made to lower the light by turning off the oxygen supply.

A certain quantity of saturated oxygen is required to produce a flame, and, in order to obtain the necessary degree of heat upon the lime, a certain quantity of pure oxygen must also reach the nipple. While the saturator is amply charged, the incandescence of the lime may be stopped by turning off the direct supply of oxygen; but if, on the other hand, the supply of volatile fluid has become partially exhausted, then will the lime remain more or less incandescent without the oxygen side of the jet being turned on. This denotes that sufficient oxygen has passed through the hydrogen side of jet, without being saturated, to give the necessary conditions for obtaining an incandescent spot upon the lime without resorting to the direct supply of oxygen to produce same. Under these conditions the light is almost uncontrollable, and an attempt to turn it down will invariably result in a pop of more or less severity.

When a saturator is charged and working properly, turning off the oxygen side should result in a flame—like house gas—being left at the nipple. This, then, should be capable of being turned down to a very low point, and, if turned completely off, the light will go out without the slightest sound, it being only when the saturation is not complete that it will go out with a pop.

There is little doubt but that the saturator of the future will be capable of having the charge renewed during the time of using. With this end in view, I have been experimenting with a commercial form of saturator, which is placed inside of the lantern. Although I cannot say that, up to the present, my experiments have been successful, owing

to the heat present, I will briefly describe one by saying that I connected a small metal chamber with a screw lid to the upper part of the saturator, this chamber to contain a charge of ether. On the connecting tube was a small tap, so that, on the principle of a mechanical oiler, the saturator would become charged by turning the tap. This principle, I found, would not answer with a saturator inside the lantern, although I think it might be applied without difficulty to one placed outside.

A supply tank connected with a cotton wick has, I believe, been experimented with, with a certain amount of success.

However, if more than one lantern is used, each jet should have a separate saturating chamber, whether encased in one outer case or singly, so that, given the conditions for a thoroughly charged saturator in a single lantern, it only becomes a matter of making it in duplicate or triplicate for the production of dissolving views.

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### GELATINO-CHLORIDÉ PAPER.

By F. T. BENNETT.

I HAVE little time at my disposal for carrying out experiments, and therefore make it a rule to read up the journals carefully before touching any new thing, in order to start with a thorough knowledge of the subject, which is quite as necessary as the practice. Lately I have been giving the gelatino paper a good trial, and must say I am very disappointed with it, in spite of the good things that have been said about it, and have gone back to the much-abused and still popular albumen; for you will notice that most of the large firms still use it, and one of the largest of all, to my knowledge, has given gelatino a very thorough trial, and discarded it in favour of albumen, which, though not a perfect printing process, will, as regards permanency, hold its own with gelatino, in spite of the following testimonial, which I do not think will do much good for the process: 'We have specimen cases in the suburbs of our town, and in one of them, early in the year, we placed equal numbers of albumen and gelatine prints, *carefully prepared* for specimen purposes; three months afterwards, on changing them, we found the silver prints hopelessly ruined, while the gelatine were, to all outward appearances, unchanged.' I can only say I shall have the greatest pleasure at any time in giving a lesson free on how to produce albumen prints that will stand at least three months in an ordinary show-case, beside a gelatine print, and show no sign of being 'hopelessly ruined.' Such a testimonial to men who have in their possession albumen prints prepared twenty and thirty years ago, and are still as fresh as when first made, must appear very absurd. There is one thing to be said against gelatino (and that is one of the most important things which professionals must consider in these times of competition), and that is, that it is much dearer than home-prepared paper, which can also be sensitised to suit different negatives, while the gelatino, as supplied, is only suitable for very thin ones, nor does it print (as now put on the market) any quicker than the albumen, one of the first claims made in its favour. The finished results are in many cases very beautiful, but I have a great objection to the dirty whites and double tones, both of which are conspicuous by their absence in albumen.

My best results with gelatino were got by using a very weak borax toning bath, carefully keeping it from getting acid by testing it constantly, adding gold as required, previously having washed the print very thoroughly. I have always had a great dislike to using sulphocyanide, which seems to me so prone to give double tones and destroy the purity of the whites, even when used in small quantities. There is one thing that can be urged in its favour, and that is, it is free from blisters; but in the warm weather, such as we experienced in 1893, it is much given to frilling, unless the alum bath is used before and after fixing, which I considered unsafe to use before fixing and thoroughly freeing it from hypo. I think it will take something better than the present make of gelatino paper to supplant the good old albumen, with all its faults and alleged want of permanency.

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### MAKING THE BEST OF A SITTER.

By FRANK WILCOCKSON.

THE enterprising photographer whose aim is to give satisfaction to his clients will endeavour to provide them with portraits in which, without sacrifice of resemblance, they shall 'look their best;' and in order to do this he will not crave possession of the 'giftie,' for which the Scotch poet yearned, of showing us ourselves as 'ithers see us,' but will seek rather to represent people as they think they are, or even as they would like to be.

That the camera cannot lie, is a fallacy indulged in by a few, but even if the general veracity of photography be admitted, it must also be conceded that it can tell the truth in a more or less pleasant way, according to circumstances. To obtain the most satisfactory results, and such as will meet with the approbation of clients, certain precautions must be observed, and it is with a view to supplying the place of experience that the following suggestions and advice are offered, with the reminder that in our counterfeit presentments we shall be expected, not merely to 'set down aught in malice,' but also to extenuate a good deal; and the more tardy our friends may have happened to be in coming up to the front on that proverbial occasion when good looks were distributed, the better opportunity is offered of exercising such powers of improvement as our profession enjoys.

The scope of this paper includes hints upon posing and illuminating a sitter, and the arrangement of the *entourage*, leaving the reader to select, from the many able treatises on those subjects, any information he may require about the modifications possible by the aid of retouching, and the treatment of the print; but in all these processes, from first to last, much can be done to accentuate beauties, and to soften or hide defects. A capital subject for treatment presents itself in the case of a person of short stature; here we can scarcely fail to please by making the real height a matter of mere conjecture. The way to do this is to cut off the feet—not surgically—but by putting them outside of the bounds of the picture, as in a three-quarter length. A figure will seem larger in proportion as it occupies more of the picture space. With a dress that is adorned by a long train, fresh resources present themselves. The model may be mounted on the top of a flight of two or three steps, the train brought round towards the front, where it conceals the termination

of the dress, together with the feet, and falls in graceful folds over the steps.

A simple but excellent method of imparting an appearance of height and dignity consists in choosing a low point of sight, that is, in having the lens directed towards a spot not too far above the level of the ground.

Contrast is a powerful factor in forming one's judgment as to the relative sizes of things, and to avoid the effect of dwarfing the figure, the proximity of massive surroundings, furniture, &c., must be guarded against.

When the model is a lady of good figure, well and fashionably dressed, take care not to allow such enviable possessions as a well-rounded bust, or a small waist, to pass into insignificance; but by the aid of backgrounds contrasting with the tone of the *corsage*, display them to the best advantage. The arms should be posed in such a way as not to impede a full view of the outlines of the figure.

A long neck has always had attractions for the artist, and it should be remembered that a small effort on the part of the model will often suffice to lift the head, and elongate the neck considerably.

One of the first cares of an operator in regard to those parts which it is undesirable to have 'come out' too large—the hands and feet, for instance—will be to avoid letting them approach too near the lens, on account of its tendency to exaggerate the perspective, but this can be turned to useful account in some cases; as when the lines of the eyes diverge instead of being parallel, that side on which they are farthest apart should be turned away from the camera. In the perspective view thus obtained the lines will tend to converge, and thus render the defect less noticeable. Other opportunities of modification by similar means occur in dealing with ill-proportioned jaws, long upper lips, enormous foreheads, &c., by slightly inclining such features towards or away from the lens, its power of foreshortening will be brought into play, and the apparent size of the feature diminished.

It may safely be said that no face is so regular and symmetrically built as not to have both a good and a better side; the eye should be practised to quickly select the best side, so as to give it most prominence in the picture.

There is a pose of the head against which beginners may be warned; this may be termed a 'seven-eighths' view, and although a little less than full face, it just happens to hide one ear, giving the disagreeable impression of its having been lopped off.

Before going in for a profile, notice whether the ear be sufficiently small and well formed to occupy the conspicuous place it will have, and shun the 'full-face' whenever the ears unduly project.

Many people habitually keep their mouths a little open, sometimes on account of a short upper lip, or prominent dental region, when all attempts to improve their appearance by causing the mouth to shut will end in failure. The object upon which the sitter is desired to concentrate his gaze during the exposure should not be in proximity to a light, or anything of a dazzling description, as it might beget a frown.

A pleasant expression is capable of redeeming a plain countenance. Hands are seldom so small and well-shaped that we can allow them to be much *en evidence*; if they are very large, try to hide them partially. In some views they present a narrower surface than in others. Generally speaking, they cannot with advantage be placed close together.

Angular positions are unfavourable to thin and lanky people, whilst very stout persons cannot be expected to assume sitting positions with grace and ease.

Coming now to the ameliorations afforded by suitable lighting, it should be observed that the most ungracious and disagreeable form of illumination is that in which the source of light is situated vertically above the model; it is particularly unsuitable to those who have deep-set eyes, side light being the best for them.

A soft and well-diffused lighting, without cast shadows, or very dark shades, is in harmony with young and pretty faces; whereas old and rugged ones, full of character, though not beautiful, may be considered sublime; and some contrasting light and shadow may be quite in accordance with their picturesque nature.

Orthochromatic plates are indicated for freckled faces and sandy complexions, associated with red hair.

These are only a tithe of the resources available to the ingenious and sympathetic operator, who bears in mind the 'golden rule,' and the sentiment of the poet who says—

'Teach me . . . to hide the fault I see!'

It now remains for the developer, retoucher and printer to carry on the beautifying process. All should work together, with a determination to give their clients full credit for as much good looks as they possess, not forgetting that the majority of mankind—and womankind also—are at one with the gingerbread lady of the popular fairy tale, in their desire to present their *best* side to the view of a critical and not over charitable world.

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### DRYING BOX FOR GELATINO-CHLORIDE PRINTS.

By GEO. W. VALENTINE.

For those that do not enamel their gelatino-chloride prints, I would call attention to a very handy way of drying prints quickly and free from dust. Construct a deal box, with close joints, of half-inch wood, three feet long by two feet wide by two feet deep, to contain three or four shelves, each shelf to be covered with clean white blotting-paper *fastened at the corners only*. A lid for the box must be made of deal, thirty-seven inches long by one and a half inch wide, and close fitting, and to be covered with clean white blotting-paper. To use, put the prints on the shelves, face upward, put on the lid, and keep drying box in warm place, or in the heat of sun, when prints will be found to be thoroughly dry in an hour and a half.

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### THE EDUCATION OF THE PHOTOGRAPHER.

By J. CARROLL, M.B.

PHOTOGRAPHY is intimately connected with various arts and sciences—so intimately, in fact, that it may be said to depend on them for its very existence. To prove this statement, I need only mention its relation to optics, chemistry, printing, &c. For many years it has been the fashion

to cry down the study of the optical and chemical side of photography as unworthy the photographer's attention. 'What is the good of a man wasting his time studying these,' it is said, 'when he might employ his time to better advantage studying art?'

Now, without for one moment despising the study of art, I contend that, at any rate, an equal amount of attention should be bestowed on the scientific side of the photographer's education. That the time spent over these science subjects is time well spent and will amply repay the student, 'I am free to maintain,' and also that their study is not unworthy of attention is shown by their having engaged the time and energies of such acknowledged masters in photography as Abney, and many others whose names are 'familiar as household words' among photographers.

This leads me to speak of the general education of the photographer. After receiving a fairly liberal English education, he should spend a few years—say, three or four—in acquiring a good knowledge of the various photographic processes under competent masters—become, in fact, educated in photography all-round, including the theory, chemistry, optics, and art. His knowledge of the various processes might be tested practically and by means of written papers at the end of each period of study. Then, if he wish to rise above mediocrity in his profession, let him take up the study and practice of one subject—let him become a *specialist*. By thoroughly mastering all the details of his specialty and devoting his whole attention to it, he may fairly hope to reach, if not the topmost twig, at least a point not very far from the top of the tree. But a photographer who knows little or nothing of the other departments of his profession misses many of its pleasures. His previous training, as suggested, keeps him in touch with all classes of photographers. Without this previous all-round development, his specialty is liable to become mechanical, and his presence among all-round photographers a bore. Most amateurs go in for trying all the processes known, but they rarely settle down to one subject and stick rigidly to it. This, I think, is where amateurs make a grave mistake. Let each one become a specialist, and then we shall see results vastly superior to what we are now accustomed to, good as some of them undoubtedly are.

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### LOOKING BACKWARD.

By JOSEPH H. WOODWORTH.

We often hear of the improved facilities photographers, especially amateurs, enjoy nowadays, but I fancy none but 'veterans' in the art, or science—or 'art science,' if you will—can properly realise modern advances in its practice. I fancy only a very small percentage of the modern workers know anything, practically, about the 'wet process,' and would find themselves considerably 'at sea' if required to 'coat a plate.' Cut off the supplies from our modern amateur, deprive him of prepared plates, ready-sensitised paper, and sundry other appliances now so liberally provided, and I hardly think it would be necessary to take any steps to suppress him in the interests of the 'professional,' as some representatives of that class seem prepared to do if they had the power, which, thanks be to Providence, they have not.

In the olden time, outdoor photography meant work. There was no standpoint for the 'press-the-button' school. Taking your appliances and chemicals with you, and developing 'on the spot,' implied a very different line of action from the 'light and airy' usages that prevail nowadays. The practice of the amateur was therefore greatly restricted to portraiture, copying, and such work as could be done at home, and here the professional, with his properly lighted gallery and condensed experience, had him 'on the hip.' Amateur enlargement was a *terra incognita*, and lantern-slide making was necessarily kept down by the paucity of landscape negatives.

Long before the dry plate became a commercial article, efforts in that direction were made in various quarters. I recollect trying some of the earlier products; but, whether owing to the plates or my own want of experience, I do not recollect the results as 'brilliant successes.' There were several processes tried by amateurs themselves. I can testify to the good 'keeping' qualities of the old 'tannin process' plates, as having 'come across' some I had prepared and put by. On one of them, backed with paper, on which was the date of the making, I made a transparency, and exhibited it at one of our meetings. It had kept extremely well for more than twelve years. Our printing in those days was almost confined to productions on albumenised paper, home sensitised, and, as far as that class of proofs is concerned, I fancy we got at least as good, if not better, results than are usually obtainable on modern commercial papers. The strong silver bath, and the rapid using up of the prepared paper, had probably a good deal to do with the results.

From the amateur standpoint, the two positions may be stated thus: long ago photography implied work rather than 'recreation;' now it means 'recreation' rather than work.

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## THE MOUNTING OF GELATINO-CHLORIDE PAPERS.

By T. H. POWELL.

JUDGING by the number of failures one comes across, the majority of amateurs find the mounting of chloride paper a matter of some difficulty. Many, indeed, discard these papers altogether, finding that, after they have produced a batch of good prints, and successfully brought them through the perils of toning and fixing, their work is completely spoiled when they attempt to mount. These failures are generally due to the softness or stickiness of the gelatine, but by adopting the following method mounting may be accomplished as quickly and certainly as with albumen paper.

After fixing, the prints should be well washed and then placed for a few minutes in a strong solution of alum to harden the gelatine, then again thoroughly washed. They should then be lifted out of the water one by one, the surplus water allowed to drain off, and placed face upwards on sheets of paper; newspaper does very well for the purpose.

The mountant is next made by placing in a saucepan sixty grains of starch powder (known to chemists as *pulv. amyli*), and stirring with sufficient water to make a thin paste, then adding two ounces more water, and well stirring the whole over a fire till the boiling point is reached,

when the starch will swell, and a nearly solid jelly result. The mountant being ready, it is brushed over the *mount* with a broad brush, those sold for applying enamel answering every purpose. The print, while still wet, is placed in position, and rubbed down in tight contact with a small piece of fine and wet sponge, beginning about the middle of the print and rubbing backwards and forwards till the edges are reached, which, of course, require rubbing down thoroughly all round. The entire print will then have adhered so firmly that it may be rubbed all over with considerable pressure without injury. The mounted print should be left to dry spontaneously, and, when thoroughly dry, may be burnished, if a fine surface is desired, a weak solution of hard soap in spirit being first applied. Should the mountant go beyond the edges of the print, it is of little consequence, as, after drying, no marks are to be seen.

The advantage of this method of mounting may be briefly explained. Cardboard, or paper, when wetted, expands, and contracts again on drying. When mounting a wet print on a dry card, contraction of the print takes place, but not of the mount. This contraction is of little importance in the case of an albumen print, which stretches without difficulty, but with a chloride print the contraction of the gelatine film, paper supporting it, and mount, all vary, and the result is the print tears away from the mount. If, however, both mount and print are wetted, they will expand, and subsequently contract equally, or sufficiently so as to avert the tendency to peel. It might be supposed there would be some risk of the wet sponge sticking, but such is not the case in the slightest degree, the gelatine is rendered so hard by the action of the alum that it may be rubbed over as safely as if it were a sheet of glass. The sponge should be squeezed in clean water between each mount.

A wrinkle is suggested by the above that may be of value. If it is desired to remove a photograph from a mount, pour hot water upon them, and leave for several hours; then, instead of trying to tear the photograph from its support, bend back the *mount* from the photograph. Risk of tearing is by this means reduced to a minimum.

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## LENGTH OF EXPOSURE WHEN PHOTOGRAPHING UNDER A SUN VERTICAL, OR NEARLY SO.

By PROFESSOR W. K. BURTON.

I HAVE never been in the tropics, and have, therefore, never photographed under a sun absolutely vertical. I have, however, photographed under a sun so nearly vertical that it might be considered to be practically overhead. I have exposed when the shadow of a vertical pole ten feet high was only one foot long. Premising that this was at midday in midsummer, any one who is curious may work out this latitude.

I have often photographed when the sun was only ten degrees from the vertical, and, as may naturally be inferred, at every angle between that and ninety degrees, or even more, for I have exposed after the sun had dipped below the horizon.

Here I may incidentally mention that very striking and sometimes beautiful effects are to be got by letting the camera face the sun when the

latter is anywhere between ten degrees and twenty-five degrees from the vertical.

What I wish particularly to state, however, is that, atmospheric effects being so far as possible identical, *the exposure with a sun nearly vertical has to be longer than with the sun at a considerable angle with the vertical.*

This is all that I can say definitely. The following statements are to be taken as approximations only, nay, in some cases, but little more than guesses, for I recognise that a most careful and elaborate set of comparative experiments would have to be made to establish anything like exact figures.

The position of the sun that allows of minimum exposure is that when it is between sixty and seventy degrees above the horizon.

The exposure with the sun at forty-five degrees is not longer than with the sun about vertical.

With the sun vertical, or nearly so, the necessary exposure is certainly sometimes fifty per cent. greater than with the sun sixty degrees to seventy degrees above the horizon. The increase of exposure necessary may sometimes be more.

The average increase of exposure necessary is between thirty and forty per cent.

The necessary increase of exposure varies with the subject. It is greatest in a subject such as wide spreading trees not far from the camera. In the case of distant landscape without foreground it disappears altogether.

Whatever the subject, any haze between it and the camera makes the necessary increase of exposure with a vertical sun less than it would be with a perfectly clear atmosphere.

It may be asked, Can I account for this apparent anomaly? Well, I have a theory, but I by no means pin my faith to it. I believe it to be that, with a vertical sun, we have larger masses of shadow that are not sky illuminated, or that are less sky illuminated, than with a sun at somewhat of an angle from the vertical.

I should like to hear any other theory. Of the necessity for increased exposure I am quite satisfied. When wanting to do 'instantaneous' work with the shortest possible exposures I have often waited till the sun had declined to sixty degrees or so from the horizon.

Actinographs, &c., made for latitudes where the sun is ever, say, seventy degrees above the horizon, ought to take the fact of increased exposure with a vertical sun into consideration.



## SEAFORD.

By R. E. GREEN.

READER, have you ever heard of Seaford? In a delightful situation, nestling between two ranges of the South Downs, within view of the English Channel, Seaford—with its picturesque developments—offers an almost unrivalled attraction to the weary worker who wishes to combine complete rest without sacrificing the camera. The sea-front is bold and

beautiful, and many a 'shot' can be obtained of passing vessels. But it is the village and surrounding country of which I wish now to write.

Seaford in its early days was an important place, and Roman, Saxon and Briton have all left their traces. The church is of considerable antiquity, and there is a very picturesque crypt, now used, by-the-by, as a hen-house, which is worth inspection and a plate. The village streets are irregular, and it would be impossible to turn the camera in any direction without securing a picture. The walks over the Downs are both numerous and picturesque. The valleys are rich in flora, and I am sure the photographic tourist who takes a walk to either Blatchington, Alfriston or West Dean—all within a radius of six miles—will only regret that he has a limited supply of plates with him. Blatchington, especially, deserves mention. About ten minutes' walk from Seaford, it commands a wonderful sea-view of this village, with the Channel as a background. The church, however, I wish to draw particular attention to. It is a most interesting building, and boasts of what is known as a shingled spire. Alfriston, too, possesses a church of architectural pretensions, and also a mutilated market cross.

There is an ancient hostelry at Alfriston which has several antique carvings, believed to date from the early part of the sixteenth century. I only mention these places as a few examples of what there is to be done at Seaford, apart from its own attractions.

Another advantage, a very great one, too, is that it is within easy reach of London (60 miles), Brighton and Eastbourne, and quite close to Newhaven. Lodgings are cheap, and the water is excellent. Of course there are no dealers in any of the villages I have mentioned, but plates and the use of dark room can be obtained at Eastbourne, which is, I believe, the nearest place at which photographic requisites may be obtained.

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## ENAMELLING GELATINO-CHLORIDE PRINTS.

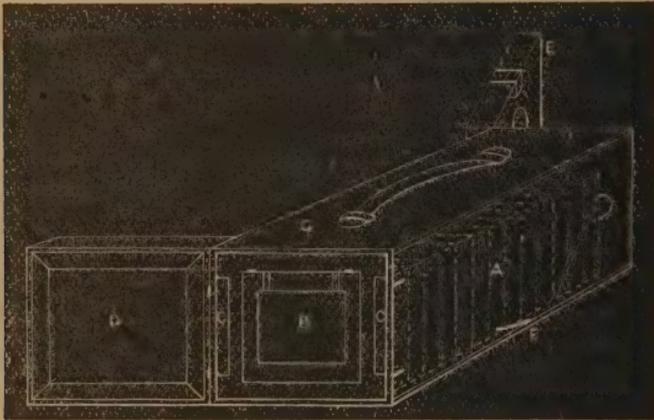
By GEO. W. VALENTINE.

For enamelling prints, a piece of plate glass should be obtained on account of its polished surface, which should be entirely free from scratches. For a start, well wash and dry the plate glass, and, when all surface dampness is gone, dust on the surface some French chalk-powder, give the glass a good polishing with a dry, clean duster, and apply, for second time, French chalk. Polish and dust off again. Take a chloride print out of washing-water, and let it drain on a clean, slanting board for five minutes; then invert the print, face downwards, on the polished plate glass. Now take a roller squeegee, and roll over the back of the print, working from the centre outwards, until all bubbles are thoroughly dispersed; afterwards put in a cool current of air to dry, rub some finely-made starch paste over the back of print (keeping the glass clean), attach to mount, well rub down, and set aside to thoroughly dry, when the print and mount will easily separate from the glass. If the above is strictly followed, no vexatious annoyance will be found of the print, when dry, sticking to the plate glass.

## A HAND AND HANDY CAMERA.

By CAPTAIN CHARLES G. VATCHER.

To those who have a quarter-plate already, or are contemplating a hand camera, I can recommend the following. In touring it is a well-known thing that most amateurs would like to curtail the impedimenta, therefore a camera that could be used alike in hand or on stand at a moment's notice will considerably do so. I know that my half-plate on a hot day is quite enough to be almost a 'last straw.' I give with this a rough sketch, and hope my meaning will be grasped. Of course, when made, the camera will not be seen as in sketch; it will slide in like the hand-sewing machines, and be caught with a pin (F). The camera, to my



- |                                                                                            |                                          |
|--------------------------------------------------------------------------------------------|------------------------------------------|
| A. Camera proper.                                                                          | E. Front cover, with finder and shutter. |
| B. Focussing glass hinged.                                                                 | F. Pin to catch camera in position.      |
| C. Two places for two slides (three slides six plates), one always to be in position at B. | G. Outer case of mahogany or walnut.     |
| D. End cover.                                                                              |                                          |

mind, ought to be square, and have reversing and swing back; the front may simply be rising and falling; the lenses, rapid rectilinear and wide angle rectilinear; the shutter of the blind type, and one finder. Before the outer case, G, is made, correct focussing will have to be adjusted with the rapid rectilinear lens, making a mark on the baseboard at each distance, say from 5 feet to 30 feet and beyond. Having ascertained this, arrangements will have to be made to permit the slide, when exposing a plate, to be drawn out clear of the case, and folded, depth enough in cover, D, being allowed for this purpose. Three double slides for six plates go with the kit, one being always in position, and the other two one on each side the camera in the outer case. A light threefold tripod would, of course, have to be carried, and a light waterproof satchel for the camera, which could always be ready for action. I have said a quarter-plate camera, as I prefer it, but I do not see why a  $5 \times 4$  cannot be used as well. An enlarging apparatus of an inexpensive kind can now be got to work with the above, getting prints equal to any larger-sized cameras direct.

## THE INCANDESCENT GAS LIGHT.

By G. FOXALL.

How often one hears the remark, 'Lantern slides made by reduction in camera at night time. Why, they will not compare at all with slides produced by means of daylight.' Well, for the future, such a remark will be without any foundation in fact, for if any will take the trouble to try the Welsbach light for this purpose, they will find results in every way satisfactory, and, I trust, bless me for suggesting its use.

Well, to describe the light itself. The cost of the burner complete, with all fittings, is now 15s.; by means of an adapter sent out with each one, anybody, not absolutely a born f—l (and few such ever practise photography), can fix it in a minute or so to any existing gas-fitting. The light is very actinic indeed; the consumption of gas only three-and-a-half feet per hour. There is absolutely no smell, or any products of combustion noticeable; very little heat, and from one burner the amount of light given is equal to eighty candle power. I can safely say that, as a means of using ordinary gas for any photographic purposes, it is without a rival. Why, an ordinary Bray burner, giving a decent light, will consume six feet per hour, give off any amount of noxious fumes and heat, and withal give a light so weak and yellow as to be quite unsuited for the photographer's use; even with the argand form of burner one gets but a very poor light for all the intense heat and amount of gas consumed.

I have had one of these incandescent lights in use for twelve months now, and am still perfectly satisfied with the results I can obtain with it; in fact, now I should consider I was wasting good daylight if I either made slides or enlarged then, when I had this light always of the same power, and available when no other work could be done.

I have subjected the light to very exhaustive tests, and find that I can produce equally good lantern slides and enlargements as with the best daylight, and owing to its concentrated character and actinic power, the exposure is no more than for diffused ordinary daylight, and not being variable in intensity as daylight is, I think, that in the end it is decidedly quicker, for one gets no waste by errors as to time owing to the variation of light, and thus more good work can be produced in a given time.

The burner can easily be adapted to most existing arrangements for lamp or gas enlarging; all that has to be done is to fix the burner in the place of the lamp behind the condenser.

If possible, as the incandescent veil is very fragile, it is best to have the burner a fixture, but if moved about, care in carrying is all that is needed. I have never harmed my light, and yet have moved it about constantly, because, in addition to using it for photographic work, I use it for painting at night, and now can do work in colour that no one without an electric arc light would have attempted. One hint I should like to give: instead of using the ordinary glass chimney with the light, use a mica one; it is not liable to damage by draughts of cold air as the glass one is, and only reduces the light by three candle power.

I trust that, as a result of my remarks, some may derive as much pleasure from the use of this light as myself.

## THE APOTHEOSIS OF THE HAND CAMERA.

By J. DORMER.

LAST year's ALMANAC contained a truly dispiriting, hand-camera-phobic article from a contributor who had evidently been bitten by some cheap and nasty instrument, or who had not thought so lowly a thing as a hand camera worth any study. If the Editor permits, I should like to give any intending hand-camera buyer a hint or two, and, though eulogy suggested the title, I have erased as far as possible the superlatives in these few lines.

Firstly, then, do not buy a hand camera for half-a-guinea and expect to produce landscapes worthy of Colonel Gale by simply snapping the shutter (if any) of such an article. You may not begrudge a 10*l.* note for a lens for your cumbersome camera, but, for its natty brother, 'Oh, let's get one of these—they're the cheapest I've seen!' &c. A good lens in a good instrument is more than ever a *sine qua non* in this respect for good photography. Get both, and start fair. As for the pattern, thank Heaven I am not an editor to be badgered for advice on the matter. Compare, at least, the maker's descriptions of the leading forms, and *decide which points are of most importance to you*. Each one has its good points, though some of them, alas! prove thorns.

Secondly, if you decide on one which is made for plates (and their only real drawback is their weight) do not waste your substance on express-cum-thunder-and-lightning plates. With *f*-16, or at most *f*-11, it is easy to obtain perfectly satisfactory negatives of most objects met in the course of a stroll on a sunshiny day with the common 'slow' (save the mark!) plate. On the 'good old ordinary' I have personally taken snap-shots from the windows of a moving 'local' train, and even bicycle and foot races, not to mention that I always use it in crowds. I love vigour in a negative, and, given good light, I usually get it. Reserve, then, your extra special plates for darker days, and do not swear if you do not get a satisfactory negative.

Thirdly, do not point your lens at the first object that happens to strike your fancy; press the button; and walk on. The hand camera has not that discriminating and artistic eye which some people seem to consider included in the price. It does not see any better than its three-legged predecessor. It requires an equal amount of aid to make a picture of the view before it. I think hand cameras should have this inscribed on them, by way of occasionally reminding their owners of the fact.

With regard to development, of course, don't hurry it. Professor Burton's *tentative* alkaline pyro has answered well, unstrengthened, in my hands on the Ilford ordinary.

And as to printing. By all means learn, if you do not practise, the carbon process. Disregarding the permanency and the beauty of the results, the simplicity of the single transfer process is wholly captivating to one who has gone through the usual tedious, but requisite process of toning, fixing, and washing usually connected with printing. As actinometer, use some Solio seconds (which I use for proofs) cut into strips. When the strip you have inserted under a negative similar in tone to the one you are printing in carbon shows nearly the full range of light and shade, take out your carbon tissue and develop. It should be accurately exposed.

There is much more to be said, but this would be to write the ALMANAC on one subject. But I should like to ask, why is the hand camera so scornfully treated? Give it but *half* the attention its big brother demands, and the improvement on the result will be a surprise to many. What, however, is a still more painful subject to me is the frequent distrust and dislike displayed by the public cognisant of the presence of the instrument. If I may add a corollary to what I have already said, I would say, When you have got your hand camera, be *merciful!*

P.S.—On glancing over what I have written, I feel it imperative to write, at least, a postscript on the possibility of the mask in printing. Comparatively few amateurs realise how completely the form of the outline will alter the appearance of the print, or how a picture may be produced by covering up one half of the plate with brown paper—sometimes. A whole treatise on artistic photography may be mastered by the mere study of cut brown paper masks. Slides, says the lanternist, must be masked; but prints—oh, they are *all right, in puris naturalibus!* Are they? Get an artistic friend to clothe them properly and see! But the Editor's blue pencil will assuredly be at work on this copy if I continue. I won't but mention the necessity for absence of flurry when changing plates, and the enhancement of even snap-shots by printing-in clouds; but I will invite every one to drink deep and long to the health of our friend, H. Camera, Esq., junior.

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### A SUGGESTION FROM AUSTRALIA.

By F. A. JOYNER (Adelaide).

THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC is so extensively read in Australia that the suggestion which follows will, if you should deem it of sufficient import, be as much an idea for my brother amateurs here in Australia as for those in your own land.

There are a great many amateur photographers who are content, year in and year out, to produce little else than landscape pictures, beautiful, doubtless, but (especially in the smaller sizes) likely to pall on one's friends. From my point of view, the pleasure of the practice of our Art (with a big A, please, Mr. Editor) is intensified, indeed, when it gives pleasure to others. The little album which accompanies this is my practical suggestion in this direction. I now produce such a one annually, and it is aimed at the gratification of my own particular friends. The idea, the subject, and the form is, of course, readily capable of alteration, and, no doubt, improvement by your readers. The album is intended to take the place of a Christmas or New-year's card, and comprises five or six pictures (less would do), and the subject is always one calculated to interest friends. I bar landscapes pure and simple.

My example consists of five cabinet pictures of my own boy, aged a little over two years, and his cousin of a like age, and a garden roller. The pictures are snap-shots, taken with an ordinary folding camera, and they represent, 1st, the youngsters' delight at getting hold of such a plaything; 2nd, their effort to move it; 3rd, their annoyance and anger when a stone is placed in the way of the roller; 4th, their exertions to

get the roller over the stone; 5th, their hilarious joy when, the obstruction overcome, the roller is fairly on its way.

A little thought, and hundreds of kindred subjects will suggest themselves. Children I deem *the* subjects par excellence, but animals, fowls, birds, or even adult friends might be pressed into service. Whatever the subject, it should, I think, have in it a touch of humour. The frontispiece of the album may be a composite picture. In my example, it is a picture of myself and wife, and the young actor in the pictures which follow, encircled with the twining stems and fine-cut leaves of a little creeper, together with a New-year's greeting. The album is home-made, with a double hinge, and covered in book-binders' cloth. It adds to the appearance, and does away with the difficulty of rough edges if the leaves, as in my example, are also edged with cloth.

I shall be most happy to give, in a future paper, simple directions for the manufacture of the albums. They need a minimum of skill, and cost but a trifle.

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### ODD POINTS.

By T. E. HUSTON (Cannelton, U.S.A.).

ONE finds out by experience a lot of things. For instance, that the light at 3 p.m. is not nearly so strong as at 9 a.m.; by theory it should be the same. Hydroquinone is a good developer, but tends to harshness. Many people say that eikonogen is just the thing, but turns out thin negatives. There is nothing like 'old pyro,' especially when it comes to staining. Some of the old stand-bys say they never will give up albumen paper; these same parties were going to stick to the good old wet plate. *Verb. sap.* Fast lenses and slow plates are better than slow lenses and fast plates for everybody but the quicker-than-a-wink man; it is better to get a picture even if it does take a whole second. The only safe light for the dark room is an extinguished lamp. Diffused dark-room lighting is pleasant but unreliable. Nobody but a fool wants to read newspapers in the dark room. People don't take to 'art' pictures of themselves. When they say, 'Take me just as I am,' flatter all you know; when they are taken 'just for fun,' it is a serious business for the photographer. The margin of profit grows smaller year by year. The unfittest, artistically, continue to survive. One should stop, some time.

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### AMIDOL AND METOL-HAUFF.

By A. R. DRESSER.

OF the numerous new developers we have had put upon the market in the last few years, none have given such good results in my hands as amidol and metol, and as I have been a good long time using them, I shall take the subject for my article this year.

In my opinion, these developers are bound to replace pyro, as they are easy to work, and give results as good, and, to my mind, better than pyro ever did. The only developer I have as yet used that is equal to amidol or metol is eikonogen; but, then, although in my hands eikonogen

is nearly as good as amidol for negatives, it is not so good and certain for bromide papers; so while I prefer amidol, I often use eikonogen for negative work, but think that others will find they will get the best results with amidol or metol, as either of them is good for negatives, bromide papers, or lantern slides. Thus they may be called all-round developers, and as such cannot be beaten.

As to which is the best of the two developers I am dealing with, it is hard to say. I can find little or no difference in the results I get, and I have developed a number of negatives and bromide prints with each. Certainly amidol is a little the harder to learn, but when once one is master of it he will, I fancy, use nothing else. Again, I think that for *very* fast instantaneous work one can get better results with amidol, and that for normal exposures and lantern slides metol will be found the best. As for bromide papers, I can find nothing to touch amidol. I get as good results with metol for, say, one or two prints, but when one requires to develop six or seven with the one solution, then amidol is far ahead, as all will be one colour; whereas with metol the last ones will be of a grey tone, and not so good a black. Perhaps, if I had longer trials with metol, I might get as good results as with amidol, but I am so satisfied with amidol that I use it for all my bromide printing (and I print on nothing else, as all my work is enlargements from hand-camera negatives).

Now, each of these developers has its own advantages, and so I strongly advise my brother photographers to give them a trial. Here are the formulæ I use; I will leave it to those who wish to make trials to choose which they like best.

#### AMIDOL.

This developer is, to my thinking, a little better for very fast exposures, but has the disadvantage of not keeping well in a solution, in whatever form it is made up in. I first tried the formula sent out by the makers, but found it would not keep longer than a week or so in solution, and so tried a formula of my own, which worked much better, as it kept in solution for three months, and kept clear, and worked well, and is the only formula I found that would work if one required to keep his amidol in solution.

The formula is as follows:—

| A.                                |            |
|-----------------------------------|------------|
| Amidol.....                       | 1 ounce.   |
| Metabisulphite of potassium ..... | 1 „        |
| Water .....                       | 10 ounces. |
| Ten per cent.                     |            |

| B.                          |           |
|-----------------------------|-----------|
| Carbonate of potassium..... | 1 ounce.  |
| Water .....                 | 5 ounces. |
| Twenty per cent.            |           |

C.

Bromide of potassium, a ten per cent. solution.

For use for instantaneous exposures I take—

|             |           |
|-------------|-----------|
| A .....     | 1 drachm. |
| B .....     | 1 „       |
| Water ..... | 1 ounce.  |

Use no bromide. The image will appear at once, but takes some time to get density; but after a short time one can add more of B—say, 30 drops, 10 drops at a time, which will bring out the density, if density can be got. But it is not wise to add the extra quantity of B if it can be avoided, as it is apt to cause fog, unless used with care. Often when I find a negative that will not gain density I use developer as above, and when plate will develop no more with that developer, I add, say, half-ounce of the metol developer, which will bring out anything.

Of course, I am only giving an idea of how to work, as one must learn by experience, as so much depends on the plate used, as some plates will stand no forcing, and others will stand any amount. But my best instantaneous results are got on Eastman films, and I find they will stand any amount of forcing, *after* the image is once *well out*.

When developing full or time exposures, use the developer weaker, viz. :—

|         |                 |
|---------|-----------------|
| A ..... | 1 drachm.       |
| B ..... | 20 to 30 drops. |
| C ..... | 5 to 30 „       |

The best preventative for over-exposure when developing with amidol is bromide, and I find I can always save an over-exposed negative if I take care to use plenty of bromide, as one can then tell what he is at, as it is very easy to use stronger developer as required; and so, unless developing instantaneous exposures, it is always best to be on the safe side, and begin with plenty of bromide. I, when developing, always use three measures of developer—one well diluted with bromide, one normal, and one very strong, then begin with the first, and use Nos. 2 and 3 as required.

I feel sure amidol has a great future before it, but, as I said before, the only fault it has is not keeping well in a solution, and I now do not use it that way, but use it *dry*, same as we used to use pyro, and then all trouble of its fault of not keeping is done away with, as if used the way I will now give, it will keep for at least a week in an open measure, and so, should one mix more than he required, he could put it in a bottle till wanted.

I strongly advocate the use of amidol *dry* for many reasons, chief of which are, that it is ready for use at once; you know what strength you are using (which you do not if in solution, when kept for some time); it is handy for those who travel, and is really a one-solution developer, as, except at odd times, it requires no acceleration.

The formula I use now for all my work, negative, bromide, or slides, is as follows :—

The amidol I keep *dry* in a bottle, with a small spoon measure that holds, say, 10 grains or so; anyway, find out what your spoon does hold, within a grain or so.

I make up a large bottle of saturated solution sulphite of soda (say 40 ounces), a 10 per cent. bromide, and a 10 per cent. solution of carbonate of potassium. For use for instantaneous work I take—

|                                 |           |
|---------------------------------|-----------|
| Sat. sol. sulphite soda .. .. . | 1 ounce,  |
| Amidol ( <i>dry</i> ).....      | 6 grains, |

and, if I find, after developing for some time, my negative is weak, I add

5 drops of the potash solution at a time, till the image begins to fog; but if the negative is not developed enough before it fogs, then the negative is no use.

I seldom find I have to add the potash solution, but at odd times I have to do so, and find some plates will stand it, and others not; but if the plate has had any exposure in reason it will develop up to full density without the help of potash.

For time exposures I use half-ounce sat. sol. sulphite, but keep the amidol at 6 grains per ounce, and add plenty of bromide, say, from 5 to 60 drops of the 10 per cent. solution, according to whether the negative is much over-exposed or not.

For bromide papers I find the best results are got by using the developer strong, and not over-exposing. I use it as strong as I do for instantaneous work, but add bromide, viz. :—

|                              |                 |
|------------------------------|-----------------|
| Sat. sol. sulphite .....     | 10 ounces.      |
| Amidol .....                 | 1 drachm.       |
| Bromide (10 per cent.) ..... | 20 to 30 drops. |

Place your exposed print in water, and, when well soaked, pour on the developer; if the image appears at once, pour off developer, and put on water, and watch the print, and by so doing you will save the print, if not much over-exposed, as it will gain density in the water.

One feature of developing with amidol and metol is that the image appears at once, but requires time to get density. This often frightens those who are not used to these developers, but they soon learn that, although the image flashes up, it is not a sign of over-exposure. I am strongly impressed with this developer for bromide papers, and feel sure it is the best developer for that kind of printing, and I never now lose a print in developing.

I think I have now said enough of amidol to show I am very fond of it, and, being so, should like others to try it, as the tones got are extra good.

Metol is the same in treatment as amidol, but, as a rule, gives more density. I think for negative work it is better than amidol for those who do not work with very fast exposures, as with exposures from  $\frac{1}{100}$  second down one is quite safe in getting all out of his negative with metol. Metol can not be used without the addition of either the carbonate of potassium or of soda, and in that way differs from amidol. The formula sent out by the makers is a good one, and cannot be improved upon; but this developer is like all others, one wants to learn how to use it before he can get the best results.

The formula I use for metol is as follows :—

|                                                |            |
|------------------------------------------------|------------|
| $\frac{1}{2}$ Sat. sol. sulphite .....         | 20 ounces. |
| Metol.....                                     | 2 drachms. |
| 10 per cent. sol. carbonate of potassium ..... | 20 „       |

and use bromide (10 per cent.) as required.

In all cases, when using either amidol or metol, it requires the developer to be strong with the developing agent, and so I never use my developer with less than six grains of metol or amidol to the ounce.

## BROMIDE ENLARGEMENTS.

By J. VINCENT ELSDEN, B.Sc. (Lond.).

THE following simple process for producing enlarged photographs without any special apparatus may be of some assistance to those who have not yet tried this fascinating branch of photographic art. So many descriptions of the hole in the darkened window have been given that I shall suppose all these details have been successfully overcome, and that a suitable window is available in a room facing anywhere, provided that direct sunlight does not fall upon the window.

An ordinary bellows camera, which should be capable of extending to about twice the focal length of the lens, is fitted into the hole in the darkened window, so that light can only pass through the lens. The back of the camera should, of course, be turned towards the light and the focussing screw should be easily accessible. All this can be easily done by any one possessing even the simplest appliances for amateur carpentry, together with some wood, brown paper, and paste.

The screen on which the image is to be received must be capable of easy adjustment to the required distance from the lens, and must, of course, be strictly parallel with the camera back. The negative is now gummed in with paper strips in the place usually occupied by the dark slide, upside down, and film facing the lens.

Probably the first difficulty will be experienced in endeavouring to get an evenly illuminated image on the screen. This will especially be the case if dark objects, such as trees or houses, intercept the sky view outside. Much has been said about the arrangement of reflectors outside to obviate this difficulty, but I find a simple and perfect remedy is to let the ground-glass focussing-screen hang behind the negative. This distributes the light most perfectly, and gives an uniformly illuminated image.

The kind of lens to be employed depends upon the size of the negative to be enlarged. To enlarge from a whole-plate negative, it is better to use a lens of about nine inches focal length; but it does not seem to be of much importance whether a symmetrical lens or a good landscape lens is used, provided a sufficiently small stop can be used to give sharpness at the margins.

The next real difficulty is to ascertain when the image on the screen is really sharp. For this purpose it is better not to attempt to focus until the eye has become well accustomed to the darkened room. It is astonishing how much clearer the vision becomes after a time. Details which are at first quite invisible gradually become evident, and the point of maximum sharpness can be readily judged.

The length of exposure must be left to experiment. No definite rules can be laid down to suit the varying conditions of density and colour of negative, quality of light, and nature of lens.

Suitable developing dishes for pictures of large size are expensive to buy, and often deter the photographer from attempting anything of this kind. I have used most successfully for this purpose the ordinary flat sponge baths belonging to the house. It is true they are rather heavy to manage, and it is almost necessary to have assistance in lifting them for the purpose of pouring off the solution; but they are a very effective

substitute for flat dishes, and can be used for even larger sizes than that of the bottom of the bath by turning up the corners of the paper.

To secure the best results, the negative should be of even density throughout, and moderately thin. But in some cases the difficulty in procuring sufficient exposure in skies, horizon lines, and other dense portions of a negative may be overcome by masking portions of the image during exposure by means of a large piece of cardboard, with a hole cut in the centre, and which is kept continually moving about half way between the lens and image, so that light falls only on the required spots. In this way some parts of the negative may, if necessary, be exposed twice or three times as long as the rest.

By such simple contrivances as these, enlarging is brought within reach of all without the necessity of purchasing expensive apparatus. I have omitted all details of development, since the instructions furnished by the makers of the various brands of paper are ample if carefully followed.

## PENCIL JOTTINGS.

By WILLIAM FLEMING.

*Focussing Cloths.*—Any idea that has for its object to improve the camera focussing cloth should be of service to all photographers, and the following is a useful suggestion in that way. Fix in the centre, at one end of the cloth, a loop of black tape, large enough to go over the lens mount, and at the corners of the same end fix pieces of tape which, when tied together, draw the cloth round the front of tail-board. By adopting this idea, there is no chance of the camera and focussing cloth parting company, and the camerist parting with his temper, as sometimes happens on a squally day with the ordinary arrangement.

*Smooth-working Dark Slides.*—Do you ever have any difficulty with your dark slides? The shutters sometimes have a tendency to stick, and that always at the most inopportune moment. Well, to obviate this drawback, occasionally touch the edges of the shutter with tallow, then dust on a little powdered talc. Work the shutter in and out a few times, and finally, carefully wipe off any superfluous particles of talc and tallow that may be adhering to the end or outside of slide. A little of the same compound may, with advantage, occasionally be rubbed on the groove of slide which fits into the reversing frame of camera, thus doing away with any stiffness which may arise through disuse or the like.

*Choice of Subjects.*—Certain amateurs, when they visit any favourite resort, rush off to the printsellers' and stationers' windows to see what is photographable in the district according to other men's ideas, and, after having found this out, lose no time in planting their own cameras at these subjects, thus securing pictures, certainly, but pictures of the same value as a modern copy of one of the old masters. Now, if these gentlemen had exercised their own artistic powers, and found out new points from which to take the various subjects, how much more creditable the result would have been to themselves.

Another way in which some photographers lose many splendid studies is, the passing over of what seems to them too simple subjects; such as

a ruined gateway, with any suitable figures introduced, or, perhaps, the exquisitely lighted trunk of an old monarch of the forest, which has weathered the storms of centuries; and passing therefrom, attempt to make pictures from combinations which, though looking well enough to the eye of the ordinary observer, are not quite suited for reproduction through the eye of the camera. Many amateurs err in the above respect, and if a little more thought was given to the subject, and the eyes used a little more when photographing, fewer negatives would be, perhaps, made, but a greater proportion of them would be really 'pictures,' and worth finishing as such.

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### THE FLAP SHUTTER.

By JAMES A. GEE.

As I believe the advantages of the flap shutter are not fully appreciated by amateur photographers in general, I thought I would make this the subject of this year's contribution. The advantages of the simple flap shutter over some of its more intricate brethren are numerous. 1. Whatever exposure you give to a landscape you must necessarily give the foreground a longer exposure than the sky. 2. With a little practice an exposure of a quarter of a second is easily given, if not a fifth, and of course any *time* exposure can be given, so there is full range of exposure without previous setting of shutter. 3. The flap when raised acts as a sky shade. 4. If the four sides are extended  $2\frac{1}{2}$  inches, so forming a kind of open box (which is easily done), photographs taken in the open are equal in quality to those taken in a studio, because all extraneous light is cut off from the lens. 5. With a little judgment a very long exposure can be given to the foreground and finally a quick exposure given to the sky. Say you wished to take a sunset—the foreground would require quite fifty times the exposure of the sky. Before making the exposure, test at what height the flap should be raised just to reach the sky-line, and then during exposure raise and lower rather quickly the flap, just to keep out the sky, and so give the foreground the right exposure, and finish off then with the sky; and, 6. A flap shutter cannot easily get out of order.

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### A SIMPLE DEVICE.

By W. J. STILLMAN.

I HAVE been using experimentally a variety of plates and films during the past summer, and found a very simple device for at once distinguishing one kind of plate or film from another, and at the same time showing which had been exposed. It consists of sticking a gummed label on the slide of the plate-holder over the junction with the holder, so that the slide cannot be withdrawn and exposure made without cutting or breaking it. The quality of the film or plate is written on the label when it is put in, and any other memorandum when it has been exposed. The label also prevents accidental opening of the slide where there is no mechanical catch, and I use them both. The label should be as slightly dampened as will suffice to give adherence, as the paper, if thoroughly wet, will contract and may part where it crosses the junction. It is worth all the trouble it gives to try this,

## MOON PHOTOGRAPHY.

By REV. T. PERKINS.

EVERY one is familiar with the so-called 'moonlight effects,' produced by short exposures on suitable views of sea and cloud, developed so as to get great contrasts, and an absence of detail in the shadows, possibly printed on tinted paper to enhance the effect. Many, also, have seen the lunar photographs, taken at the principal focus of the object-glass, or better still, the mirror of an astronomical telescope. Some may have seen pictures taken by the light of the moon, with exposures of some hours' duration; but it is of none of these that this short article is intended to treat.

It had often struck me that a photograph of the rising full moon might be taken while the light of the afterglow was still illuminating the landscape, and at last a favourable opportunity for making the experiment occurred on Good Friday of 1893. Opportunities are indeed rare, as it is necessary that the moon should rise about the time at which the sun sets, so that, generally, only one evening during the month is available, and, of course, favourable weather is required, and it by no means follows that this can always be obtained when desired. The western sky must be bright, and the eastern tolerably free from cloud; at any rate, so far that the moon may be distinctly visible—any haze or redness of the moon would cause failure. Then, again, the eastern sky must be sufficiently dark to form a marked contrast to the moon, and the moon must not be too high above the horizon, or a wide-angle lens would have to be used to get the moon on the plate, and it is absolutely necessary that a very narrow angle lens should be employed, for a reason that will be given presently. On the day in question, the moon was marked in the almanac to rise at 5h. 46m., the sun to set at 6h. 30m.; the time of exposure was about seven o'clock, and the duration of it ten seconds, with stop of  $f-8$ , of a rapid rectilinear of eleven and a half inches focus. The moon was full about twelve hours after the exposure was made. The plate was a 30 Hurter & Driffield, and was of quarter-plate size. The foreground was a field, backed up by some cottages, and the moon was about eight degrees above the horizon. In the negative, the moon is clearly defined, the markings visible to the naked eye being shown, the sky is sufficiently transparent to print grey, and the tone of the buildings and foreground is excellent.

One point is very clearly demonstrated by this photograph, and that is, the enormous exaggeration in the size of the moon of which painters are guilty. The diameter of the moon, as every one should know, subtends an angle of about half a degree; that is, if a number of moons touching one another were piled up from the horizon to the zenith, it would require no less than 180 to reach the point overhead. A little calculation will show that, if we are using a lens and plate with focus and length respectively so chosen that an angle of twelve degrees is taken in, then the diameter of the moon will, on that plate, be only one-twenty-fourth of its length; in other words, it will be very small. In the plate I exposed, the diameter of the moon is about one-tenth of an inch, and the angle embraced about twenty degrees; and even with this comparatively narrow angle the moon looks small compared with what we are accustomed to meet with in paintings. In fact, artists frequently

paint pictures embracing, perhaps, an angle of forty degrees or more—say on a canvas twenty inches long—and make the moon an inch across, exaggerating its diameter fourfold, and its area sixteenfold.

The photographer cannot do this, so that, unless he is willing that his moon should appear insignificant, he must, as before stated, use an unusually long-focus lens in proportion to the size of his plate; for example, an eighteen or twenty-inch lens would not be any too long focussed for a quarter-plate.

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## EXPOSURE AND DEVELOPMENT.

By W. M. SMITH, C.E.

Nothing short of practical experience and careful observation will enable a photographer to make absolutely correct exposures. Exposure meters and all the other ingenious contrivances may to some extent assist the inexperienced, but I think it must be admitted that if we depend entirely on them without bringing into use the experience gained from previous practice, the results will, in nine cases out of ten, not be satisfactory.

Why is this? Simply because too many factors are involved in exposing a sensitive plate—viz., time of year, time of day, distance of the principal objects from the lens, colour of the objects, condition of the atmosphere, actinic power of the light reflected by the various objects, rapidity of the plate, the relative amount of light entering the lens, &c. The last but one is usually given by the maker, with more or less degree of accuracy, and the last-mentioned is simply a matter of calculation. The other factors are in a greater measure dependent on good judgment. If we analyse a ray of sunlight, by passing it through a prism, we shall find it is composed of seven primary colours—violet, indigo, blue, green, yellow, orange, and red; the violet ray being the most, and the red ray the least, actinic. Suppose, for example, we wished to photograph a subject composed of all seven colours, it is evident that the exposure required for the violet would be altogether inadequate for the red.

Take, as another extreme case, a subject with a red building in the foreground, trees in mid-distance, and a blue sky with white clouds. If we expose for the sky, the building would be very much under-exposed simply because the actinic power of the sky is very much greater than the light reflected by the red building. Actinometers and exposure meters register the actinic power of light at the point where the instrument is placed, and not the power of the light reflected by the various objects which compose the picture. Much useful information may be gained by exposing a few plates on a clear, bright day. Draw up the shutter an inch, and give, say, half a second exposure; then draw up another inch, and again expose half a second, and so on; develop, and note which is the correct exposure, and profit by the experiment.

Pure homogeneous colours are not usually found in nature, even the darkest objects give off more or less highly refrangible rays. Some surfaces reflect more light than others, which is a very important point for photographers to remember in connexion with exposure. For instance, smooth, bright foliage, such as ivy leaves, reflects more light than dull, heavy foliage.

The sensibility of photographic plates and papers is frequently

influenced by certain conditions of the atmosphere which does not visibly affect the brightness of the light, and in this way photographers are sometimes deceived when making exposures. It is not on the brightest day that the actinic power is the greatest—

When the wind is in the east,  
Give double the exposure at least.

It is, of course, possible to produce fairly good negatives from a plate which has been either slightly under or over-exposed, if development is well understood. There is, however, a certain point where actinic reduction should end and chemical reduction begin, and the closer we approach to it the nearer perfection our finished negative will be. A proper knowledge of the process of development is as essential for the production of good negatives as the exposure, and it mainly depends on understanding the action of the different chemicals used.

The chief reducing agents now generally in use are pyrogallic acid, iron, hydroquinone, amidol, &c. They have all a great affinity for oxygen, and their function is to reduce the salts of silver on the exposed plate to the metallic state; hence it is to their action that the density of the negative depends. Used alone, they would not be sufficiently under control. It therefore becomes necessary to add an alkali, which increases the affinity for oxygen, and so hastens the development. It is also necessary to add a bromide to check the development should it be too rapid and so produce contrast.

Pyrogallic acid is one of the oldest reducing agents, and probably the best. The alkali generally used with it as an accelerator is either soda or ammonia, and bromide of ammonium or potassium as a retarding agent. The developer I prefer is composed of pyrogallic acid, sulphite of soda, carbonate of soda (not bi-carbonate), and bromide of potassium. The sulphite of soda is used to check the decomposition of the solution and prevent it becoming discoloured. It probably does not play any other part in the development. The carbonate of soda acts as the accelerator, and the bromide of potassium as the retarder, and produces contrast. If there is an excess of alkali, the reduction would be too rapid, and chemical fog would probably be the result. It is of the utmost importance that the accelerator and retarder should be properly balanced. I would strongly recommend the beginner to select a good well-tried developer, and adhere to it, and not to dodge about from one formula to another.

Make up the normal solution, and add, say, ten per cent. more water than the makers of plates usually give. Have at hand a small quantity of pyrogallic acid in solution, also a solution of carbonate of soda and bromide of potassium the same strength as the normal developer. If the picture does not come out quickly enough, add a few drops of the soda solution; if it comes out too quickly (indicating over-exposure), add a few drops of the bromide solution; when all the detail is well out, but the negative not quite dense enough, take a little of the fresh normal developer and add a few drops of the pyro solution. A properly exposed and developed plate should not require any intensifying nostrums; a negative which cannot be worked up to a proper printing density by legitimate development is never worth much.

I would recommend every photographer to back his plates; one can never tell when halation may appear. Many consider backing a messy,

troublesome job. If it is done in a systematic way there is very little trouble, and we reap our reward in the quality of the negatives. Get some burnt sienna ground in water, add to it a little caramel (burnt sugar), and thin it down to the consistency of cream with methylated spirit. Paint over the back of the plates, using a flat camel's-hair brush; place them in a draining rack, and put them into a drying cupboard. A dozen plates can be backed in a quarter of an hour. It is well worth the trouble. Take care to have plenty of light in the dark room, but of the proper kind; unless you can see to read the labels on the bottles, developing must be mere guess work.

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### FIXING THE ROLL-HOLDER FILM.

By C. W. WATTS (Heidelberg, Victoria, Australia).

TAKE a piece of thin paper, rather wider than the film (something like journal-wrapper paper) and eighteen or twenty-four inches long, and a piece of *thin* muslin the same size. Go over the paper with the usual mounting paste, place the muslin smoothly on it, and pass a roller over. When it is nearly dry, square one end, fix it on the winding reel, and wind it up smooth and tight. When dry, square the end, trim the sides to the proper width, and place in position. Bring the end over the roller on to the exposure table, so that it will overlap the sensitive film about half an inch, draw the sensitive film smooth on the exposure table, fix with two small drawing pins, place a piece of paper on the muslin, and then turn the muslin back on it, place a straight-edged piece of paper half an inch from the end and go over the half inch with stiff flour paste, turn it back on the film (see that it is smooth), fix with two more small drawing pins, as soon as the joint is dry remove the drawing pins. If the paste is good, it dries in about one hour; but if done at night, it is as well not to wind the film ready for exposure before morning. If properly done, there is no waste of film. The exposed film may be cut off, and a new joint made in about five minutes. The muslin, &c., will last a long time, as only half an inch is used for each joint.

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### A RETROSPECT.

By WILLIAM QUIN.

THE more we think over and study the beautiful art of photography, the more we become impressed with its beauty and fascination, for no sooner do we seem to grasp it than something fresh reveals itself to us; so from time to time, as some new and important discovery has been made, another has presented itself, which bids fair to eclipse that already discovered. Half a century ago and photography was but in its infancy, but what leaps and bounds it has made since then? That it was always looked upon as an art-study, as well as a scientific one, we have ample proof. Amongst its earliest patrons and supporters were found such able

men (the highest representatives of art and science of that day) as Sir Charles Eastlake, P.R.A., Earl Somers, Sir William J. Newton, Charles Wheatstone, Esq., F.R.S., Dr. Diamond, P. Le Neve Foster, Esq., Robert Hunt, Esq., and others. And it is a notable fact that the Society of Arts has, from the formation of the Photographic Society of London, some forty years since, extended to the profession its warmest sympathy and given to it, up to the present time, its help and support. Looking back over its history we cannot but help feeling that a great impetus was given to its study and practice through the great Exhibition of 1851, which fact is supported by the following statement, taken from the Report of the Provisional Committee of the above-mentioned Society:— 'In the winter of 1851–52 it appeared as if the time were come for more vigorous exertions. The impulse given by the great Exhibition has so increased the number of photographers, and the art itself had, by the competition and comparison which that Exhibition induced, been so improved, that it was evident it was about to enter a new phase of its history.'\*

From that time the art came more to the front, and Daguerre, Niepce, Fox Talbot, Hunt, Archer, and others had their day, and passed from amongst us; but the *influence* and work of these fathers was great in the building up of the art-science, which was to expand and become better known in the future.

Looking back some twenty-five or thirty years, we first saw the introduction of the *carte-de-visite*, which soon became universally popular, and has maintained that popularity up to the present day. But what changes have taken place since their *début* into the world of ever-changing fashion! Then dry plates were not known, at least, commercially. It is true dry collodion plates were made, but these were far too slow for portraiture, although for other subjects, where time could be given, some very beautiful results were, we are informed, obtained; and with the wet-plate process it took as many minutes to take a portrait or group as it now takes seconds; so we have to be thankful for the introduction of a plate already prepared and sensitive, and which we can take about with us without any cumbersome dark tent and other paraphernalia irksome in the extreme to the traveller or the tourist.

Nevertheless, all this comfort and convenience to the photographer was not brought about in a day. Many experiments had to be, and were, made by such men as Sayce, Bolton, Kennett, and afterwards by Harrison, Maddox, Mawdsley, Wratten, and Bennett. These are the men who, by perseverance and study, have brought the dry plate to its present perfection.

Still, in this *day of progress*, perfection after all, is but a comparative term, for still 'greater perfection' is being sought, hence a new plate ever and anon is being brought into the market, the latest of which is the 'Sandell' plate. Now, in looking back upon some of the old wet-plate negatives, I am not sure that some did not beat many produced in the present day, at any rate, so far as regards their printing qualities. One *practical lesson* we ought to learn here, and that is, to strive to produce such negatives on dry plates as will yield us brilliant prints, resembling those produced by the wet-plate process.

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\* *Journal of the Photographic Society*, vol. i., p. 3.

Next to the *carte-de-visite* the *cabinet* has taken a prominent place, and in large sizes the *panel*. With the introduction of *bromide paper*, by Messrs. Morgan & Kidd, in 1879,\* enlargements almost to any size became possible, and I have seen, both at Greenwich and Richmond, some beautiful specimens done by that firm. There is also the 'Eastman' and the 'Ilford' bromide papers; but competition here, as well as in the other photographic printing papers, is so keen that new papers are continually being introduced, with, of course, some great improvement, or possessing some advantage, which those already in the field do not possess. The latest additions in this direction being Eastman's *Nikko* paper and Scholzig's new *enamel printing-out paper*. There is no doubt that the printing papers of to-day are being brought to the highest standard of perfection, and so prepared that they are placed into the hands of the professional and the amateur ready to use at once, even to being cut to the sizes required. What a contrast to the *good old days* of the past, when there were only two or three kinds of paper, and those, for the most part, had to be prepared by the photographer himself! It brings to your remembrance stained fingers and clothes; but those 'good old days' are past and given way to brighter and better ones, at least, in this respect.

Still, it is good to *reflect* whether even here some advantage is not lost, for I maintain that one who is really a lover of the art is *not* satisfied with having everything to his hand already prepared, without being able at any moment, in case of an emergency, to prepare and make it himself.

Notwithstanding the fact that we have most of our photographic requisites (including plates) already prepared for us, of the highest quality, yet, because our plates are so placed in our hands, it is none the less incumbent upon us to have a *thorough knowledge* of their preparation, *practically* as well as *theoretically*, and, therefore, we cannot over-estimate the good work being done by the various technical classes and schools in connexion or union with the Central Institute for Technical Studies, nor, perhaps, in the interest of our art-science, the great Photographic Congress at the World's Fair at Chicago, and the Conventions held from year to year to cement more in union its workers, and to help, stimulate, and encourage those who are working to bring the art to perfection.

The limits of this paper will not allow me (which otherwise I should have liked to have done) to compare the cameras and lenses of forty or fifty years ago with those of to-day. Suffice it, therefore, for me to say that wonderful improvements have been made in them since then; in fact, all that science could suggest has, so far as practicable, been from time to time carried out in their manufacture; indeed, it may almost be said that some new improvement in their construction is daily being worked out, hence our cameras and lenses have now reached to great perfection, so that, technically speaking, great power has been placed in the hands of the photographer, and it is for him to use it to the advantage and advancement of his profession.

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\* The actual invention of this paper dates back 'several years previous to this,' and was the outcome of experiments of Mr. Kidd, of the above-mentioned firm.

## ZOO-PHOTOGRAPHY.

By LEWIS MEDLAND.

I AM frequently asked if I have to obtain permission to photograph in the 'Zoo.' In the ALMANAC for 1889, when writing on this same subject, it is stated that I obtained a card from the Secretary, admitting me free daily from nine a.m. to three p.m., Saturdays and Sundays excepted. Now, however, one need only pay for admittance, when he or she is at liberty to take photographs from nine a.m. until sunset on any day, Sundays excepted, when a Fellow's special ticket is necessary. For my part I prefer to pay and stay, for I have found that some animals take their siesta during the heat of the day. To the casual visitor things do not seem to have altered much during the last four years, each den, cage, and enclosure having its occupant as in times past. The naturalist, artist, or photographer, however, sees many changes, and many familiar faces are missing, oftentimes when least expected. Alas! where is the lion, Prince, and his consort, the treacherous Nancy, hero and heroine of thousands of spoiled plates? Where, too, are the stately giraffes, the intelligent Sally, the unwieldy aurochs, the highly prized gaur, the elephant Sulieman, together with numerous 'Jacks' of all kinds, *cum multis aliis*? Alas! they have succumbed to our treacherous climate.

I would like to impress upon those who visit the 'Zoo' from time to time on photography bent, that it is all important to expose a plate on the rarer animals, no matter in what position you may find them, after which you can, if you have time, await the 'four legs and tail' business. To-day this or that animal looks well and hearty, a week hence you hear of its decease. Many times has this occurred in my recollection, and has made me value the 'any position' negatives all the more. I need only mention three animals, viz., the giraffe, gaur, and aurochs, specimens of which we are not likely to see again in the Gardens.

In these days of the hand camera one rarely sees a tripod. Not only are they almost useless here, but very obtrusive at times where the general public is concerned, hence they are not in favour with the officials. If one must of necessity use his field camera, an adjustable support, such as a clip which can be attached and detached instantly, will be found useful. Another handy article is a Japanese fishing rod which, when closed up, forms a walking stick three feet long and when extended about seven feet. By means of this cheap little article the dimensions of any den and enclosure can be ascertained by measuring the outside set of railings, or even one railing, and counting the number of sets. A twin-lens camera seems to be just the instrument required when one is standing at the shop door, but in the open I have yet to know the individual who can conscientiously declare he is fully satisfied with it as an auxiliary focuser.

Now a word to those who intend next year to try their luck at the 'Zoo.' To photograph the lions and some of the other animals without the objectionable bars it is necessary to be inside the barrier. This privilege is accorded only to those who are supposed to know the consequences of carelessness. I therefore sincerely trust that they will bear in mind that this privilege is on sufferance only, and it would be a serious matter to those who have for years taken an interest in the animals should they not be allowed to enter these almost sacred enclosures. It was only

recently that a somewhat careless or absent-minded gentleman had his camera torn from his grasp, although duly warned by the keeper. He is, no doubt, a wiser though sadder man since he has had the opportunity of surveying the various fragments of his instrument.

Before closing these remarks I must not forget the Bartletts, father and son, who, with their army of keepers, are ever ready to give information or help to the photographer when needed.

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### REMOVING HYPO STAINS FROM PRINTS.

By D. W. HILL.

It may interest some of your readers to know that indiarubber, used *with care*, will remove hypo stains from prints on albumenised or printing out paper, without injuring the surface, and without anyone being able to detect the spots. I first used an ink eraser, but white rubber did better. Should this not be known, it may be useful for this ALMANAC.

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### STEREOSCOPIC PHOTOGRAPHY.

By W. E. LEEK.

To those photographers who have not yet given it a trial, and are seeking for pastures new wherein to extend their field of operation, I would earnestly recommend stereoscopic photography. I am an old worker myself, but it is only within the last year or so that I have taken up this branch of our art science, and must say that I am charmed with the results.

My first acquaintance with the stereoscope was some twenty years ago; it was of the then common box form, and like many others of its type, faulty in construction, and failed to give the stereoscopic relief it was intended to do. It is therefore scarcely to be wondered at that it failed to impress me as other than a useless toy.

My present stereoscope is one of the American hand pattern, which are now to be obtained for a few shillings. It has a focussing arrangement to suit the different sights, and is altogether an admirable instrument for the purpose, as it gives the true stereoscopic effect without any straining of the eyes.

For interior effects, domestic or *genre* studies, hoar-frost, and ice and snow scenes, stereoscopic photography is eminently adapted.

A photograph, when viewed binocularly, reveals beauties hitherto unobserved; every detail stands prominently forth, the hills and dales appear in their true planes, the birds on the trees and each blade of grass is as distinctly seen as in real life; in fact, it appears as if a miniature model of the scene had been made. But great as are the inherent beauties of a stereoscopic print, they are completely eclipsed by that of a glass transparency, or stereogram; the sparkle and brilliancy of the latter are simply magnificent, and no better exponent of the beauties of our art can be found than in a glass stereogram.

I think many are deterred from following this branch of photography

under the impression that great difficulties exist; certainly both care and judgment are required, especially in 'centreing' the pictures properly, and, in the case of glass stereograms, correct register in printing; but these difficulties are soon overcome.

In printing stereograms, many writers advocate the use of a special transparency printing frame, but I have found a simpler plan is to use an ordinary printing frame, of larger dimensions than the negative; in this I place a piece of plain glass, and on top of this a piece of thin cardboard, with a suitable aperture cut in the centre. Parallel and transverse parallel lines are drawn on the cardboard, and the position of the negative being noted in relation to these, printing is simplicity itself.

One of the advantages of stereoscopic photography is, that the negatives are just the size, and equally suitable for making lantern slides from, or the glass stereogram itself may be used for this purpose.

Negatives for stereoscopic work should not be taken in direct sunlight, otherwise the resulting prints will appear 'snowy,' or 'chalky'; a soft, reflected light and a full exposure give the best results.

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#### MENDING BROKEN NEGATIVES.—TELE-PHOTOGRAPHY.

By ALBERT LEVY.

PAGE 616 of ALMANAC for 1892 speaks of a broken negative and the remedy. I will tell you of a preventive I have employed for years with unfailing success. The printing frames are usually furnished with a very strong plate glass, so as to allow of printing smaller negatives in larger-sized frames; the consequence is, that the weaker one gives way, and that is the negative. I have always used, instead of plate glass, ordinary glass or cleaned negative plates, and I have invariably found that when something breaks it is the white glass, and never the negative, except if the last one is cracked already, and then only slowly, if at all.

Parties taking interiors which are dimly lighted will probably have found it hard to get a sharp focus on the ground glass. I have overcome this by taking out the ground glass and cutting out a strip about one inch wide from the centre, and replacing it with a strip of same size cut from an exposed plate, developed and fixed, and replacing all in the frame. One can see the picture all over the ground glass, and focus on the centre strip, when an exceedingly fine focus can be obtained. This will be the case also for out-of-door work. However, the idea certainly is not new, but may prove interesting to some readers.

A few words in regard to the tele-objective may be of some use just now, since it is an entirely new subject, and few, I suppose, have tried it as yet. The greatest difficulty, which few will find out at the start, is the *steadiness* required in the support. No flimsy tripod of the very portable kind will ever answer, except perhaps inside of a room, and even then it is dangerous, as the very slightest motion will ensure a picture looking out of focus and of the fuzzy pattern. Therefore use only the very strongest support. Out of doors, wind of some strength may easily move a camera stretched to its utmost, and if the stand is

not very solid, a passing carriage may sufficiently shake the camera to move a distant object on the plate. To take distant views, the *very clearest* day must be chosen, or else the picture will be foggy all over, while even a clear day may not give very sharp images, if the wind is wavy in the distance, yet the result may not be unsatisfactory. While the smallest diaphragm should always be used as recommended, the exposure is about six to ten times that of a rapid rectilinear with smallest diaphragm. As an illustration of what I say I send you herewith three samples. (1.) A group of three ladies, distance forty-two yards, exposure ten seconds. (2.) A country house (nine a.m.), distance 650 yards, exposure ninety seconds. (3.) A village, distance 1300 yards, background nearly double distance, exposure ninety seconds.

I have tried some other views, but, on account of haziness, smoke, &c., I have had poor success. For accurate work on level ground I think the limit in very fine weather is between 1000 and 2000 yards, which is pretty fair, I think.

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### SELECTIVE DEVELOPERS.

By J. STERRY.

ALMOST all the new developers introduced during the last few years, have been supposed to be much more powerful than those previously in use, and that consequently less exposure would require to be given to secure equally good results.

In the paper by Messrs. Hurter & Driffield on 'The Determination of the Sensitiveness of Plates,' printed in the *Journal of the Society of Chemical Industry* for May, 1890, it is stated, 'There is a theoretical possibility that a plate may be rapid to one developer and slow to another, so as to require different exposures according to the developer used,' and it now seems that some of the new introductions do, under certain circumstances, carry this into effect. There does not appear, however, to be any general belief that such is the case, many stating that in practice they can obtain as much detail with the well-proved old developers as with any of the number more recently introduced.

That there is a difference in action all are agreed, and perhaps all will also agree that the new give softer results, but that various developers probably behave differently with the different haloids of silver does not seem to have received attention. Most makes of plates contain iodide as well as bromide of silver, and probably all those sold for making transparencies contain a considerable quantity of chloride, the proportions being greatly varied in the different makes of plates. It should, therefore, be possible to develop one particular haloid in the plate if the various developers have any selective action, and that the effect due to such a selection is possible is easily proved, though perhaps much more experiment is needed precisely to define what is done; and, until developers can be classified by reference to their action upon each of the haloids separately (and this may be found again to be complicated by the various degrees of sensitiveness to which the haloids are brought), we shall at best only have a general impression of their relative action.

A few points, at any rate, seem to be decidedly indicated:—

1. The presence of a very small quantity of free bromide reduces the differences in developers very materially.

2. A much larger proportion of bromide is required to stop the action of some developers than of others.

3. The absence of all bromide from the developer tends to increase the latitude of correct representation, whilst large quantities do not decrease the latitude materially beyond that which results from the addition of a very small quantity; thus the bromine set free by the development of a single plate is sufficient, in some cases, very considerably to alter the action of the developer upon a second plate developed immediately afterwards, and further additions of bromide merely retard the development.

4. Apparently the more difficulty is found in obtaining density with any developer, the more power it has to increase the latitude of the plate, and search out and develop correctly the portions which have received but little light action, but with this there seems always to be a corresponding disadvantage in tendency to chemical fog needing correction by bromide. If this were not so, ferrous oxalate, with thiosulphate or sulphite of sodium added, would make one of the most powerful developers known.

In making a negative, the development must be carried sufficiently far to secure such differences of opacity in the various gradations, that when used for printing, the resulting positive shall give as truthful a representation as possible of the object photographed, consequently the speed estimation of a plate by Messrs. Hurter & Driffield's method, is always made when the development has reached the useful point. It is evident that this must be a practical method of dealing with plates of very varied composition, and in which, probably, the haloids often vary greatly in degrees of sensitiveness.

When, however, the early stages of the action of developers are studied, very marked differences are found, and it is here that the new developers show their characteristic action. Most must have noticed the tendency which they show to flash out the image, and there has been an almost universal complaint of the difficulty experienced in obtaining adequate density.

Though the rule is by no means rigid, and depends somewhat upon the strength of the alkali used, it seems to be well marked, thus:—Pyrogallol, ferrous oxalate, and hydroquinone, especially when used with free bromide, select and develop those portions of the plate first, which have received most light, and afterwards bring up the detail, and may therefore be called density-giving developers. If now the estimation of speed of the plate is taken too early, it will indicate too low a speed. Eikonogen, para-amidophenol (rodinal), and amidol, especially when used without any free bromide, immediately begin to reduce the silver where the least light has acted, density slowly increasing. These may therefore be called detail-giving developers, and if the estimation of the speed of the plate is taken too early it will indicate too great a speed. In this selective power we have a reason for the increased softness of negatives, as also for the additional latitude available. We can also see why the new developers fail fully to maintain the claims generally made that less exposure is required, seeing that especially when bromide is used, by the time the necessary density is obtained, the speed increase has become lost. This

is not always the case with some makes of plates, density coming up readily, and the full value of the increased rapidity may be secured with certainty, and from this it would appear that the varied character of plates prevents the real character of developers from being fully estimated.

Taking advantage of the selective powers above mentioned, and the great difference in the sensitiveness of bromide and chloride of silver, it is possible to decide which haloid shall be used in a chloro-bromide plate. If it is one made by a maker who has adopted the Hurter & Driffield system of marking plates, it will be numbered so that when using ordinary developers containing some bromide the exposure can be calculated so as to 'yield a true representation with minimum density,' that is, that will secure the best possible negative requiring the shortest possible time in printing.

If a plate is exposed for the same time, and developed with any of the detail-giving developers, without bromide, a very fully exposed negative will be obtained, requiring a somewhat longer time in printing.

If now another plate is given about twenty or thirty times the exposure of the others, and a greatly restrained density-giving developer is used, the chloride will be correctly developed only. This is easily proved by making the long exposure upon a different subject, over the first and short exposure, when it will be found that the bromide exposure is scarcely developed at all in the time required to bring up the chloride to full density. It can also be seen that the bromide yields a dull superficial image, whilst the chloride runs right through to the back of the film.

That a full and satisfactory classification of developers has not been yet found, is shown by repeating this experiment, using pyrogallol only, varying the proportions thus—for the short exposure, strong alkali with a small quantity of pyro, and the long exposure, strong pyro and weak alkali. Similar results will still be obtained, indicating that there is probably a simple and general law governing the reduction of silver, whatever haloids or developers are used, and which may be expressed thus:—When using the same developer, the *more* light found necessary to obtain reduction of the silver in correct proportions the *less* time will be taken in effecting that reduction. This is only another way of stating the common experience, that the slower the plate the easier it is to obtain the required density, both a weaker developer and a shorter time being needed than when a very rapid plate is used.

If this law is therefore of general application, the differences in sensitiveness must be deemed of more importance than either the particular haloid or developer.

In the example given, the difference in sensitiveness between the bromide and chloride is so great that there is no difficulty whatever in making use of either, but when more rapid plates are tried, the difficulty increases, until variation can only be shown by careful photometric measurements, and further, the differences in the developers become much less marked.

It is difficult to imagine that any emulsion, the rapidity of which was increased by any process of ripening, could be of uniform sensitiveness throughout, and this seems partly to account for the power of making a correctly exposed positive transparency instead of a negative with greatly decreased exposure. (See 'Auxiliary Exposure,' THE BRITISH JOURNAL OF PHOTOGRAPHY, October 27, 1893, page 686.) Very rapid, and presumably

well-ripened emulsions, scarcely show any sign of reversal with auxiliary exposure, general fog only resulting, but with others there is a very short period of correct reversal which is available.

The method adopted is to give a very short exposure, usually one-thirtieth to one-fiftieth of that required for a negative, and develop with a powerful concentrated developer until all reduction ceases, by which means a very weak negative is formed embedded in the emulsion. An auxiliary exposure to the whole plate now given, will produce a positive upon further development, the gradations of which differ from those which would be obtained in the usual way, the negative being in the film instead of upon its surface, the effect of which is, that though really very under-exposed and incorrect in gradation for ordinary use, under the new conditions it acts as though properly exposed.

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### HAND-CAMERA POINTS.

By WALTER D. WELFORD.

IT would almost appear as though the makers of some patterns are not practical workers with hand cameras, otherwise it is difficult to account for one or two points that do not receive the attention they deserve. These I shall endeavour to describe.

Why do makers persist in turning out the brightly polished mahogany abomination that tells the ignorant public a mile away the sort of purpose it is used for? Indeed, some go further, and by means of glittering brass fittings outside, add still more to its gaudiness of attire. In any class of work I cannot see how the polish or glare helps the negative or developer, and certainly, in many instances, it is simply ruination to lift it out of the bag. Then, when brass rims are placed round the finder holes, and brass flaps in front of the lens, the camera is—oh, so very pretty! It is suitable for the shop window or dealer's counter, it looks well at any exhibition, and if the user will content himself by carrying the camera about in the bag or case to show to admiring friends, the polish is not detrimental. But he must not, of course, take it out of the bag for use. Should any worker be the fortunate possessor of such an instrument, let me render him assistance. Get a good big pail of water, and therein stir up blacklead to the consistency of cream. Drop in the camera and leave it to soak all night. When dry it is ready for use.

Another point is the trouble—indeed, in some cases, the impossibility—of getting at the finders. However carefully these be made, dust will find its way upon the inside of the lens and surface of the mirror. Of course, if the finder is an ornament, the question is not of great importance; but, if the worker desires to use the finder in actual work, in a few months he will find the image given by it terribly foggy. Many cameras that have passed through my hands needed really no time or labour whatever to make the finders getatable.

My last point is a similar one, viz., the accessibility of the lens. Cameras are constructed that need taking to pieces before the lens can be cleaned. It is very nice and instructive, besides finding something for idle hands to do; and yet, somehow, I hanker after a camera that will

allow me to get at the lens every time before use, not at intervals of six months when things get desperate.

My advice, therefore, is to make inquiries before purchase. When you read that the 'Ticklemup' hand camera will take 1000 plates or films any size up to  $20 \times 16$ , change automatically at the rate of 250 a minute without the possibility of error, and that the new patent check box shoots out a ticket for a glass of champagne at the end of each ten exposures so as to render an efficient check, just write and ask the makers:—

1. Have they tried to make the camera as pretty as possible? and suggest a brass plate all over the front with the words 'detective camera' blacked in, the letters being not less than two inches in height.

2. Are the finders carefully covered up so that they cannot be got at for any purpose?

3. Is the lens firmly fixed and perfectly inaccessible?

If the answers are satisfactory do not hesitate, but place the order at once—with another firm.

## ARCHITECTS AND SURVEYORS AND THE CAMERA.

By W. ALLPORT, F.S.I., M.S.A.

If it is not out of place in the compendium of this year's notes, permit me to offer a few remarks to those in the profession (who do not at present possess a camera) upon the usefulness of photography at times in their professional career, and as an important adjunct thereto, whilst it is well known that there are several very eminent professional photographers who are special experts in first-class architectural work, yet their services are not always obtainable at times in emergency, or may be so far removed from the locality where the object to be taken is situated as to make the cost of their services prohibitive, whilst the necessity of obtaining speedily a good photograph is a matter of great importance to one's client. Further, an architect or surveyor of experience is, perhaps, the best judge of what he desires portraiture of, whether it has reference from an artistic point of view or of the prosaic practical requirements—in the latter event especially—or having reference to duties and professional services in connexion with such matters as 'dangerous structures,' the 'rights of owners in light and air,' 'party walls,' and similar cases, or as to the state and condition of buildings at various periods during their erection, enabling a record being kept of same.

The writer has no doubt that many of his *confrères* have been unable to obtain the assistance of a professional photographer at a short notice, and this desired assistance not being at hand, the client has had to sustain loss through being unable to have a photograph taken of a special condition of a matter at a given time, which might otherwise have proved an important fact in support of a client's claim; for a photograph taken at a proper time, with a correct knowledge of light and shade most applicable to the case, is an undeniable factor in many cases, and often gives such a clear definition of the matter that a glance at a truthful photograph by judge or jury will produce a result that would, perhaps, be impossible to attain by the most elaborate hand-made drawings. A case in point, a few days before writing this, occurred in a legal dispute

in the Court of Queen's Bench, which was referred to a legal arbitrator (an eminent Queen's Counsel) to make his report upon. Verbal evidence was given, and elaborate drawings, which had been prepared some six years back, were put in evidence as to the relative levels of two adjacent streets. The learned arbitrator would not accept their evidence, remarking, What proof was there before him that the levels of the streets had not been subsequently altered?—when it occurred to the writer that he had recently taken negatives of each of the streets in question, and, having prints of them by him, he was able to conclusively demonstrate that the lamp-posts, railings, steps, &c., were exactly as they had existed for the last twenty years to his knowledge; and therefore the model before the arbitrator, the accuracy of which was disputed, was truthful, and in every respect correct. It was, in consequence, accepted as evidence by the arbitrator. The amount involved and dependent on the evidence thus derived from the photograph was a *very large sum*.

Your readers, it need scarcely be remarked, know something about fogging—especially the amateur photographer, in the development of his negatives; but there is also another kind of fogging, which is especially peculiar in architectural photography, with the taking of subjects in connexion with light and air, party-wall and dangerous structure cases, which enables the professional photographer to take photographs, under special instructions, of such a nature as to completely fog any judge or jury. Such an one was recently produced and made an exhibit in an interim injunction case, the writer having been refused to be allowed to take counter-photographs. Application having been, however, made to a judge in chambers, an order was made for the writer to take them at the appointed time, 4 p.m., middle of September, and thirty-six hours only before the next hearing. The writer took four whole-plate negatives which he thought would *not* fog a judge or jury; they were enlarged to 12 × 10, and four prints of each made, mounted, printed, and written upon, and long affidavits prepared in connexion with them, sworn to, and made exhibits of, and laid before the Court within the hour fixed by the learned judge; the result being that the professional's fogging photographs did not attain their end, whilst the amateur's did that of his clients, and thereby turned the scale in the affair.

The numerous uses I have put my camera to during the three years of my amateur life with it have led to many interesting photographs, and at times of an amusing character, in my holiday rambles, both in England and on the Continent, giving oftentimes a pleasure and a fascination foreign to the use of my camera in connexion with the profession; the narration of these would fill a small volume. I have already trespassed, otherwise could give many important notes of my experience, showing the great advantage it is to the architect and surveyor to have a good camera at his own or at a competent assistant's command.

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## AN EXPERIMENT.

By ALBERT HINDLEY.

ABOUT three years ago I was at home from business on the sick list, and, under my doctor's orders, I had to stay indoors. My thoughts were di-

rected toward photography, and having a few plates to develop, I reasoned that this would be a good opportunity to do them. On looking round my shelves I found I had no developers mixed ready for using. I at that time used the washing soda developer; there was pyro in abundance. I took down my bottle to make ready some soda, that I might go on with my developing, when a thought flashed through my mind, Why not use some out of your syphon? Being dyspeptic, the doctor had ordered me soda-water for my complaint, and I decided to try whether I could not use it for developing. The question that next put itself to me was, What is the strength, and what proportions will you take to mix with your pyro?

I could not answer these questions all in a minute, but, after deliberating for a short time, I determined to weigh out one grain dry pyro, and to make up my developer by dissolving it in one ounce of soda-water out of the syphon, which done, I went into my dark room and placed a quarter-plate negative in developing tray. I did not have to wait long before I discerned a faint image coming up, but I did not get it up to proper density with developer as first made up. So I added by degrees another ounce of soda-water, with which I brought a negative full of detail, and plenty of density—in fact, I could not have wished for a better negative.

I therefore had to use, to get a good negative, a developer composed as follows:—

|                                 |           |
|---------------------------------|-----------|
| Soda-water (out of syphon)..... | 2 ounces. |
| Pyro (dry) .....                | 1 grain.  |

Of the strength of my soda-water I had better say a few words. It was prepared according to the formula of the British Pharmacopœia, that is, thirty grains per twenty ounces of water, or one and a half grains per ounce of water. Not so strong, I fancy some will say, yet strong enough to use, and if properly used one may get good plucky negatives free from stains, and in every way satisfactory to the manipulator.

## ENLARGED NEGATIVES.

By J. McINTOSH.

THE following notes, though uninteresting to the experienced worker, may possibly suggest to a struggling amateur a way out of a difficulty.

It sometimes happens that we amateurs are favoured with a negative which will not only bear enlargement, but would, in a larger size, do better justice to the effect aimed at.

For this purpose I prefer, instead of making an enlarged positive direct, to make a carbon transparency and an enlarged negative from that, and so have the choice of all the papers to print upon.

When working with plates I found that blocking up a window was too risky and inconvenient, so made an apparatus which is practically a large camera with focussing screen, vertical and lateral swing to the back (for correcting drunken architecture, &c.), and a single dark slide. This is arranged upon a long baseboard, upon which my ordinary camera is bolted, with the lens pointing through the front of the larger

camera. A sliding panel or shutter, with a round hole in the centre and cut in half, fits closely round the hood and excludes the light. As the lens is the fixed point, and the backs of both cameras can be slid to and fro, it is easy to set them either for enlargement or reduction by the ordinary rules.

After centering the image comes the question of exact focus. The low intensity of the light and the somewhat diffused appearance of the enlarged image makes it difficult to do this by shifting the larger screen, and to work the rack of the small camera while examining the enlarged image would require a rod with bevel wheels; rather an expensive arrangement, and troublesome to put in and out of gear when required for use.

It occurred to me that the law of conjugate foci might be usefully applied here. I attach a piece of opaque paper to the larger screen, and focus it upon the transparency which I am about to enlarge from. The conditions are those to which one is accustomed in ordinary work, and I find in practice that when the image of the piece of paper is sharp at the smaller end of the combination, the enlarged image is in best focus at the other end. The principle can be applied to other arrangements for enlarging, and will, I think, be found helpful.

It happens sometimes (it frequently does with me) that the negative to be enlarged from is not technically perfect. The defects are carried through all the stages, sometimes with others added, and are woefully apparent in the enlargement. I find that the ordinary retouching pencil, water colour, &c., require more manipulative skill than I possess or have time to acquire. To make good these defects I find a piece of lithographic chalk very useful. With a broad point and a gentle rubbing motion large gaps can be filled in or strengthened without showing lines, and with a fine point broken detail may be made good. Should the gelatine at first refuse to take the chalk, the point may be moistened on a piece of sponge wetted with benzine. Unlike lead pencil, once the chalk is on the film it may be strengthened to almost any density by repeated application, and if more is put on than is needed it can be removed with the sponge and benzine, and the work done again.

For filling up pinholes I find that bitumen dissolved in benzine is an admirable medium, as it can be thinned out to any degree and dries instantly.

Even the best sable brushes as sold are not well suited for this work. If the photographer can prevail upon a lithographic draughtsman to sell him a fine-pointed brush which has been brought into good working order it will be worth many times the cost of a new one, and should be preserved with care and treasured as a prize.

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## ORTHOCHROMATIC PLATES IN LANDSCAPE PRACTICE.

By GEORGE T. HARRIS.

IN spite of all that has been written of the advantage the orthochromatic plate possesses over the plain bromide or bromo-iodide plate, the fact remains that the use of the yellow-sensitive plate, more especially the intelligent use of it, is very far from being universal. Indeed, consider-

ing the many years orthochromatic photography has been an accomplished fact, and the many times its working has been described in everyday language by writers thoroughly conversant with the subject, it is marvellous that so large a proportion of plate users continue to ignore the superior claims of the yellow-sensitive plate. Perhaps the fact can be accounted for by inferring that photographers as a body are not conscientious students of current photographic literature, and hence the intelligence, scattered through photographic papers, that should lead them to an appreciation of higher results is to them a book sealed by their own wilfulness. Very often workers using orthochromatic plates are but dimly conscious of the increased power placed in their hands, and in some measure bring discredit on orthochromatic photography by their failure to utilise the additional advantages. Even in 'manuals' on photographic procedure we find colour-sensitive photography passed over entirely, or compressed into a short, grudgingly given chapter.

The general impression regarding these plates seems to be that their great advantage is in copying oil paintings, and that for landscape negatives the ordinary plate will yield the most pleasing result. Only a want of consideration of the most elementary principles of orthochromatic photography can account for such an erroneous conclusion, for a monochrome reproduction from an orthochromatic negative intelligently made should be infinitely superior to one from the ordinary plate as regards the rendering of visual light intensity. In looking over an album of prints made some four years ago on orthochromatic plates, those prints from the negatives in which the screen was used recall most vividly the actual appearance of the landscape at the time of photographing it. Nor is it difficult to account for the fact if we remember that the blue rays of the spectrum, unless checked by a screen of yellow glass, are in photographic activity so enormously in excess of the less refrangible, that the rendering of the appearance of luminosity in a print is not in accordance with visual interpretation. We have been satisfied so long with the interpretation of the ordinary plate, that it requires quite an effort of the mind to get away from years of erroneous precedent and accept the truer rendering of the yellow-sensitive plates.

The function of the screen in orthochromatic photography seems but ill understood, and doubtless has proved a stumbling-block and caused many to delay adopting the use of these plates. The idea that orthochromatic plates *cannot* be used unless in conjunction with a screen has not a few adherents, but although orthochromatic plates can be used precisely the same as ordinary ones, the screens cannot by any means be ignored by he who desires the utmost from an orthochromatic plate; and although light screens increasing the exposure twice or thrice are usually advocated, the deep yellow screen, bordering on orange, has its uses, though they may be infrequent. Often in summer and autumn the haze over the landscape is so dense that an ordinary plate would utterly fail in reproducing the distance, and even the orthochromatic with pale-tinted screens does not show so much detail as is apparent to the eye, and the deep yellow screen will often give a negative rendering very fairly the amount of distance seen by the eye. But its use requires careful consideration, and the plates very generous exposure, or results more untruthful than with ordinary plates will follow.

It has often been alleged that without the screen no advantage over

ordinary plates is to be gained by using orthochromatic. After very careful observation during four years continual use of orthochromatic plates under every condition, the writer has come to the conclusion that there is a distinct gain by using an orthochromatic plate even without the screen. The greens and yellows are much better impressed than with the ordinary plate, and when clouds are present there is a greater chance of reproducing them in the finished negative. Altogether, the range of tone and gradation in an orthochromatic plate seems better than in an ordinary one. When it is necessary to photograph on dull days, or in taking a negative in diffused light, the orthochromatic plate with a pale yellow screen will give by far the best result.

The exposure with orthochromatic plates should be such that, on viewing the developed plate by transmitted light, very little unconverted bromide remains to be seen—especially should such be the case when using the screen. Development is a point upon which it is unwise to dogmatise; each worker has his own particular formula, and provided it suits the plates and gives satisfactory results it little matters what developer is used. It should be remembered, however, that to represent a landscape by photography there should be a wealth of detail, and perfect gradation from highest light to deep shadow. Clumps of trees should show in the negative full of detail and not be bare expanses of plain film, as has been too often the case.

The most intelligent user of orthochromatic plates will be the one who understands the principles of their manufacture, and these principles are so simple and full of interest that it is somewhat surprising there are not more experimental workers with colour-sensitive plates. Apart from the gratification of using plates prepared by oneself, there is a fascination in studying the effect of dyes on the haloid salts of silver that is absent from the preparation of ordinary emulsion. To those desirous of preparing their own orthochromatic plates, Dr. Eder's little book, *The Chemical Effect of the Spectrum*, will be invaluable and full of interest; there is also, for those able to read German, much information in his larger *Handbook of Emulsion Photography*. Indeed, to those acquainted only with English manuals of photography, it is a revelation to find such an amount of attention and space devoted to colour-sensitive plates as one finds in Eder's work.

Plates coated with orthochromatic emulsion are to be preferred in landscape work, as the keeping qualities of dipped plates are very limited; and plates having special sensitiveness to the red rays are not necessary in landscape practice, or desirable, for the development of such plates requires a most irritating minimum of light. With ordinary orthochromatic plates of medium sensitiveness quite a comfortable amount of light may be used, and the 'outer darkness' so usually associated with the development of orthochromatic plates is quite unnecessary. A paraffin lamp with a sheet of ruby glass supplemented by one of ruby medium gives me a light that is comfortable and safe, though in the earlier stages of development the plate may with advantage be protected by covering the dish with a piece of cardboard.

One point in working orthochromatic plates may be not unworthy of mention, which is that when using the colour screen the plate in development often shows what may be termed a fictitious density, and a plate that under the developer has rapidly taken this apparent density will

usually leave the fixing bath quite thin and in need of intensification. I find it best, when developing plates with which the screen was used in exposure, to carry the development a little further than when the plate was exposed minus the screen, so that there may be no danger of the fictitious density misleading me. On the other hand, colour-sensitive plates will be found to gain density far more rapidly than the ordinary plate, and any orthochromatic plate I have used, either of home or commercial preparation, required but a small amount of pyrogallol to obtain density, 1.5 grains per ounce being ample, except in cases of over-exposure.

When photographing glen and woodland scenery, or subjects where large masses of foliage occur in the immediate foreground, the superior claims of the colour-sensitive plate, if carefully made, are to my thinking undeniable; for the exposure becomes, with even a mediumly sensitive plate, curtailed in a manner so significant as to plead its own cause. The same with interiors, where the extremely active violet rays are filtered out to a great extent by the light passing through the red and yellow glass so abundant in the windows of our churches and cathedrals. My field note-book is witness to a marked decrease of exposure on this class of subject since taking into use orthochromatic plates.

It is to be hoped that I may not be read in these lines as condemning *in toto* the ordinary plate and its uses; it is still too much used by careful workers, and too many artistic productions have been and are being produced by its aid, to allow of such condemnation being valid. But no one can ignore the fact that a plate sensitive to the yellows and greens of Nature is a long step in advance; and as it has several undeniable advantages over, and is not less incapable in any way than the ordinary plate, why not accustom oneself solely to the use of yellow-sensitive plates?

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## STEREOSCOPIC PRINTS IN OPTICAL CONTACT WITH GLASS.

By F. J. PATERSON (Hobart, Tasmania).

It may interest your readers to know that splendid results can be obtained in stereoscopic work by printing on Ilford (or other) P.O.P. and mounting in optical contact. The prints, trimmed and divided ready for mounting, are soaked in a two-grain gelatine solution until limp, then taken out, and, without draining, placed in proper position as regards right and left on a clean stereoscopic-sized plate, centre first, then ends lowered, and excess solution blotted off. The plate is turned over, and exact adjustment made by moving prints from back. Although not necessary, it is an advantage to now put under pressure in a printing-frame, &c., for half an hour; then paste a piece of opaque paper, and gently press down upon back. When dry, the edges are trimmed off, and the slide is finished. The advantages are: pictures devoid of grain, superior to burnished, with delicacy of detail almost equal to a transparency, of any desired tone, protected from dust, and the utilisation of waste stereoscopic plates.



*Collotype, Waterlow & Sons Ltd.*

*Negative by P. L. Waterlow.*

## BORROWDALE.



## EPITOME OF PROGRESS,

WITH NOTES ON PASSING EVENTS ORIGINAL AND SELECTED,

By THE EDITOR.

### HAS PYROGALLIC ACID BEEN DISPLACED ?

DR. H. W. VOGEL publishes the following plea in favour of pyro:—In the presence of numerous new developers, such as rodinal, amidol, eikonogen, &c., the question whether pyrogalllic acid has been altogether displaced has been repeatedly raised.

This question has already been answered several times in favour of pyrogalllic acid, as by W. J. Stillman (*Photographic Times*, November 25, 1892), and, again, in *Photographische Mittheilungen* for December (p. 283), where side by side with the mention of the newest developers, various practical workers emphasised the pyrogalllic acid developer as the best.

I have often and repeatedly worked in the Imperial Technical College with the most varied developers old and new, and have unreservedly recognised the claims of the new developers—the so-called amidophenols, which give pictures without addition of carbonate of soda—in cases where instantaneous plates are to be developed, where, generally, a rapid effect is desired.

For such purpose the amidophenols will be welcome, especially to the amateur, as well as sometimes in portrait work where short exposures are desirable and no great density of the plate is necessary.

On the other hand, experience has shown that the pyrogalllic acid developer possesses more universality of application. According to the amount of alkaline carbonate added, it can be made to work softly and rapidly, or slowly and hard. The density can be increased to a degree unattainable with the new rapid developers, so that, in all my colour-sensitive exposures where I developed plates with pyrogalllic acid and with amidophenols for purpose of comparison, I abandoned the latter because the density progressed only to a certain degree and then remained unaltered, while I could push it to any desired extent by the use of pyrogalllic acid. There can be no doubt that amidol develops more quickly, but the action of pyro can be accelerated by addition of more alkali or potassium carbonate, while with the amidophenols such additions may readily cause fog.

For the rest, slower development is in no way detrimental as a matter of fact, it is emphasised as an advantage of hydroquinone, because the development can be more easily watched.

At the same time the pyro developer has the advantage over hydroquinone that it remains active at low temperature. In separate solutions (alkali by itself and pyro with sulphite of soda in another vessel) it keeps for weeks, and, under a layer of vaseline, even for months.

On the the large scale, therefore, I use the pyro developer exclusively, and resort to the other developers only when speed is a desideratum or a case of under-exposure is concerned, or for certain interim exposures.

My solutions are prepared as follows:—

## No 1.

|                               |              |
|-------------------------------|--------------|
| Distilled water.....          | 500 ccm.     |
| Sulphite of soda, cryst. .... | 100 grammes. |
| Sulphuric acid, conc. ....    | 8 drops.     |
| Pyrogallic acid.....          | 14 grammes.  |

The pyrogallic acid is added only when the other constituents have been perfectly dissolved.

## No. 2.

|                               |             |
|-------------------------------|-------------|
| Distilled water .....         | 1000 ccm.   |
| Carbonate of soda, cryst..... | 50 grammes. |

To prepare the developer, one volume of No. 1 and two volumes of No. 2 are mixed together.

The potash developer, which works much more rapidly, I use seldom, although it is preferable for instantaneous exposures. In the case of normally exposed plates I add, as a rule, three drops of ten per cent. potassium bromide solution to each ounce of the mixed developer.

For the potash developer I take twice as much of potash as of soda for the soda developer. I prefer the latter the more because the soda keeps unchanged in well-stoppered bottles, while potash very readily deliquesces. Sulphite of soda should also be kept in tight-closing vessels, and not in paper parcels.

It has been long known that several plates can be developed one after the other with a mixed pyro developer.

I am accustomed, however, to employ a fresh quantity of the solution for each plate. The low price of pyrogallic acid justifies the slightly increased expense.

It has also been known for several years that softer negatives can be obtained by dilution of the developer with the half or an equal volume of water.

## VARNISHING ZINC TRAYS.

WHEN zinc trays, &c., are used for washing plates or prints, says 'Ki-Non in *L'Amateur Photographe*, the deposited hypo reacts on the metal, which, if coming into contact with prints, stains them. This, he says, may be avoided by varnishing the vessel with bitumen of Judea (5 parts dissolved in 100 parts of benzol). The varnished vessel is placed in sunlight in order that the bitumen may be rendered insoluble. He advises two applications of the varnish, and to repeat the operation as occasion may require.

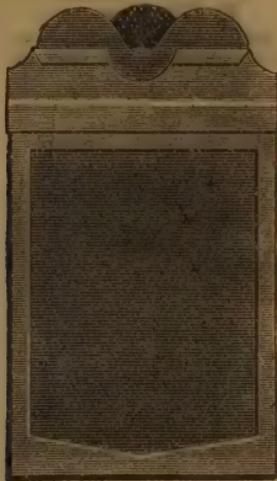
## PURIFYING EOSINE.

EOSINE, which is employed in orthochromatic photography, is not always found in commerce of a sufficient degree of purity for photographic purposes. The following method of purifying it is given:—Dissolve 20 grammes of eosine in 700 c.c. of boiling water, and after dissolution, add sulphuric acid 1:10 until no further precipitate of bromofluorescein is formed. The liquid is separated by decantation, and the salt washed and dried. The purified eosine is insoluble in water, but is soluble in alcohol.

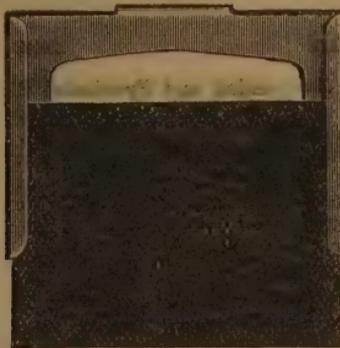
## EDWARDS' NEW DARK SLIDES FOR FILMS.

In the dark slide for films or plates which Mr. Edwards has invented will be found many points of novelty and utility, in addition to lightness and portability. The slides are made to take two films, or two thin glass plates. The

draw shutters are made of xylonite, one side being black, the other dark red ; the latter, when facing outwards, indicating that the film or plate next it has been exposed, and also serving for the inscription of memoranda.



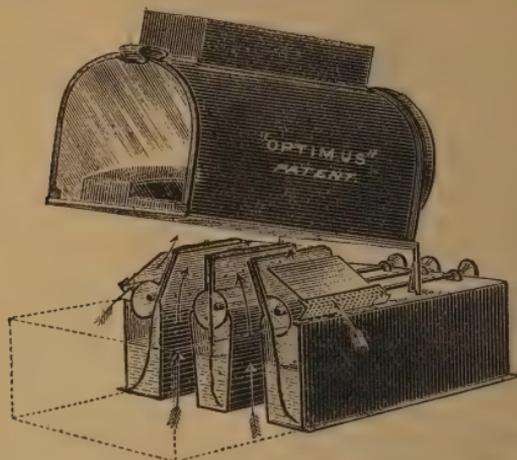
The holder, too, containing the plates, is easily removable. It has an end-piece, which folds back, thus allowing of the insertion of the plates or films back to back, a sheet of black opaque material being placed between them. The end-piece being replaced, the two plates are held in position, and the carrier is then easily returned to the slide proper. The new slide is very compact and small, and should acquire a great popularity among those anxious to reduce bulk and weight in camera impedimenta.



Mr. Edwards has also designed a simple film-carrier for ordinary dark slides. In this, a thin metal frame with turned back edges holds a stout card, which, to insert the film, is removed by being slightly pressed on the centre through the opening in the frame. The film is then placed half-way in the groove, the card put in under the film, and both pushed home together. It should form a useful, as it is, undoubtedly, a simple and effective film-carrier.

'OPTIMUS' (1893-4) LAMP FOR PROJECTION LANTERN.

REFERENCE to the diagram will at once explain that central, as well as side, air shafts are provided to ensure complete combustion of the paraffin oil which is burnt in the lamp. By this means a greatly increased brilliancy is secured, which has been computed to equal more than twice the candle-power of the refulgent lamps hitherto sold with the 'Optimus' series of magic lanterns.



These air shafts, in promoting combustion, create perfect ventilation, thereby overcoming the offensive odour so objectionable in mineral oil lamps. The colour of the flame is particularly white, and is therefore well suited for photographic enlargements, materially lessening exposure as compared with many lamps which give a flame of far less actinic value.

THE PREPARATION OF TABLETS FOR VITRO-ENAMELLING.

BEFORE the members of the London and Provincial Photographic Association on Thursday, September 28th, Mr. A. Haddon read a paper, accompanied by a demonstration on this subject. He hoped, he said, to show that plaque-making was not a formidable undertaking. With a little care, plaques could be made quite as good as the best that could be purchased, and cheaper. It was surprising that so few photographers prepared vitrifiable images, as they were permanent, and would stand any amount of magnification without loss of detail. Many amateurs never heard of a vitrifiable image; some fancy that it required a life of study to produce passable results; others would like to try their hand at it, but they had been told that the wet-collodion process must be used for it. No good book in the English language had been published on the subject, and if one had to buy all the plaques required in one's early experiments, it required a long purse, so that to many mere expense is a powerful cause for not taking up the subject. He would endeavour to remove the last reason by demonstrating the preparation of plaques. Whatever method of preparing the positive image was employed, a muffle was necessitated. Any one could build a small furnace at a cost which need not be a serious item. Fire bricks could be purchased at about 3*d.* each.

Enamel was nothing more than very fusible glass with some oxides in it, in

order to make it black or white, as occasion demanded. White enamel was not worth making when it could be obtained commercially at a low figure. Mr. Guilbert Marten, of Falcon Street, sold it for 6½*d.* a pound for a bag of twenty pounds, 7*d.* for a single pound. The enamel he (Mr. Haddon) had used was given him by Mr. Bolas. If he had had to purchase all the plaques he had used in his experiments, it would have cost him over 20*l.*, whereas it had only cost him a few shillings for copper foil. A plaque 1½ × 1½, making allowance for the copper basis, held forty-three grains of enamel. Ten plaques of the size named could be made from one ounce of copper, and 150 from one pound. If one used a pound of enamel (7*d.*) and a pound of copper (2*s.* 6*d.*), one would be able to produce 150 plaques for that small sum; and, if they paid 1*s.* each, they would cost 7*l.* 10*s.* The enamel should first of all be reduced to a certain consistence by being pounded with a hardened steel pestle in a wooden mortar. It is then sifted through a sieve of a certain size of mesh, the coarse particles being again subjected to pounding. The enamel powder is then soaked in a solution of nitric acid 1 : 4 for from three to twelve hours; this removes all metallic impurities, particles of wood, &c. After further treatment, the coarse particles of the powder are separated from the fine by placing it in water and then separating it into two solutions. The particles will have subsided in two hours, when the water is poured off, and the deposits washed a third time to remove any acid left.

As to the basis of the plaque Mr. Haddon said copper was found to be the best, as the enamel adheres to it more firmly than to other metals. Virgin copper was best, and it was recommended to use it only recently rolled, but he found that age made little or no difference to its properties. Having remarked that the thicknesses of the copper varied with the size of the plaque, he said the copper foil should be annealed and then cooled, and next freed from oxide with a nail-brush dipped in a one per cent. solution of nitric acid and brush charged with powdered flagstone. Deprived of all dirt, it presents the appearance of pure metallic copper.

In determining the size and shape of the copper plaque, a piece of zinc or brass the exact size of the shape required must be used. The copper must be a little larger than the zinc or brass, and the shape traced on the copper by means of a small steel tool that has been previously hardened and tempered. It is better to work to about one thirty-second larger than is wanted. The copper plaque being trimmed, the edges are turned up all round, so that it has the appearance of an oval tray. The shape is then placed on the copper, and both shape and form are gripped between the jaws of a small hand vice, burnished over and the edge raised up. Burnishing enabled the plaque to resist deformation in the vitrification; if the edges were not raised, the enamel would run off, and the curved copper would not remain true in shape. If placed on a flat piece of wood, and the excess of edge filed off with a fine cut file (a coarse cut file would indent the edges). Generally, the copper plaques are filed on box wood; copper filings should not be allowed to get in the enamel, as black or green specks result.

As many boxwood shapes will be required as forms of plaques are wanted, the shape being imparted by the use of a curving tool, resembling a spatula, being pressed over the back of the copper when in contact with the shape. The copper plaques are pickled to remove oxide, &c., from the surface, in sulphuric acid solution 1 : 5; then thoroughly rinsed in cold water, passed through sawdust, wiped carefully, and dried.

The enamel powder having settled, the water is poured from the two vessels. The copper shape is now placed with its concave surface upwards on some concave support. The fine enamel is applied to the concave surface by means of a hog's-hair brush. It should be of a creamy consistency, and should be spread uniformly. The water is got rid of by the application of blotting-paper. The coarse enamel is applied in a similar manner to the front or

convex side of the copper form, and finally, when the desired evenness of surface has been obtained, the moisture remaining is removed by evaporation over a Bunsen burner. The plaque is then placed on a suitable support for firing, some recommend a refractory earthenware, the latter being treated with a coating of kaolin or rouge to prevent fusion. He did not know where this earthenware could be obtained in thin sheets. He had tried platinum, nickel, and iron for the purpose, and preferred the latter.

Muffles were of two kinds, open and closed. Generally speaking, enamellers preferred the open to the closed; these were made of very refractory clay, and open at both ends. When using white enamel, retort carbon is preferable to ordinary coke, as it is much denser, and less likely to throw off particles of carbon. He had had no experience with the open muffle; it was practically more difficult to use in consequence of black specks being thrown off. Prefatory to the introduction of the plaque, the muffle should be placed in a gas furnace and raised to a cherry-red heat. To guard against black oxide of iron being thrown on the surface of the plaque, he recommended the inside of the muffle being smeared with red lead and water, red lead combining with the silicates present to form fusible glass. The plaque must not be pushed in the muffle suddenly. When in the muffle, and the temperature is sufficiently high, the first thing observed is that the surface of the plaque resembles that of a ploughed field. It fuses in contact with the copper first; then the little globules gradually coalesce until a smooth surface results. If the temperature is not high enough, mottling results, but if raised high enough the enamel acquires a perfectly glossy surface. If continued too long, oxide of copper will enter into combination with the silicate, and a green coloration will result. Generally speaking, there was one point in the muffle where the temperature was highest, and the plaque should be turned accordingly. The best tool for the purpose was one of thin steel, with the end turned over and having a wooden handle. Unevenness in coating can be remedied by rubbing down with flagstone powder and water. The plaque should then be refired. Black specks are removed with a steel tool used tangentially. Then holes are then filled up with powder, and the plaque re-fused.

#### THE FLUORIDES OF SODIUM AND POTASSIUM FOR STRIPPING PURPOSES.

THESE two salts, which are prepared by saturating commercial hydrofluoric acid with sodium or potassium carbonate, take the form of white crystals, easily soluble in water, and present no danger in handling them, while they form excellent substitutes for hydrofluoric acid, which requires to be used with considerable precaution. The alkaline fluorides in the presence of an energetic acid, such as sulphuric acid, set free hydrofluoric acid, the alkaline sulphate being formed at the same time. Taking advantage of this reaction to produce a trace of hydrofluoric acid in a film of gelatine attached to a glass plate, the gelatine will be found to leave its support with as great facility as if hydrofluoric acid were employed. To produce the minute quantity of hydrofluoric acid necessary for the operation, M. L. Mathet says he first places the plate in a solution of alkaline fluoride, leaving it therein for three or four minutes, then, without washing, immerses it in a ten per cent. sulphuric acid solution, when the film will soon commence to regularly detach. He suggests that the plan would be available for cleaning off old negatives. In order to prevent the film, when detached, from expanding, the negative, before being stripped, should be soaked for about an hour in a five or six per cent. solution of chrome alum, being afterwards washed in several changes of water before the application of the fluoride and sulphuric acid.

## SOME PROPERTIES OF METOL.

HERR LAVROFF, of St. Petersburg, says that metol hardens the gelatine film to such an extent that it requires longer than with other developers for fixing and washing. Notwithstanding the clearness of the solution, plates therein may be exposed to a candle light at a distance of fifty centimetres without fear of fog when the image has appeared and before development is complete. He tried the experiment with hydroquinone, but the plate was badly fogged. With metol and sulphite (without alkali) he covered up half of a thin image which had taken ten minutes to appear, for twenty minutes, exposing the uncovered half the while to candle light, without fog supervening, the latter holding good although the plate was left in the developer all night.

## A NEW FILM HAND CAMERA.

MESSRS. PERKEN, SON, & RAYMENT have perfected, and are to have on sale in January, a hand camera to carry forty-eight films on celluloid, the important feature of which is that the films will be used as supplied by all manufacturers, *i. e.*, without any notching or interference with the films. The outside of the instrument measures  $9\frac{1}{2} \times 5\frac{1}{4} \times 5\frac{3}{4}$  inches. We have had submitted a sample



for examination, and we find that by moving a lever it acts automatically without a hitch. It takes plates as well as films—a fewer number of the former, of course. The movement of the one lever releases the exposed film, and sets the next one ready for exposure. The mechanism is exceedingly simple and not likely to get out of order. We predict great popularity for the new camera.

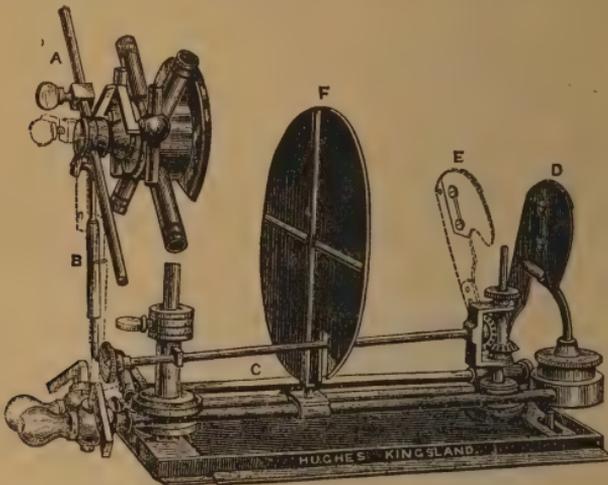
## WRITING ON GLASS.

FOR 'matt' inscriptions on glass it is suggested to dissolve in 500 grammes of water 36 grammes of fluoride of sodium and 7 grammes of potassium sulphate, and in another 500 grammes of water 14 grammes of zinc chloride, 65 grammes of hydrochloric acid being added. For use, equal parts of the solution are mixed, and the inscription made on the glass with a pen or brush. In about half an hour the lettering so traced will present the customary 'matt' appearance.

## AUTOMATIC INCANDESCENT LIMELIGHT SHUTTER.

MR. W. C. HUGHES has introduced this to prevent the incandescence showing on the screen, as many exhibitions are spoiled this way by the amount of light that shows on the picture dissolved when the other is taken out of the lantern during the changing of slides.

It consists of a shutter working in front of the lime, covering the incandescence which is still retained on the lime after the gases are turned off, the shutter being automatically controlled by the movement of the dissolving tap handle. When the gases are cut off, the shutter is lowered in a position in front of the lime and condenser. The engraving illustrates its mechanism and its connexion to a dissolving tap of the star pattern—of course it is understood that a separate tap is fitted to each lantern.



The rod, C, is fixed, and runs the entire length of the lantern, from front to back, where a brass plate is fixed, acting as a bearer; to the end of the rod C, at this point is fixed, by means of a clamping screw, a small lever, which is again coupled with a second lever, B, which in turn is connected with the dissolving tap handle A, on which it is adjusted and clamped by the thumb-screw; the shutter and adjacent parts slide along the rod C, and are held in position by being connected to the tray of the lantern by means of a connecting piece, which has a slot cut in same, dropping over a pin previously fixed into the tray, so that, whatever may be the position of the jet, the shutter would occupy the same position relatively thereto. D shows the shutter in position when the gases are shut off at the dissolving tap. E illustrates the position when the gases are turned on; the slot and screws on shutter illustrate that the shutter adjusts itself to the size and position of the jet.

## TEST FOR PLATINUM OR PLATINUM-TONED PRINTS.

MR. J. SPILLER states that a solution of cyanide of potassium formed a test for ascertaining whether a print be in pure platinum or is a silver print toned by the agency of that metal. In the latter case, the silver forming part of the image is attacked by the cyanide, while the print in pure platinum is unaltered.

## THE HAWK-EYE CAMERA,

THE generic name given by the European Blair Camera Company to their cameras is the 'Hawk-eye.' Of these there are several varieties, there being, however, a family likeness, as regards their working mechanism, among them all. They permit the employment of either glass plates, cut films or roll holder, some of them all three. Their parts are interchangeable; their lenses



are made with the standard flange screw of the Photographic Society of Great Britain. Some of them fold into exceedingly small compass with considerable range when opened out. The drawing represents one of them known as the Columbus Camera, which is much used in America. As will be seen, it is capable of being expanded to suit the focus of a variety of lenses, and is fitted with two finders, a ground glass focussing screen, and a scale for distances; also with appliances for time and instantaneous exposures.

## BLUE-STAINED NEGATIVES FOR WINTER PRINTING.

M. LIESEGANG points out that, owing to the yellow stain of some negatives, printing through them in winter is often a matter of great difficulty, and he recommends the conversion of the yellow stain into the more actinic one of a blue-violet. This may be effected, he says, by immersing the plate for a few minutes in an old combined toning and fixing bath, as used for aristotype paper.

## A BLACK STAIN FOR WOOD.

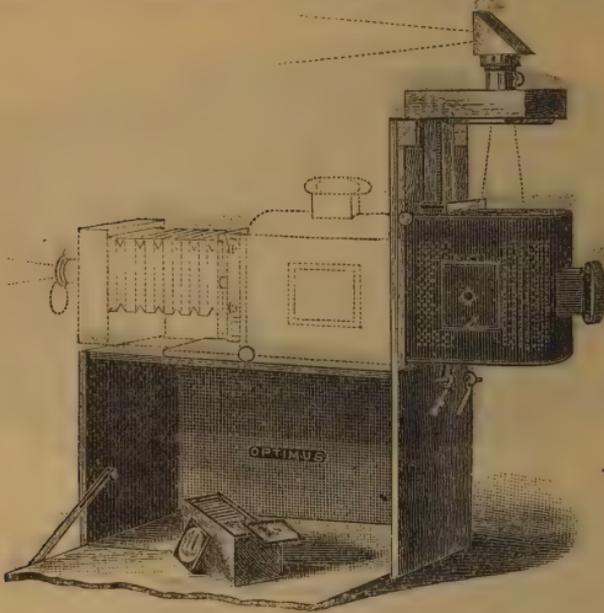
THE photographer who makes his own apparatus may desire to know a good and cheap black stain. According to *Science en Famille*, the following fulfils those requirements:—

|                          |             |
|--------------------------|-------------|
| Extract of logwood ..... | 15 grammes. |
| Chromate of potash ..... | 2 „         |
| Water .....              | 1 litre.    |

The extract of logwood is dissolved in boiling water, and the chromate then added. The colour of the liquid is a deep violet, which changes to a pure black in contact with the wood.

## 'OPTIMUS' SCIENCE DEMONSTRATION LANTERN.

NUMEROUS arrangements have been adopted to enable the manipulator of the lantern to display on the screen objects in a horizontal position, such as liquid surfaces. Most of these arrangements have involved loss of light and loss of time through the rearrangement of the optical system, by introducing an



angled mirror between the two lenses forming the condenser. In the mode shown in above diagram, it will be seen the condenser requires no alteration; the change is made instantaneously by slipping the angled mirror on to the hood of the front lens, and tilting the hinged board to which the lantern is attached to an angle of 90°. The extra cost is about one-fourth of that charged for the ordinary vertical attachment.

## RECOGNISING METOL BY ITS SMELL.

COLONEL WATERHOUSE says: Old metol solutions can easily be recognised by the strong smell of phosphorus they evolve. I observed this smell in testing it with various reagents. Metol is said to be the sulphate of mono-methyl para-amido-meta-kresol, but is probably a phosphate or phosphite of this compound. The smell of phosphorus is most decided and unmistakable.

## COMMON SALT IN MERCURIAL INTENSIFICATION.

MM. TORRES FRÈRES, of Mexico, describe an intensification process which allows the plate to be bleached with mercury without having been submitted to perfect washing after fixing. It consists in the avoidance of the yellow stain, which would thereby be produced, by placing the fixed plate slightly washed in a solution of common-salt (1 : 100) for about half a minute. Intensification then proceeds as usual.

## SODIUM SULPHATE IN THE DEVELOPER.

HERR PIPPEL, in a German contemporary, recommends the use of sodium sulphate (Glauber's salt) instead of the sulphite in the developer, it yielding clean negatives of a rich black colour. For a properly exposed plate he recommends immersion for a few seconds in a bath of—

|                                           |               |
|-------------------------------------------|---------------|
| Pyro .....                                | 1 gramme.     |
| Saturated solution of soda sulphate ..... | 20 to 40 c.c. |
| Water.....                                | 100 c.c.      |

to which being returned to the developing measure, is added 2 to 10 c.c. of a saturated solution of sodium carbonate, development then being resumed with the mixed solution. For over-exposure, bromide; more detail, an increase of carbonate; and for under-exposure, more of the latter, plus 20 to 30 c.c. of the sulphate solution, are recommended.

## CHIPPER'S DOUBLE DARK SLIDES.

MR. W. C. CHIPPER, of 39 Highgate Hill, N., has submitted to us a sample double dark slide which he is supplying singly or in quantities. The slide is well made, has reeded draw shutters, and is light-tight. Its strongest characteristic is its price, a half-plate costing 5s. 6d., other sizes being supplied at proportionate prices. The slides are cheap and efficient.

## INTERCHANGEABLE LENS SCREW FITTINGS.

BEFORE the Photographic Society of Great Britain, Mr. W. Taylor, of Leicester, read a valuable paper on this subject from which we make the following extracts:—

There is an important difference which I ask you to observe between such interchangeability as we need with photographic lenses and such as is commonly secured among bolts and nuts and among gas fittings; it is this, that bolts, and nuts, and gas fittings may be forced together with wrenches and tongs, while our lenses must never be subjected to such treatment, they must go together freely and without strain; and we may conveniently distinguish this by calling it a condition of *free* interchangeability.

Now, I should like you to realise what this condition means and involves. Let us suppose that we have fifty lenses, each with a standard two-inch male or external screw, and fifty flanges with corresponding two-inch female screws. These are freely interchangeable, when any lens will screw into any flange without difficulty.

There will be 2500 distinct combinations formed in trying all these screws together. Now, if one of the male screws be large, even to the small extent of only one-thousandth of an inch on its diameter, this will effectually prevent its entering every one of the fifty flanges which are of normal size. It is thus evident that every male screw must be at least as small as the normal or standard screw. In the same way it may be shown that every female screw must be at least as large as the normal. These are the conditions of free interchangeability among screws, and I ask you to note them carefully. The small amount of one-thousandth of an inch is sufficient to prevent the screws going together at all. Errors much smaller than this are still sufficient to prevent free interchangeability; and it is thus evident that extreme care and accuracy should be observed in measuring such screws, and in making and measuring the gauges with which they are tested. Particularly is this evident when we remember that it is sought to make the lenses, not merely of one maker but of all makers, freely interchangeable, and that the various makers cannot readily compare their work or their gauges, but must rely upon the accuracy of the

standards of length with reference to which their tools are constructed and periodically tested.

#### THE MEASURING OF SCREWS.

A screw such as you see in the diagram (fig. 1) has three principal elements:—

(p) The pitch of a screw, which in general terms we speak of as coarse and fine, is the distance between two successive threads, or turns of the thread, measured in a direction parallel to the axis of the screw. At present we are not concerned with methods of measuring the pitch of a screw.

(d) The nominal diameter of a screw is usually the measure of the full outer diameter of the male screw. Thus, the two-inch standard male screw measures two inches over all, and it is a simple thing to measure this diameter accurately by placing the screw between the plain measuring faces of a micrometer gauge or measuring machine.

In order to fulfil our condition of free interchangeability, it is necessary not merely that this full outer diameter of a male screw be at least as small as the normal; it is also necessary that upon the sloping sides of its threads and at their base or root, the screw should be everywhere sufficiently small. Equally important then with the full outer diameter in securing free interchangeability of screws is the thread form, which determines the size of the screw on the sloping sides and at the bottom or root of the threads. The form of thread is taken as its cross section in a plane containing the axis of the screw. The diagram shows the form adopted in the Society's Standards, and which is known everywhere as the Whitworth thread. It is a form beautifully adapted to the purpose for which it is chosen. It is planned in this way (see fig. 1): A base line is divided into sections, each of a length equal to the pitch of the desired screw. Upon these sections of the base line isosceles triangles are formed by

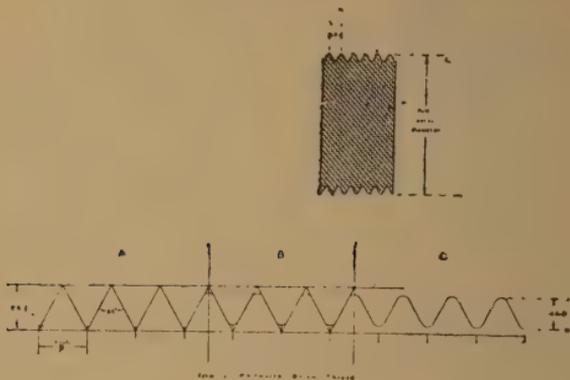


FIG. 1.

drawing lines inclined to each other at fifty-five degrees. A line parallel to the base line and touching the apices of the triangles will stand above the base line  $\cdot96$  of the screw pitch, and will include another series of triangles between the first and similar to them but inverted as at (A). By means of equal circular arcs, one sixth of the height of every triangle is rounded off its apex, as at (B), leaving the form of the thread as at (C). The depth of the Whitworth thread is  $\cdot64$  of its pitch.

Suppose that we have a screw already made, and we wish to measure its thread form. The full outer diameter of the screw is easily measured by placing it between the plain jaws of the measuring machine, as shown at A in fig. 2. This full diameter of the screw is represented by the height of the first thick

black line to the right. The depth of thread in any place may be measured by providing the little test piece shown at D, and on a larger scale below in the diagram. This little hardened steel bar of triangular section has its lower edge very slightly rounded, and its measurement, C, accurately determined.

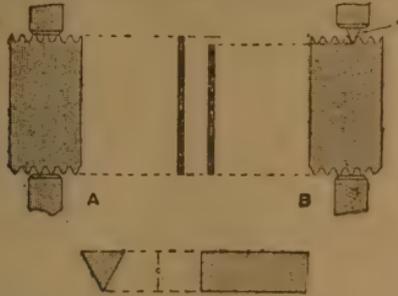


FIG. 2.

FIG. 2.

When placed along and between the threads of a screw in the direction shown at D, it touches the screw only at the root of the threads, and, by measuring the diameter of the screw, including the test-piece, in the manner shown by the figure, it is easy to determine the depth of thread; for if we subtract from the measurement so obtained the constant measure, C, of the test-piece, we get a result, indicated by the shorter thick black line, which is less than the full diameter of the screw by exactly the depth of the thread. With due care, and with simple appliances, these measurements may be made correctly within about one five-thousandth part of an inch, which is sufficiently accurate for practical purposes.

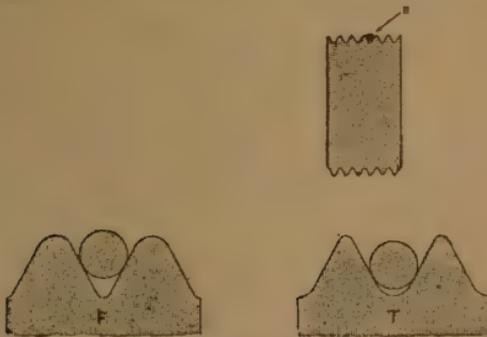
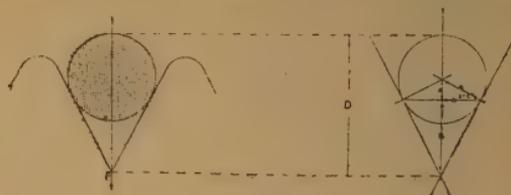


FIG. 3.

The diameter of a screw, as measured on the sloping sides of its threads, may be determined by the aid of a simple application of trigonometry. One easy method, applicable under certain conditions when the angle of thread is known, is to use a small cylindrical gauge placed along and between the screw-threads, so that it bears only against the sides of the threads in the manner shown in fig. 3. The question to be solved by using this little gauge is this—Are the threads of the screw, so to speak, too fat, as at F, or too thin as at T?

You will see that, if the threads are fat, the little gauge will stand too high above their tops. If the threads are thin, the little gauge will sink too low be-

tween them. It is a simple matter to discover just where the gauge should stand in relation to the thread-tops, and it is simpler still, and just as useful, to find where it should stand in relation to the base or root of the threads. If the sloping sides of the threads had been continued downwards to form a thread not rounded at its root, but sharp, it would have been of the form shown in fig. 4; and, knowing both the diameter of our little cylindrical gauge



$$\text{Depth } D = \frac{d^2 \cos^2 \alpha}{4 \sin^2 \alpha} + n (\sin 2\alpha) + a$$

FIG. 4

and the angle between the sides of the threads, is needs only a simple application of trigonometry to decide where the gauge should stand in relation to the point P. We know, by the construction of the Whitworth thread, that an amount equal to  $\cdot 16$  of the screw pitch is rounded off the sharp angle to form the rounded root of the thread. Knowing, then, how far the cylindrical gauge should stand above the point P, we can easily find how far it should stand above the base or root of the threads, and how far above their crests.

For practical purposes, the necessary calculations may be made once for all, and I prefer to construct for each pitch of screw to be dealt with a small cylindrical gauge, of such diameter that it shall stand, when in use, one or two-thousandths of an inch, or some such simple recorded distance above the crests of a perfect or normal thread.

The radius of such a gauge for this purpose may be found by the formula :—

$$\frac{1 \cdot 25 \, d - p}{3 \cdot 1656},$$

where  $d$  is the depth of thread, and  $p$  the desired convenient projection of gauge above the crests of the thread. The main features of this problem are shown in the diagram (fig. 4).

If it be necessary to measure the angle between the sloping sides of a screw thread, it may be done by using a second gauge, small enough to lie between the threads close down at their root.\*

#### COMMON METHOD OF GAUGING SCREWS.

It is customary, in making screws, for opticians to provide themselves with certain gauges or standards with which to compare their work. Such gauges generally take the form of those shown (not illustrated). Let us suppose that a lens-maker, wishing to do the thing well, seeks the aid of some expert to construct for him a set of standard screw gauges in pairs, male and female, for each size of screw.

\* The use of trigonometry for this purpose is naturally not new. It is employed in a very different way in the measurement of the Sellers form of thread by Messrs. Pratt & Whitney of Hartford, Conn., in whose works I have had the pleasure of seeing it applied. The use of small cylindrical gauges such as I have described was first suggested to me by Mr. Barber, the superintendent of Messrs. Whitworth & Co's gauge department; but, so far as I am aware, the application in the way I have explained is novel.

He may keep a duplicate set if he likes, and can afford the luxury. Such gauges may be made of steel; but, as they would warp in hardening, they must be left soft, and are thus specially liable to become worn. They are put into the hands of the workman, who uses them to test his work. When, for example, a male screw has been formed, he screws upon it the ring gauge. If the gauge fit stiffly, he reduces the screw until the gauge passes on freely. In this way he tests one screw after another as he makes them, screwing the gauge upon each, and inevitably wearing it away. It is only a question of time, and generally of a very short time, for such a gauge to be worn large. Suppose it wear only one-thousandth of an inch large on its diameter at the root, or crests, or sides of the threads; it then becomes possible to pass freely through that gauge a male screw which may be one-thousandth of an inch too large. But such a screw does not fulfil our conditions of free interchangeability, and such a gauge, worn even so little, is not capable of ensuring such accuracy as is indispensable. 'But,' says the workman, 'I always make my screws fit the gauge loosely.' 'How loose?' we ask. 'Oh, so that they shake a bit!' he replies.

This is the common method of gauging screws; only it is rarely the gauges are themselves accurately formed at first. But, even if the gauges are correct, a method like this, which depends for its success upon the workman's fancy of the right amount of shake, and which makes things loose to secure their being interchangeable, cannot be considered an exact and satisfactory method, nor should it be tolerated when we know any better way.

#### COMMON METHODS OF CUTTING SCREWS.

The common methods of cutting screws are very simple.

Let us take the case of a male screw. The piece to be screwed is held and made to revolve in a lathe, and its outer surface is turned truly to the form of a cylinder approaching the full outer diameter of the desired screw. Then what is called a comb or chaser is brought into use. This instrument, which may be bought at the shops, is a cutting tool roughly in the form a common chisel, the working end of which is serrated, the series of alternate indentations and projections presenting exact counterparts of the thread form and pitch of screw which it is desired to cut. This chaser is presented to the revolving piece of work, and, sometimes by hand, sometimes by machine, it is moved in a direction parallel to the axis of the lathe, so that it cuts a spiral groove along the cylinder and forms it into a screw. The form of the screw thread is determined by the form of the teeth on the chaser.

We know that it is of great importance in securing free interchangeability that the form of thread be correct, but it is a fact that screws cut by this common method seldom, or perhaps never, are correctly formed in this respect. A famous navy captain, being asked why, on a certain occasion, he had not fired a salute gave thirty-nine distinct and substantial reasons for his neglect. The first reason was that he had no powder. In the same way, several reasons might be given why opticians fail to cut screws correctly with these common chasers; but the one sufficient reason is that there is not such a tool in the market correctly formed. At least I have never found one, though I tried hard to do so before giving it up and making my own. All the bought chasers I have seen form threads of wrong angle and insufficiently deep. Since the prominent points of the chaser teeth come into operation first in cutting a screw, and are thus most worn away, and since the chasers are themselves cut and formed by tools liable to similar wear of their prominent edges, we cannot expect very much of the ordinary shop tools, which cost only eighteen-pence per pair. And, since everything the workman may do in grinding the tool to sharpen it, in altering the angle of the inclination of its upper face, either by grinding it or by the manner of applying it to its work, tends to alter the form of the screw thread and make it shallow, it comes to pass that

the screw threads which are found on scientific instruments generally, and which are nominally of Whitworth form, vary from *a*, in fig. 5, which is correct, to *b*, and even worse than that, which is prepared from measurements

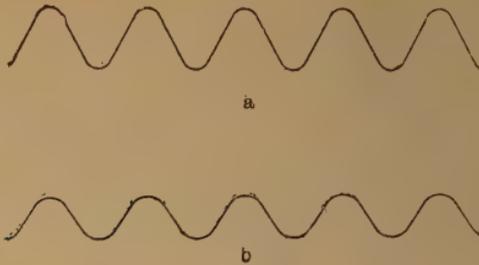


FIG. 5.

of screws furnished to the recent Conference of Opticians by the opticians themselves.

#### AN IMPROVED FORM OF CHASER FOR SCREW-CUTTING.

I have shown the two principal weaknesses of the common methods of screw-making—the possibility of error arising from the inevitable wear of the ordinary solid screw gauges, and the certainty of error arising from the use of chasers which in the ordinary way are faulty. It is now several years ago since I designed a chaser, shown in fig. 6, which possesses important advantages over the ordinary form. The chasing tool, *a*, is itself a portion of a

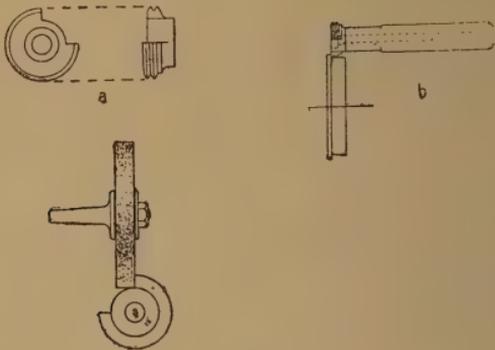


FIG. 6.

screw, with only two turns of the thread, and is produced in a screw-cutting lathe, a quadrant being afterwards removed to form two cutting edges, one for male and the other for female screws. The figure at *b* shows also the chaser attached by a bolt to its holder, and in position for cutting a male screw. This chaser has the following important advantages:—The form of its thread is easily measured by means of the test-pieces which I have described. This is practically impossible with the ordinary form of tool. The circular chaser is easily made, and the tools used in making it are not subject to that incurable deterioration of form which is inevitable with the tools used in forming an ordinary chaser. The circular chaser is easily sharpened by threading it on a fixed pin or stud, *S*, as shown in the figure at *C*, so that the chaser may

bare on the face of an emery wheel always in the same way to preserve the radial position of its cutting faces. It thus retains its original cutting angle until entirely worn away, and, with ordinary care, it is practically impossible to set it wrongly in relation to its work. It may be removed for sharpening by loosening the bolt, without displacing the holder, and in replacing it the only thing necessary is to set the cutting edge at the level of a fixed line upon the holder. With such a chaser, so easily removed and replaced, there is little temptation for the workman to neglect the sharpening of the tool, while with the ordinary form this temptation is very great.

For want of time I cannot now describe my methods of originating the thread form on these chasers. With suitable appliances the work is quite simple.

When properly constructed and arranged, such a chaser as I have described will form screw threads accurately, and for a considerable length of time before appreciable error arises from the wearing of the tool. For practical purposes it is possible so to rely upon the constancy of the thread form which it produces, that to measure the diameter of a screw on the tops of its threads sufficiently indicates to the workman the gauge of the entire screw.

#### THE CHASING LATHE.

I show you a view of part of a chasing lathe as used for cutting screws with this chaser. The usual slide-rest is removed to show the screw-cutting gear without confusion. The spindle which supports the work, and revolves with it, carries at its other end a guide screw of the same pitch as the one we wish to cut. Engaging with this guide screw is a nut attached rigidly to a bar capable of sliding along and behind the lathe bed, which bar serves to support and move the chasing tool. As the spindle revolves, its guide screw, acting on the nut, causes the bar to slide and so to move the chaser along at the necessary rate. For convenience the chaser commences its work at the shoulder of the screw, and moves away from it in performing its work. Then, by raising a handle, the guide nut and the chaser are lifted from their engagements, and the bar is moved back so as to repeat the movement of the chaser from the shoulder and along its work. At each turn, by means of a screw and hand wheel, the chaser is moved a little further into cut, until it has at last produced a full thread on a screw of right diameter, and further advance of the chaser is then prevented by a stop on the hand wheel.

By these means we have accomplished our screw-cutting at Leicester for some time with a remarkable degree of accuracy. We have been able not only to ensure that every male screw shall be at least as small as the normal, in order that it may be freely interchangeable with its fellows, but we limit its error in the other direction also, that it shall not be more than one-thousandth of an inch smaller than the normal—that is, that it shall not be loose nor shake in its fellow more than one thousandth of an inch on its diameter.

#### LIMIT GAUGES.

For practical purposes in gauging such male screws, and not for purposes of strict examination, though indeed, with due care it is a practically complete test, we use a hardened steel gauge.

This is the two-inch standard male screw gauge. It is applied to the screw as a calliper to gauge its full outer diameter only. The gauge has two sides, the gap between its jaws on the side marked F being exactly two inches across. On the second side, marked S, the gap measures exactly one-thousandth of an inch less. In using the gauge, the screw is cut so that it passes through the two-inch gap without any jamming, but it is not allowed to pass through the gap, which is only one-thousandth of an inch smaller. Thus the

screws are at least as small as the normal, and are freely interchangeable, yet they are not loose and shaky. For gauging female screws we employ a pair of disc gauges, one being of a correct core diameter of the screw, and the other one-thousandth of an inch larger. These are used in a similar way to that I have described for male screws—to limit the error in the size of female screws.

This is not a laboratory experiment. It is a process daily and hourly employed at Leicester, where such screws are made more cheaply than less accurate screws were ever made before. So reliable are the methods, that I could produce from stock at any time a sufficient number of screws of one size to form a million distinct combinations, every one of which would present a sweet, smooth fit without any need of forcing.

It should be understood that our brass work is prepared by special machine tools in order to form it accurately and uniformly as it never can be done by hand. It is in this process of preparing that the accuracy in the cutting of screws is observed. In the subsequent processes of finishing, slight errors are inevitably introduced through the wearing of the parts, but such errors are very small indeed, and do not lead to any sacrifice of free interchangeability, but rather in the other direction.

In order to cover every reasonable risk of our work not being freely interchangeable with that of any other maker who adopts accurate methods for his work of screw-cutting, it is our practice to make every female screw, such as those in flanges and adapters, one-thousandth of an inch larger than the standard. Flange screws are thus made to fit loosely to this small extent.

It is also our practice, which, to save confusion, I have not previously mentioned, to make the prominent points of the threads upon our screw chasers abnormally prominent, so that the threads which are formed upon the lens fittings are abnormally deep, though they are correctly formed on their crests and on the sloping sides. This has the effect of making the threads bear only upon their sides when they are put together, as shown in Fig. 7, at *a*, an arrangement which has two principal advantages: one, that there is much less risk of the screws sticking fast together, a common defect with ordinary screws, which often fit only in the crests and hollows of their threads and not fully upon their sides. The other advantage is that the prominent edges or crests of

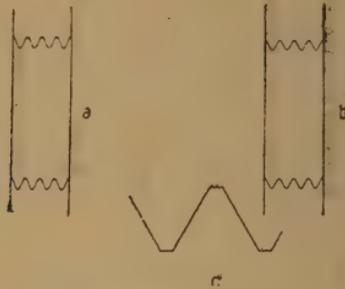


FIG. 7.

the screw thread, which are the parts most liable to damage by bruising or by other accident, may even be bruised to a considerable extent before the damage will extend to the sloping sides of the threads and affect the fit or the free interchangeability of the screw. With the American form of screw, which has a flat and not a rounded crest, as shown at *b* and *c*, any slight bruising of the prominent edge of the thread is certain to affect also the sides, and thus to impair the fit of the screw. For this reason the Whitworth form of thread is better adapted than the Sellers thread for such screws as those on the fittings

of our lenses, which we are frequently screwing and unscrewing, and sometimes leaving exposed and liable to damage.

#### FINDING THE ZERO OF A SCREW.

I should like now to refer to another matter of mechanical practice. Several years ago it occurred to me that it would be possible to provide a system by which all our lenses might be made to arrive home with their diaphragm indexes or other fittings in one position, convenient for use. The principle involved is that we should make the screw threads terminate at the shoulders of all the male screws at a point around the lenses having a fixed relation to the position of their diaphragm indexes or fittings. For example:—The screw thread of a lens with iris diaphragm might terminate at the shoulder of the screw at a point coinciding with the position around the lens of the iris index zero. If it did this in one lens, it might be made to do so with any number, and in this way all those lenses when screwed in turn into one flange would arrive home with the diaphragm indexes in one position. This system has been adopted as part of the Society's Standards, and it is a matter of considerable importance that opticians should be provided with some easy means of making their lens fittings uniform in this respect. When a male screw with a shoulder is screwed home in a female screw or ring so that the shoulder bears against the face of the ring and stays further advance of the screw, one side of the male screw thread is caused to bear hard against the corresponding side of the female screw thread. One side only of the thread is thus employed, and on the male screw it is the side which faces the shoulder of the screw. The position of rotation at which any lens screws home in its flange is determined by the relation of that active or working side of the thread to the screw shoulder. If we take a number of such male screws and try to discover just where the thread faces lead up to their shoulders, we shall have no easy task if it is to be accurately performed, and, unless we take into account the diameters of the screws as measured on the working sides of their threads, the lenses will not all screw home in the same flange to the positions our calculations would lead us to expect. But there is a simple way of accurately finding that point, which we may call the zero, of any such male screw with a shoulder. It is to have a corresponding female screw ring with the zero marked upon it, and after screwing home the male screw in this ring, to place the zero mark of the male in agreement with that of the female gauge.

The most convenient point to choose as the zero of a screw, is that point around the female screw where the tip of a tool cutting the screw would lie in the plane of the ring face. In other words, it is where the thread becomes complete at the face of the ring; but, if we were to locate the zero by watching where the cutting tool came into this position, or by looking for the commencement of the thread at the face of the ring, we might easily get into considerable error. If, however, we make the thickness of the ring-gauge an exact multiple of the pitch of the screw, and if we put zero marks upon both sides or faces of the gauge, the two zeros will be together at one point on the circumference of the gauge. It is easy to determine the true position of these zeros, for, if any wrong point be chosen for the mark, a male screw would not arrive home in either side of the gauge in the same relation to the zero marks. The true zero is at that point to which a male screw arrives home on both sides alike. This method is very simple and accurate, provided always that the screw of the gauge be of true size and form. Such a gauge should be made of steel, or it will not long withstand the wearing effect of forcing screws home in it.

#### FACILITATING THE ENGAGEMENT OF SCREWS.

This system of providing that all lenses may screw home in their flanges in one position depends, as I have said, upon the principle of making all the

male screw threads terminate at the shoulders in one uniform position in relation to the diaphragm indexes or other fittings of the lenses.

This leads me to mention the improvement which I designed a year ago for facilitating the engagement of screws.

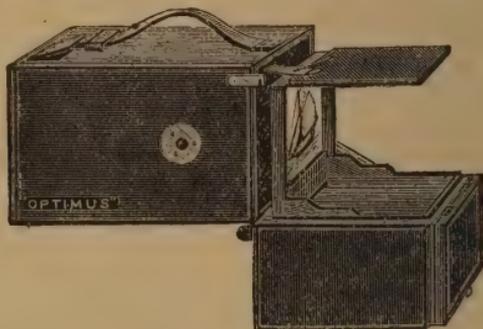
When a pair of screws accurately formed are merely chamfered at their ends in the usual way, it is astonishing to any one who has not tried it how very difficult it is to get the screws to engage. They work together like a ball and socket joint, and, particularly with screws of large diameter, it is sometimes impossible to find at what part of their revolution the screws first engage. This difficulty is only lessened in common experience because such screws usually fit very loosely. The same kind of difficulty always occurs, if in less degree, with such screws, and we commonly experience the trouble of holding a lens to its flange in the right direction axially, and of finding at what part of their revolution the screws first engage.

The method I devised to overcome these difficulties by removing the usually incomplete portions of both male and female screw thread so that they commence abruptly of full section near the point which I have named the zero of the screw is perhaps familiar to you all.

There is one point only in this to which I wish to call attention in closing. It is that screws so formed cannot be damaged by crossing the threads; and, while this construction renders the engaging of such screws beautifully simple and certain, it removes a source of danger and helps to ensure the permanence of that accuracy of workmanship which is essential to the effective establishing everywhere of standard interchangeability lens fittings.

#### PERKEN, SON, AND RAYMENT'S 'OPTIMUS' (1893-94) MINIMUS HAND CAMERA.

THE present model of this instrument has several improvements upon its predecessor of last year, not the least important of which is a focussing screen that requires no handling, but opens and closes automatically. The focussing is adjusted by a rack and pinion from the outside, so that, as a field camera, it is complete. A graduated scale is attached to the pinion. Two finders are also provided, making the instrument equally well suited for instantaneous



work. It carries twelve dry plates, which are changed by simply pushing the exposed plate into an attached bag by means of a sliding piece of wood, which acts in a second capacity in screening the plates from the action of the rays entering the lens. A roller blind shutter capable of giving exposures of various rapidities is fitted within the instrument. The outside is of the same superior and practical finish as the interior, being covered with a durable morocco leather.

## ANOTHER METHOD OF PREPARING PLATINOTYPE PAPER.

WE have from time to time indicated several formulæ for this purpose as published by foreign experimentalists, the latest addition being that provided by Herr Watzek. Paper is coated with a solution of

|                                                 |           |
|-------------------------------------------------|-----------|
| Arrowroot .....                                 | 1 gramme, |
| Cold saturated solution of sodium oxalate ..... | 50 c.c.,  |

the solution being boiled until the sediment dissolves, and, according to the degree of porosity of the paper, being applied to the latter two or three times. For black tones the dried paper is sensitised in

|                                                    |          |
|----------------------------------------------------|----------|
| Saturated solution potassium chloroplatinite ..... | 5 c.c.   |
| „ double oxalate of soda and iron .....            | 8 „      |
| „ potassium chlorate .....                         | 3 drops. |

For sepia tones the following quantities of saturated solutions are taken:—

|                                       |          |
|---------------------------------------|----------|
| Potassium chloroplatinite .....       | 5 c.c.   |
| Double oxalate of soda and iron ..... | 4 „      |
| Neutral oxalate of soda .....         | 3 „      |
| Mercuric chloride .....               | 1 „      |
| Potash chlorate .....                 | 3 drops. |

More chlorate increases contrasts and a smaller quantity of mercury gives darker tones. The solution of double oxalate of iron and soda being sensitive to light, it should be preserved accordingly. Both solutions given above suffice for coating a sheet of paper 40 × 56 centimetres. For the best results the paper should be dried at a temperature of 35° C.

## ESTIMATION OF OXYGEN.

MESSRS. F. B. GRUNDY AND A. HADDON thus describe the results of some experiments on the estimation of oxygen:—To estimate oxygen very accurately, complex apparatus such as Bunsen's, or modifications thereof, in which mercury is the trapping fluid, must be used, but for ordinary purposes Hempel's, or some such apparatus, in which water is the trapping fluid, may be employed.

The estimation of oxygen in a mixture may be carried out in several ways, of which the two most important are, first, by mixing the gas to be analysed with an excess of hydrogen, exploding the mixture by means of a spark from an induction coil, and measuring the decrease in volume. One-third of the contraction, due to the combination of the oxygen with the hydrogen, will be the volume of oxygen present in the original gas. Second, by bringing the gas to be tested into contact with a solution of pyrogallic acid and caustic potash, and noting the decrease in volume which occurs. The diminution in volume gives the amount of oxygen present in the original mixture, and the unabsorbed part the diluent.

*The Hempel Method.*

The Hempel consists of two parts—the one the measuring apparatus, and the other the absorption bulbs. The former consists simply of two glass tubes about three-quarters of an inch in diameter and eighteen inches long, connected together at their lower ends by indiarubber tubing. One tube is open at the top, and the other is closed by a glass stopcock and graduated. To start an analysis, the graduated tube is filled completely with water; when connexion has been made with a supply of gas, the stopcock is opened, and as much gas as necessary is introduced; the communication is then cut off, and the levels made the same in both tubes and the volume read. The object of making the level of the water in both the same is to avoid reducing to constant pressure.

The graduated tube is then connected by means of capillary tubes to the absorption apparatus, which consists of two bulbs, joined together, one terminating in a capillary U tube. The bulb nearest the graduated tube, is filled with a solution of pyro and caustic potash in water. All the capillary connecting tubes and indiarubber tubes must be filled with water in order to eliminate errors. The following is the best proportion of pyro and caustic potash for the absorbing solution :—

|                     |            |
|---------------------|------------|
| Pyro .....          | 1 ounce.   |
| Caustic potash..... | 24 ounces. |
| Water .....         | 20 „       |

The gas under analysis, after being passed into the bulb, is brought into intimate and renewed contact with the alkaline pyro by constant shaking, three to five minutes being generally sufficient. The gas is then drawn back into the burette, and again measured as before; the decrease in volume represents the amount of oxygen in the gas. In order to make sure that no oxygen is left unabsorbed, it is again passed into the pipette, and if there is no decrease in volume on again measuring, the analysis is complete.

#### *A Simple Plan of Estimation.*

The other piece of apparatus is of very simple construction, and could be procured at a small cost. It consists of a tube, three-quarters of an inch in diameter, eighteen to twenty inches long, and drawn out at each end. To each end is attached a short length of indiarubber tubing, provided with a pinchcock. Beyond the lower pinch-cock is another piece of glass tubing, which enables the tube of large diameter to be connected to a funnel, or other containing vessel, by means of indiarubber tubing of suitable size.

In order to use it, the tube is first completely filled with water; connexion is then made with the vessel containing the gas to be analysed. Both pinchcocks are pressed, the one to allow the gas to enter, and the other to allow the water to escape. The lower end might, with advantage, be plunged into a tumbler or beaker full of water. As soon as the tube is full of gas, both pinchcocks are allowed to close the tubes, and the supply of gas disconnected. The funnel, or other convenient vessel containing the supply of pyro solution, is now, by means of the indiarubber tubing, connected, making sure that the tubing is completely filled with liquid. The bottom pinchcock is now opened, and if the reservoir of pyro be raised, a sufficient pressure will be obtained to force some of the pyro solution into the tube containing the gas to be tested. At once absorption of oxygen will commence; and, in order to facilitate this by increasing the surface of the liquid, the tube may be tilted or shaken, the pinchcock being opened occasionally in order to prevent too great a reduction of pressure inside, and thus cause a probable leakage of air into the apparatus, but this danger can be removed if the indiarubber tubing is wired on. When the absorption is complete, place the vessel of pyro, with the pinchcock open, so that the level of the liquid is the same in both tube and reservoir.

The tube must either have been graduated before, or, if only a few measurements are to be made, and the operator does not care to go to that trouble, the volume of the tube can be ascertained by completely filling it and measuring the contents in an ordinary graduated measure, then turn the tube upside down and fill with water up to the mark occupied by the unabsorbed gas.

The percentage of diluent can be easily obtained by dividing the volume of the residue in drachms or cubic centimetres by the original volume and multiplying by 100. Thus, suppose the volume of the unabsorbed gas to be 17 drachms or c.c., and the volume of gas operated on 80 drachms or c.c., then the percentage of diluent will be  $\frac{17}{80} \times 100 = 1700 \div 80 = 21.25$ .

There are one or two precautions to be observed in using pyro and potash. First, it is no use to try and absorb oxygen with a weak solution of pyro; it must be about the strength given above. Secondly, it must not be used too often, or left exposed to the atmosphere, as after a time it begins to give off carbon monoxide, which would seriously vitiate the result of the analysis.

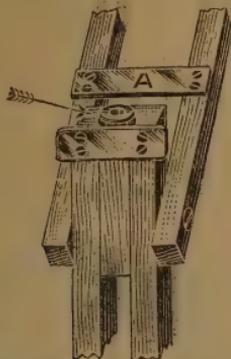
#### Results of Analyses.

The results of the analyses of various samples of oxygen, which have been obtained are as follows:—

|             | N <sup>o</sup> / | O <sup>o</sup> / |                                                                      |
|-------------|------------------|------------------|----------------------------------------------------------------------|
| No. 1 ..... | 15.5             | 84.5             | } Same maker at different times.                                     |
| No. 2 ..... | 39.4             | 60.6             |                                                                      |
| No. 3 ..... | 43.1             | 56.9             |                                                                      |
| No. 4 ..... | 43.8             | 56.2             |                                                                      |
| No. 5 ..... | 25.4             | 74.6             |                                                                      |
| No. 6 ..... | 7.0              | 93.0             | Another maker.                                                       |
| No. 7 ..... | 3.8              | 96.2             | Made from chlorate and M <sub>2</sub> O <sub>2</sub> for lime-light. |

#### AN AUTOMATIC CAMERA-STAND.

THE Thornton-Pickard Company have introduced a camera-stand, the nature of which will be seen from the cut. It is automatic, inasmuch as, when opened



out, spring bolts immediately come into action and retain the legs in their elongated form. There are no buttons that can be accidentally turned and allow the stand and camera to collapse.

#### WHY ADOPT A RECTANGULAR FORM OF PICTURE ?

MR. HORSLEY HINTON thus summarises his objections to rectangular pictures:—Why do we usually adopt for nearly all subjects a rectangular form for our pictures? The eye does not form a rectangular figure when looking at nature, but a vignettted ellipse. It was probably convenience in the first place which decided the matter, and then custom grew upon this, so that now we use a rectangular form because, being conventional, it attracts least attention, and the spectator is *unconscious* of the boundaries. The arrangement or composition of every picture should be such that its boundaries should not be felt

to be restricting, and there should be such interest within the confining lines that the eye feels no desire to wander, and the mind no wish to inquire of what else the world was composed, or what came next in the landscape panorama. I might suggest such arrangements of lines, such combinations or such dispositions of central objects, and so forth, which I have myself found to assist in this direction, but beyond this neither I nor any one else can tell you how to make your small picture overcome its impression of littleness. It is a thing to be found of experience and observation, and to be attained as others have attained it—on the steep ladder of many failures.

#### A VARNISH FOR COLLODION LANTERN SLIDES.

A CORRESPONDENT of *The Lantern Record* writes:—I have been making a series of experiments to find out the best varnish for collodion lantern slides. I have tried nearly all the published formulæ, including Mr. Armstrong's acetic acid solution of gelatine, but the best one which I have used is as follows:—

|                                                        |           |
|--------------------------------------------------------|-----------|
| Tunny's impervious varnish .....                       | 1½ ounce. |
| (This is a saturated solution of amber in chloroform.) |           |
| Pure benzol .....                                      | 1½        |
| Gum damar .....                                        | ¼ ”       |

When dissolved, to be filtered through cotton wool.

This varnish runs on the plate as freely as collodion does, without the tendency to coat your fingers and back of the plates like most other varnishes which I have tried. It dries hard with a gentle heat, and is not tacky, and it renders the film quite bright and glass-like.

#### PERKEN, SON, AND RAYMENT'S 'OPTIMUS' (1893-4) SLIDING CARRIER BLOCK.

VERY many ingenious arrangements have been devised for the purpose of facilitating the changing of glass transparencies in the magic lantern, of a more



or less complicated description. The patent represented in the diagram is exceptional, from the fact that it has neither levers nor springs nor mechanical confusion of any kind whatsoever. Its individuality and efficiency are nevertheless very pronounced. The movement of the lantern photographs is obtained by the usual sliding action, whilst the absence of the top bar of the inner frame permits the fingers to freely withdraw the exposed and insert the fresh transparency.

#### A VERY RAPID COLLODION PROCESS.

HAVING experimented with Dr. Hill Norris's process, which was patented some four years ago, without obtaining satisfactory results, M. P. David, of the Service d'Identification de la Préfecture de Police, Paris, has introduced some

modifications of his own, and gives the following method of preparing a dry-collodion plate of a sensitiveness about 22° or 23° Warnerke. He coats a plate, 180×240 cm., with 25 c.c. of collodion, containing eighteen grammes of silver nitrate and seven to eight grains of pyroxyline per litre. The film being set, the nitrate is bromised in a bath of—

|                         |                    |
|-------------------------|--------------------|
| Potassium bromide ..... | 80 to 120 grammes. |
| Potassium iodide .....  | 0·01    "    "     |
| Gelatine .....          | 2       "    "     |
| Distilled water .....   | 1000 c.c.          |

Sensitiveness is obtained by immersing the plate for a greater or less time in a solution of—

|                         |                   |
|-------------------------|-------------------|
| Potassium bromide ..... | 18 to 25 grammes. |
| Gelatine .....          | 1       "    "    |
| Distilled water .....   | 1000 c.c.         |

The sensitiveness increases with the temperature of the bath. At 70-75° the plate is left in for about two hours, at 90-95° for one hour. The figures are, however, approximate. The plate is then washed and dried. Contrary to what might have been supposed, says M. David, the collodion film does not show any tendency to leave the support, even at a temperature of 100° C., provided that the surface of the glass has been carefully prepared.

#### A PERMANENT ACID FIXING BATH.

The following is recommended by the *Bulletin* of the Photographique Club de Paris:—

|                          |                 |
|--------------------------|-----------------|
| Water .....              | 350 c.c.        |
| Bisulphite of soda ..... | 10 grammes      |
| Hyposulphite .....       | 40       "    " |
| Chrome alum .....        | 2       "    "  |
| Citric acid .....        | 15       "    " |

The bath is said to keep indefinitely, fix rapidly, and obviate staining of the plates.

#### SOAP-BUBBLES IN THE STUDIO.

MR. HARRY SMITH in THE BRITISH JOURNAL OF PHOTOGRAPHY, describes how soap bubbles may be made for photographic purposes:—Of all the beautiful and ingenious toys which have been placed in the hands of children of late years, it must be said that, either on the ground of amusement, or the higher level of education, they are not to be compared with that delightful plaything, the soap-bubble. Present a little girl with one of Mr. Edison's wonderful dolls, which, by virtue of a concealed phonograph, can talk, sing, laugh, or cry in the most natural manner in the world, the chances are that in half an hour you will find her nursing an ancient creature with one eye missing and an internal economy of sawdust. But when do children tire of blowing soap-bubbles?

Professor Boys tells us that there is an ancient Etruscan vase in the Louvre at Paris, on the sides of which children are depicted in the very act of blowing bubbles with a pipe; but he quaintly adds, there are no means now of telling whose soap they used. Hence it is quite certain that the practice of this delightful art is of great antiquity.

It is small wonder, therefore, that so many photographers should desire to portray some of their more juvenile clients in this way; but the mechanical difficulties are very great, and so far their endeavours have frequently met with failure. To begin with, a soap-bubble itself is not a particularly easy thing to photograph, as many who have tried to do so will acknowledge; it requires very careful lighting, and is apt to burst at the critical moment of exposure; but

the latter difficulty arises from the use of an unsuitable soap solution, and may be easily overcome by making up a solution as follows:—

Take three quarters of an ounce of freshly prepared oleate of soda, which can be obtained from any large chemist, and place it in a perfectly clean quart bottle with a pint and a half of distilled water, or clean rain water. When the oleate of soda has dissolved, add half a pint of Price's best glycerine, and shake the bottle up; but the oleate must be allowed to dissolve without heating the solution, as this would spoil it to a great extent for making good bubbles. Castile soap may also be used in place of the oleate of soda, but it does not answer the purpose so well.

Bubbles blown with this solution are so wonderfully strong and elastic that they may be tossed about on the coat-sleeve, or on a flannel-covered tennis racquet, without breaking, and, if the mouthpiece of the pipe be stopped with the tongue to prevent the bubble from contracting, the bubble will remain upon the bowl of the pipe for a sufficient length of time for the photograph to be taken in a satisfactory manner.

If it is desired to show a bubble apparently floating in the air, as in Sir John Millais's well-known painting, this may be accomplished in the following manner. A piece of horsehair or exceedingly fine wire is bent into a circular loop about the size of a five-shilling piece, with a crosspiece of horsehair or wire arranged in the fashion of the handle of a bucket. If the loop of horsehair is first thoroughly wetted with the soap solution, a bubble brought into contact with it will adhere to the loop, and can be detached from the pipe. The loop and bubble are then suspended in a suitable position by means of a fine silk fibre, which is invisible in the resulting photograph.

A very good substitute for a soap-bubble may be obtained from any glass-blower in the form of a thin glass globe, similar to the silvered balls exhibited in the shop windows at Christmas time. This, when cemented to the bowl of a clay pipe, is scarcely to be distinguished in a photograph from a real soap-bubble.

#### FLEXIBLE GLASS.

THE following is the formula given by *Science Illustrée* for a flexible substance as transparent as glass:—Dissolve four to eight parts of pyroxyline in alcohol and ether in the proportion of a one per cent. solution. Then add two to four per cent. of oil of rice or any other non-siccative oil, and four to ten per cent. of resin or Canada balsam. Coat a plate of glass, and dry in a warm current of air at 50° C. This will give a sheet of a durable, unbreakable, transparent substance, impervious to acids and alkalies, and less inflammable than ordinary collodion, and of any desired thickness or colour. With zinc oxide it has the appearance of artificial ivory.

#### PREPARATION OF OXYGEN BY THE BRIN PROCESS.

THIS process is thus described in *The Lantern Record*:—The routine of the process begins with the pumping in of air from the atmosphere, which is passed into a large receiver containing caustic lime, and thence into a second and smaller receiver (of caustic soda), the latter acting as a check on the former in the removal of moisture and carbonic acid from the air. The purified air is then passed into large pumps, where it undergoes slight compression, and finally passes through a chamber for filtering out solid particles, and a distributor placed on top of the furnace, into the retorts. The large furnaces are built at an angle with the horizontal, and contain on each side twelve inclined retorts, of cast iron, of six and a half inches internal diameter, one inch thick and about ten feet long. These hold between 2000 and 3000 pounds of barium in small lumps. A temperature of about 1300° Fahr. is obtained by the

admission of primary and secondary air into a coke furnace, the carbonic oxide found being burnt into carbonic acid in the combustion chambers. By means of wall-holes in the sides of the furnaces one sees the retorts at a dull red heat. The heated barium abstracts the oxygen from the purified air, and the free nitrogen escapes up through an automatic valve, whence it passes out into the atmosphere. At the end of five minutes an automatic reversing gear reverses the working, a vacuum is created in the retorts, the air and impure oxygen in the connecting pipes are blown away, and the oxygen passes back through the pipes to a comparatively distant part of the works into the gasholder, which has a capacity of 2000 feet.

In another five minutes the reversing gear is again automatically converted, air passes into the purifiers, as before, thence to the pumps and retorts, and so on, for every five minutes of the day and night, Sundays as well as week days, all the year round. The maximum volume of gas capable of being drawn off can thus be seen to be very large. At the time of our visit only one of the furnaces and one set of retorts were at work. As showing the longevity of the barium oxide, the company are still using barium which was first employed in 1886, when the Brin syndicate started working the process. After a time the barium is prone to cohesion, when it has to be taken out and broken up.

From the moment when the air is pumped into the purifiers until the pure oxygen leaves the compressor the process is practically automatic, save and except such attention as even automatic machinery must have. Of special value is this, in that, when the air and impure oxygen are blown out of the pipes, the egress of atmospheric air is prevented. In atmospheric air there are, by weight 23.1 parts of oxygen to 76.9 of nitrogen, and by the Brin process about fifteen parts by weight of the oxygen are taken up by the barium monoxide.

#### TIN-FOIL AS A SUPPORT FOR PHOTO-LITHOGRAPHIC TRANSFERS.

CAPTAIN A. M. MANTELL before the Photographic Society of Great Britain gave the following details of Husband's photo-litho process in which tin-foil is used instead of paper in the preparation of the transfers. The method of procedure is as follows:—

##### (A) *Papyrotype Transfers (for Line Subjects).*

A zinc plate, such as is used for zincography, is damped with a dilute solution of gum arabic (say one part in sixty parts water). A sheet of smooth tin-foil of the size of the transfer required is laid on the zinc plate, and the two are pulled through a lithographic press together. The tin-foil adheres to the zinc plate, which thus enables it to be conveniently held during the process of coating with gelatine.

A solution of chromated gelatine is prepared as follows:—

|                                                                |            |
|----------------------------------------------------------------|------------|
| Gelatine, common flake .....                                   | 1 ounce.   |
| Glycerine .....                                                | 2 drachms. |
| Bichromate of potash .....                                     | 40 grains. |
| Water (measured independently of the other constituents) ..... | 8 ounces.  |

The gelatine is soaked in the water for half an hour (the water being cold); it is then dissolved by heat. When it is thoroughly dissolved, the glycerine and bichromate are added, and the whole stirred up together; in three or four minutes the bichromate is dissolved, and the mixture is ready for use.

The above quantity is sufficient to coat about eight sheets of the size of half a sheet of foolscap.

The surface of the tin-foil is then cleaned with a solution of caustic potash (strength about one part to forty parts water) to remove all grease, and the chromated gelatine solution, while still hot, is poured over it in the same way

as collodion is used to coat a glass plate in wet-plate photography. The beaker containing the solution is covered with a piece of muslin, so that the liquid may be strained while it is poured out. The zinc must be slightly warmed to prevent the solution setting too quickly. The excess of the solution is drained off, and as soon as the gelatine has set the plate is stood up to dry in a dark room. The process of drying takes about four hours at the ordinary temperature. If the room is warmed, it requires, of course, a much shorter time, but the results are inferior, as the transfer does not roll up so clean.

The tin-foil is then peeled off the zinc plate by lifting one corner of it with a knife. It may be kept in this condition about twelve days, or it may be used as soon as it is dry. It is placed in a photographic printing frame, and printed in the daylight behind a line negative in the ordinary way until the image is visible in all its details. After printing it is placed in water for three minutes, and then rolled in as usual with a rather soft lithographic ink of the following composition:—

|                               |                 |
|-------------------------------|-----------------|
| White virgin wax.....         | 1 ounce.        |
| Stearine.....                 | 1 "             |
| Common resin.....             | 1 "             |
| Palm oil.....                 | $\frac{1}{2}$ " |
| Chalk litho printing ink..... | 4 ounces.       |

The transfer is immersed for three minutes in a solution of bichromate of potash (strength five grains to one ounce of water) and dried in a dark room. It is then exposed to daylight for a period of three minutes or upwards, according to the strength of the light, so as to harden the gelatine all over. This action should not, however, be carried too far.

Before transferring, the transfer is damped for about three minutes in a 'damping book' (using water only), and it is then pulled through the press on a prepared stone or zinc plate. The after processes are the same as when a transfer on paper has been used.

With care, each sheet of tin-foil can be used a dozen or more times.

Various examples are shown of subjects which have been photo-lithographed or photo-zincographed under identical conditions, except that tin-foil has in some cases been used for the transfers, and in other cases paper. The stones or plates are quite untouched, and it will be seen that the results given by the metal transfers are sharper and cleaner than those obtained by paper. There is also decidedly less distortion in the former case.

In the case of these prints, the images on stone or zinc obtained from the foil transfers are absolutely the same size as the negatives. The images obtained from paper transfers are all stretched to the extent of  $\frac{1}{20}$  to  $\frac{1}{10}$  of an inch each way, *i.e.*,  $\frac{1}{20}$  to  $\frac{1}{10}$  of an inch in a length of four to eight inches.

The prints could, of course, be greatly improved by cleaning up and working on the stone or zinc, but it has been thought better to show the results obtained without any retouching or cleaning whatever.

The cost of the work is practically the same in both methods of transfer.

The *advantages* of the new method of preparing the transfers (as compared with paper transfers) are:—

(1) The image on stone or zinc is not distorted. The print, therefore, only has the distortion due to the stretching of the print itself in the press, and this can be eliminated by using a sufficiently stout paper and pulling the print dry.

(2) The work is finer.

(3) The work is cleaner, as specks, &c., can be more easily removed from the transfer.

(4) The transfer does not buckle in the printing frame even when it takes a long time to print and the weather is damp.

(5) Less solution is required to be made for coating a transfer of any given size.

(6) The transfer dries in about half the time.

There is the slight *disadvantage* that, in the case of zinc work, it is rather difficult to get broad lines to transfer solid; they are apt to require re-touching.

It is thought that with more experience this difficulty will be overcome, especially if a softer ink is used in rolling up the transfer.

(B) *Papyrotint Transfers (for Half-tone Subjects).*

The tinfoil is laid on a zinc plate and prepared as if for a line subject; it is coated with a solution made up of:—

|                                                      |            |
|------------------------------------------------------|------------|
| Gelatine, common flake .....                         | 2 ounces.  |
| Bichromate of potash .....                           | 40 grains. |
| Common salt .....                                    | 70 "       |
| Calcium chloride .....                               | 70 "       |
| Ferridcyanide of potassium .....                     | 30 "       |
| Chrome alum .....                                    | 8 "        |
| Water (measured independently of other constituents) | 8 ounces.  |

The gelatine is dissolved in the water as in the previous case, and the other ingredients are then added; the foil is dried at a temperature of 70° to 80° Fahr.

The coated tinfoil keeps in good condition for about twelve days.

The transfer is printed under a half-tone negative, rolled in as for a line subject, and then dried. It is not necessary to immerse in a second bichromate bath.

The transfer is damped in a 'damping book,' using dilute nitric acid (one part to sixty or eighty parts water); this tends to prevent the work becoming blurred through spreading.

The transfer is then pulled through the press on a prepared zinc plate or stone, and the after processes are carried out as usual.

The cost is practically the same in both cases.

The *advantages* of the use of tinfoil as compared with paper are:—

- (1) The image on stone or zinc is not distorted.
- (2) The transfer can be cleaned more easily.
- (3) The transfer does not buckle in printing.
- (4) Less gelatine solution is required.
- (5) The transfer dries in about half the time.

There is one very slight *disadvantage*, viz., that, if there are any inequalities in the roller used for rolling in the transfer, the marks produced by them show up more than in the case of paper transfers.

Tinfoil transfers give more contrast in the prints, and this is an advantage as compared with the papyrotint process previously used at the School of Military Engineering, which very often produces too flat a print.

(C) *Retransfers.*

Tinfoil may also with advantage be used for retransfer work, by coating it with the composition ordinarily used for retransfer paper.

The distortion, which with paper is unavoidable, can in this way be prevented, and this might be a matter of considerable importance.

The results are somewhat better than those obtained with ordinary composition paper; but the foil, when coated with composition, has the disadvantage, that it is not quite so easy to store without risk of damage.

(D) *Obtaining Several Retransfers of One Subject.*

If a reversed negative is used, and a tinfoil transfer is prepared as described above, and, if this transfer is inked in as usual with transfer ink, a

print can be taken from it on transfer paper as in the process of collotype printing. The paper print becomes, of course, a retransfer, and can be transferred to stone or zinc.

From the same original tinfoil transfer a number of paper retransfers can similarly be obtained. If these are all transferred to stone or zinc, the various stones or plates can, of course, be printed from at the same time.

For line subjects this method has no advantage as regards the final result over the ordinary method of transferring the tinfoil transfer to a stone or plate? but for half-tone subjects it seems to give much sharper and better results than the ordinary method. Also, in any case the retransfer method takes much less time, as the foil can be printed from while still wet, otherwise it has to be dried.

The experiments are not sufficiently advanced to speak positively as to the retransfer method, because up to the present time there has been a difficulty as regards getting a suitable transfer paper. It is believed, however, that this difficulty has now been surmounted.

#### (E) *Process Work.*

One other use of the tinfoil transfer suggested by Mr. Husband is, as a means of preparing a half-tone process block. If the method is a practical one, it certainly might be of very great importance. I am not able to form an opinion as to whether it could be worked, and we have no facilities at the School of Military Engineering for testing the method. In any case, as process work does not appear to be of any use from a purely military point of view, we should not be able to expend time or money on such experiments.

If a sheet of tinfoil is coated with a gelatine solution as described above for the half-tone process, a much thicker layer of solution being left on it than is required for lithographic work, the transfer obtained from such a sheet will have a much coarser grain. If such a transfer were transferred to zinc, and the metal etched with an acid, it seems possible that a half-tone process block could be obtained. Assuming that this would give satisfactory results, the method appears to be decidedly simpler than those ordinarily used.

A coarse-grained transfer when printed from zinc gives a print such as that now passed round for your inspection. Those who have a practical acquaintance with process work will be able to judge whether Mr. Husband is right in suggesting that such transfers could be utilised in this way.

#### *Kind of Foil to be Used.*

The most suitable kind of foil yet found for this work is the "4 B foil," supplied by Messrs. Betts & Co., 1, Wharf Road, City Road, N., price 10*d.* per lb. Three and one-half sheets of size 25 × 18 inches weigh 1 lb. The foil can be obtained up to 3 feet by 2 feet 6 inches in size, and no doubt still larger sheets could be got if required.

#### POSITIVES DIRECT.

MR. CHARLES W. WEATHERWAX writes:—I have discovered a simple solvent for metallic silver, which gives a very simple and practical way of making positives direct in the camera. I will not enter into a discussion on the reversal of the image, but give my method as follows:—First, expose the plate in the usual manner. Develop with—

#### No. 1.

|                                  |            |
|----------------------------------|------------|
| Sulphite of soda (crystals)..... | 3 ounces.  |
| Eikonogen.....                   | 1 ounce.   |
| Hot water.....                   | 45 ounces. |

## No. 2.

Sal soda ..... 4 ounces.

Water ..... 15 "

To develop, take of—

No. 1 ..... 3 ounces.

No. 2 ..... 1 ounce.

When the negative is almost developed, expose it to daylight, keeping it well covered with developer. In about thirty seconds you will see the change from negative to positive. Wash and fix in the usual manner, and you will have a well-defined positive.'

## 'OPTIMUS' PERFECTED PRINT AND NEGATIVE WASHER.

This tank is specially designed to automatically empty itself on the syphon principle; or to allow the water, not from the top but from the bottom of the vessel to



overflow. This *desideratum* is accomplished by the simplest possible means, for the bent pipe shown on the outside of the diagram of the tank acts as a perfect syphon when the little tap at the top of the curved pipe is closed, but when the tap is opened it acts as an air valve, and so destroys the syphon action, thus permitting the water in the tank to rise only to the height at the top of the curved pipe. A rack is provided which will accommodate negatives of varying sizes. This rack can be lifted out when prints are to be washed.

## A NEW EXPOSURE TABLE.

MESSRS. ELLIOTT & SONS, of Barnet, are issuing a system of exposure tables for use with their plates, of which they say:—'One of the leading features is, that we give four small illustrations of typical views, lettered respectively A, B, C, and D. A is a distant view without dark objects in foreground; B is also a view with distance, but there is heavy foliage in foreground; C is a near architectural subject; whilst D represents a moderately well-lighted interior. Portraits out of doors would require the same exposure as C, whilst portraits in ordinary rooms would require about the same exposure as D. The tables are calculated for stop *f*-32, but an additional table is given showing at a glance comparative exposure for any other sized stop. To use these tables, all that is necessary is to compare the subject to be photographed with the illustration, note the letter marked on picture that appears to correspond with view, also note time of day and year; then, referring to Table 1, under group of columns headed with corresponding time of day, follow down the column headed with letter on illustration similar to view, until the line marked with required month is reached, when the approximate exposure will be found.'

TABLE No. 1.

Showing approximate exposure for any given time of day and year for 'Barnet' ordinary plates, with stop *f*-32, in bright sunlight. To find exposure for any other size of stop, see Table 2. A, Distant view without dark objects in foreground; B, Distant view with heavy foliage or dark objects in foreground; C, Near architectural subjects, or portraits out of doors; D, Well-lighted interiors or portraits in ordinary rooms.

|       | 6 o'clock. |        |        |        | 7 o'clock. |        |        |        | 8 o'clock. |        |        |        | 9 o'clock. |        |        |        | 10 o'clock. |        |        |        | 11 o'clock. |        |        |        |       |
|-------|------------|--------|--------|--------|------------|--------|--------|--------|------------|--------|--------|--------|------------|--------|--------|--------|-------------|--------|--------|--------|-------------|--------|--------|--------|-------|
|       | Sec. A     | Sec. B | Sec. C | Min. D | Sec. A     | Sec. B | Sec. C | Min. D | Sec. A     | Sec. B | Sec. C | Min. D | Sec. A     | Sec. B | Sec. C | Min. D | Sec. A      | Sec. B | Sec. C | Min. D | Sec. A      | Sec. B | Sec. C | Min. D |       |
| Jan.  | ...        | ...    | ...    | ...    | ...        | ...    | ...    | ...    | ...        | ...    | ...    | ...    | ...        | ...    | ...    | ...    | ...         | ...    | ...    | ...    | ...         | ...    | ...    | ...    | Jan.  |
| Feb.  | ...        | ...    | ...    | ...    | ...        | ...    | ...    | ...    | ...        | ...    | ...    | ...    | ...        | ...    | ...    | ...    | ...         | ...    | ...    | ...    | ...         | ...    | ...    | ...    | Feb.  |
| Mar.  | ...        | ...    | ...    | ...    | ...        | ...    | ...    | ...    | ...        | ...    | ...    | ...    | ...        | ...    | ...    | ...    | ...         | ...    | ...    | ...    | ...         | ...    | ...    | ...    | Mar.  |
| Apr.  | 2½         | 5      | 10     | 25     | ...        | 5      | 10     | 25     | ...        | ...    | ...    | ...    | ...        | ...    | ...    | ...    | ...         | ...    | ...    | ...    | ...         | ...    | ...    | ...    | Apr.  |
| May   | 1½         | 3      | 6      | 15     | ...        | 2½     | 5      | 12     | ...        | ...    | ...    | ...    | ...        | ...    | ...    | ...    | ...         | ...    | ...    | ...    | ...         | ...    | ...    | ...    | May   |
| June  | 1          | 2      | 4      | 10     | ...        | 1½     | 3      | 7      | ...        | ...    | ...    | ...    | ...        | ...    | ...    | ...    | ...         | ...    | ...    | ...    | ...         | ...    | ...    | ...    | June  |
| July  | 1½         | 3      | 6      | 15     | ...        | 2½     | 5      | 12     | ...        | ...    | ...    | ...    | ...        | ...    | ...    | ...    | ...         | ...    | ...    | ...    | ...         | ...    | ...    | ...    | July  |
| Aug.  | 2½         | 5      | 10     | 25     | ...        | 5      | 10     | 25     | ...        | ...    | ...    | ...    | ...        | ...    | ...    | ...    | ...         | ...    | ...    | ...    | ...         | ...    | ...    | ...    | Aug.  |
| Sept. | ...        | ...    | ...    | ...    | ...        | ...    | ...    | ...    | ...        | ...    | ...    | ...    | ...        | ...    | ...    | ...    | ...         | ...    | ...    | ...    | ...         | ...    | ...    | ...    | Sept. |
| Oct.  | ...        | ...    | ...    | ...    | ...        | ...    | ...    | ...    | ...        | ...    | ...    | ...    | ...        | ...    | ...    | ...    | ...         | ...    | ...    | ...    | ...         | ...    | ...    | ...    | Oct.  |
| Nov.  | ...        | ...    | ...    | ...    | ...        | ...    | ...    | ...    | ...        | ...    | ...    | ...    | ...        | ...    | ...    | ...    | ...         | ...    | ...    | ...    | ...         | ...    | ...    | ...    | Nov.  |
| Dec.  | ...        | ...    | ...    | ...    | ...        | ...    | ...    | ...    | ...        | ...    | ...    | ...    | ...        | ...    | ...    | ...    | ...         | ...    | ...    | ...    | ...         | ...    | ...    | ...    | Dec.  |

Sun obscured, give double these exposures; dull, three times; very dull, four to six times. Figures in columns A, B, and C, denote seconds; figures in column D denote minutes.

TABLE NO. 2.

Showing comparative exposures for any size top. The exposures in preceding tables being calculated for medium-size stop *f*-32.

| F-6.            | F-8.           | F-11.          | F-22.          | F-32.          | F-44.          | F-64.         |
|-----------------|----------------|----------------|----------------|----------------|----------------|---------------|
| $\frac{1}{128}$ | $\frac{1}{64}$ | $\frac{1}{32}$ | $\frac{1}{16}$ | $\frac{1}{8}$  | $\frac{1}{4}$  | $\frac{1}{2}$ |
| $\frac{1}{64}$  | $\frac{1}{32}$ | $\frac{1}{16}$ | $\frac{1}{8}$  | $\frac{1}{4}$  | $\frac{1}{2}$  | 1             |
| $\frac{1}{32}$  | $\frac{1}{16}$ | $\frac{1}{8}$  | $\frac{1}{4}$  | $\frac{1}{2}$  | 1              | 2             |
| $\frac{1}{16}$  | $\frac{1}{10}$ | $\frac{1}{6}$  | $\frac{1}{3}$  | $\frac{3}{4}$  | $1\frac{1}{2}$ | 3             |
| $\frac{1}{10}$  | $\frac{1}{8}$  | $\frac{1}{4}$  | $\frac{1}{2}$  | 1              | 2              | 4             |
| $\frac{1}{8}$   | $\frac{1}{6}$  | $\frac{1}{3}$  | $\frac{3}{4}$  | $1\frac{1}{4}$ | $2\frac{1}{2}$ | 5             |
| $\frac{1}{6}$   | $\frac{1}{5}$  | $\frac{3}{4}$  | $\frac{3}{4}$  | $1\frac{1}{2}$ | 3              | 6             |
| $\frac{1}{5}$   | $\frac{1}{4}$  | $\frac{1}{2}$  | $\frac{1}{2}$  | $1\frac{3}{4}$ | $3\frac{1}{2}$ | 7             |
| $\frac{1}{4}$   | $\frac{1}{4}$  | $\frac{1}{2}$  | 1              | 2              | 4              | 8             |
| $\frac{1}{4}$   | $\frac{1}{4}$  | $\frac{1}{2}$  | $1\frac{1}{8}$ | $2\frac{1}{4}$ | $4\frac{1}{2}$ | 9             |
| $\frac{1}{3}$   | $\frac{1}{3}$  | $\frac{5}{8}$  | $1\frac{1}{4}$ | $2\frac{1}{2}$ | 5              | 10            |
| $\frac{1}{3}$   | $\frac{1}{3}$  | $\frac{3}{4}$  | $1\frac{1}{2}$ | $2\frac{3}{4}$ | $5\frac{1}{2}$ | 11            |
| $\frac{1}{3}$   | $\frac{3}{8}$  | $\frac{3}{4}$  | $1\frac{1}{2}$ | 3              | 6              | 12            |
| $\frac{1}{4}$   | $\frac{1}{2}$  | $\frac{7}{8}$  | $1\frac{3}{4}$ | $3\frac{1}{2}$ | 7              | 14            |
| $\frac{1}{4}$   | $\frac{1}{2}$  | 1              | 2              | 4              | 8              | 16            |
| $\frac{1}{3}$   | $\frac{1}{2}$  | $1\frac{1}{8}$ | $2\frac{1}{4}$ | $4\frac{1}{2}$ | 9              | 18            |
| $\frac{1}{3}$   | $\frac{5}{8}$  | $1\frac{1}{4}$ | $2\frac{1}{2}$ | 5              | 10             | 20            |
| $\frac{2}{8}$   | $\frac{3}{4}$  | $1\frac{1}{2}$ | 3              | 6              | 12             | 24            |
| $\frac{1}{2}$   | $\frac{7}{8}$  | $1\frac{3}{4}$ | $3\frac{1}{2}$ | 7              | 14             | 28            |
| $\frac{1}{2}$   | 1              | 2              | 4              | 8              | 16             | 32            |
| $\frac{1}{2}$   | $1\frac{1}{8}$ | $2\frac{1}{4}$ | $4\frac{1}{2}$ | 9              | 18             | 36            |
| $\frac{5}{8}$   | $1\frac{1}{4}$ | $2\frac{1}{2}$ | 5              | 10             | 20             | 40            |

*Directions.*—Compare subject to be photographed with illustrations, note time of day and month, refer to Table 1 under group of columns headed with corresponding time of day, follow down the column headed with the letter on illustration similar to view, until the line marked with required month is reached, when the approximate exposure will be found.

#### REMOVING YELLOW, GREEN, RED, OR DICHROIC FOG.

Dr. Menié<sup>r</sup>e, of Paris, advises the following treatment :—Soak the negative in ordinary water for five minutes and then immerse in—

|                         |            |
|-------------------------|------------|
| Water .....             | 100 parts. |
| Bromide of sodium ..... | 3 „        |
| Bromine water.....      | 3 „        |

Leave in for ten to fifteen minutes. The bleached image is well washed and dried, and the image redeveloped with an amidol-sulphite developer.

### A COMBINED TONING AND FIXING BATH WITHOUT SULPHOCYANIDE.

HERR VALENTA recommends the following :—

|                        |             |
|------------------------|-------------|
| Distilled water.....   | 1000 parts. |
| Lead nitrate.....      | 10 "        |
| Soda hyposulphite..... | 200 "       |

For use, add fifty parts of a one per cent. solution of gold chloride. The bath is said to answer with most commercial chloride papers. It does not work at its best at the first, and it is therefore recommended to tone one or two prints by way of trial.

### WYNNE'S EXPOSURE METER.

An exposure meter, differing from those already known, is brought under our notice by Mr. G. F. Wynne, of Wrexham, who has organized a 'company' in order to its being brought efficiently before the world, and who, claiming the infallibility of its indications, has adopted this qualifying term as the name of the meter.

| NO. OF STOPS                          | SPEEDS OF PLATES                          | SECONDS                                   |
|---------------------------------------|-------------------------------------------|-------------------------------------------|
| f/256                                 | 0.25                                      | 0.25                                      |
| f/128                                 | 0.50                                      | 0.50                                      |
| f/64                                  | 1.00                                      | 1.00                                      |
| f/32                                  | 2.00                                      | 2.00                                      |
| f/16                                  | 4.00                                      | 4.00                                      |
| f/8                                   | 8.00                                      | 8.00                                      |
| f/4                                   | 16.00                                     | 16.00                                     |
| f/2                                   | 32.00                                     | 32.00                                     |
| f/1                                   | 64.00                                     | 64.00                                     |
| f/1/2                                 | 128.00                                    | 128.00                                    |
| f/1/4                                 | 256.00                                    | 256.00                                    |
| f/1/8                                 | 512.00                                    | 512.00                                    |
| f/1/16                                | 1024.00                                   | 1024.00                                   |
| f/1/32                                | 2048.00                                   | 2048.00                                   |
| f/1/64                                | 4096.00                                   | 4096.00                                   |
| f/1/128                               | 8192.00                                   | 8192.00                                   |
| f/1/256                               | 16384.00                                  | 16384.00                                  |
| f/1/512                               | 32768.00                                  | 32768.00                                  |
| f/1/1024                              | 65536.00                                  | 65536.00                                  |
| f/1/2048                              | 131072.00                                 | 131072.00                                 |
| f/1/4096                              | 262144.00                                 | 262144.00                                 |
| f/1/8192                              | 524288.00                                 | 524288.00                                 |
| f/1/16384                             | 1048576.00                                | 1048576.00                                |
| f/1/32768                             | 2097152.00                                | 2097152.00                                |
| f/1/65536                             | 4194304.00                                | 4194304.00                                |
| f/1/131072                            | 8388608.00                                | 8388608.00                                |
| f/1/267744                            | 16777216.00                               | 16777216.00                               |
| f/1/535488                            | 33554432.00                               | 33554432.00                               |
| f/1/1070976                           | 67108864.00                               | 67108864.00                               |
| f/1/2141952                           | 134217728.00                              | 134217728.00                              |
| f/1/4283904                           | 268435456.00                              | 268435456.00                              |
| f/1/8567808                           | 536870912.00                              | 536870912.00                              |
| f/1/17135616                          | 1073741824.00                             | 1073741824.00                             |
| f/1/34271232                          | 2147483648.00                             | 2147483648.00                             |
| f/1/68542464                          | 4294967296.00                             | 4294967296.00                             |
| f/1/137084928                         | 8589934592.00                             | 8589934592.00                             |
| f/1/274169856                         | 17179869184.00                            | 17179869184.00                            |
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| f/1/868878956322908401339460214907712 | 54445178707350154154139936989083804288.00 | 54445178707350154154139936                |



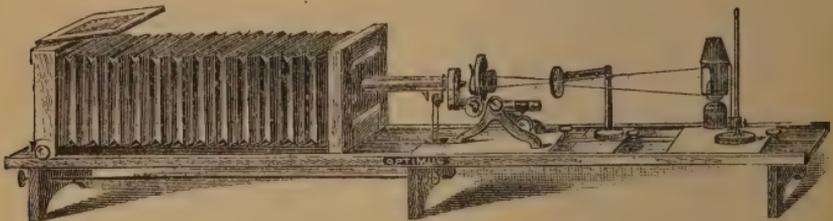
From these figures it will be seen that after five minutes' washing 97·2 per cent. of the sulphur originally present has been removed after ten minutes 98 per cent., and that, however long-continued the washing, no more of the sulphur can be eliminated. Turning to the silver, we find that as the paper comes from the fixing bath it has lost 88·3 per cent. of its silver; after washing for five minutes, 93·1 per cent.; and, after ten minutes, 95·3 per cent. After ten minutes' washing the amounts of silver and sulphur remain constant.

It is evident from these figures that the permanency of a print does not depend so much on the washing it receives as on its thorough fixing; and we are strongly of opinion that the best way of removing all the silver is not by using two baths of hypo in succession, but by washing for about five minutes after the first bath, and then soaking in a second fresh bath of hypo.

In what form the silver occurs in the paper, whether as the insoluble  $\text{AgNaS}_2\text{O}_3$ , or the soluble  $\text{Ag}_2\text{Na}_4\text{S}_2\text{O}_3$ , held in a sort of 'loose combination' with the films of the paper, we are unable to state. However, the fact remains that, after a more thorough washing and fixing than prints generally get, 246 of a grain of silver remains in each  $22 \times 17$  in. sheet of paper; and this, which is probably in the form of hyposulphite in the presence of light and organic matter, is reduced to silver sulphide, and will easily account for the yellowing of the whites of prints after a time.

#### AN IMPROVED MICRO-CAMERA.

Now that the microscope is becoming such an adjunct to the camera, we hail with pleasure every appliance that is calculated to develop this union. Hence we have pleasure in giving a brief description of a micro-camera which appears to us to combine several advantages. We have called it an 'Improved' micro-camera. So it is, in respect both of its simplicity of design and construction. The manufacturers are Messrs. Perken, Son, & Rayment, and we incline to the opinion that, of their various productions which warrant them in adopting the trade term 'Optimus,' this will not be found to be the least worthy.



The one we examined is constructed for micro enlargements on plates  $3\frac{1}{2} \times 3\frac{1}{2}$ , which, it will be observed, is the English standard for lantern plates, for which adaptation it is intended, in order to exhibit the subjects by projection on a screen. This at once imparts an idea as to the dimensions of the camera proper, which is erected on a baseboard fifty inches in length. The bellows-body is twenty-four inches long, and is attached by one end to a strong wooden front erected a little over two feet from the rear end of the camera, and pierced in the centre with a hole of such dimensions as to permit of the insertion of the eyepiece end of the microscope. But the microscope itself is erected upon a movable baseboard outside the wooden front mentioned, that

is to say, it is adjustable as regards its motion to and from the camera, and when the microscope has once been adjusted to the proper height, it is in accurate centre for ever after. On a second and similar sliding sub-baseboard, made, like the former, to slide axially, is erected any of the various microscopic sub-stage appliances common to the microscope, such as the condenser, which, after being fitted, is, like the optical system, ever afterwards in centre, requiring no further attention than the sliding backwards or forwards. A third sliding platform, similar to the two just spoken of, is intended for the lamp.

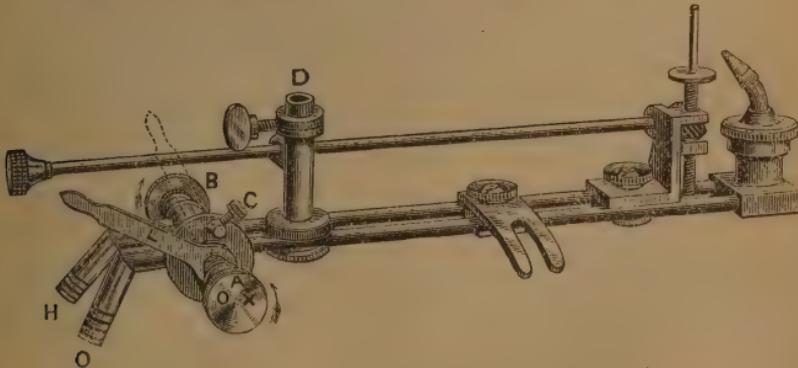
A rack extends the whole length of the principal baseboard, and each of the movable platforms mentioned is operated by a pinion ready of access to the photographer, who thus can control the various movements necessary.

The rough adjustment for degree of enlargement is made by sliding in or out the bellows body, which is under control of one of this firm's patent pinions, capable of being thrown out of gear with the rack for rapid adjustment, and of being geared again when it becomes necessary to focus. This we consider a very handy arrangement, as it saves the long and tedious racking out when extending the bellows to any considerable extent. The fine adjustment of the microscope is done by means of a band and pulley at the rear end.

The various sliding pieces work smoothly within brass guides at either side of the baseboard. It is made of mahogany, and is finely finished. Although the one we examined is made of dimensions suitable for lantern slides, there is no limit to the size to which it can be made. A great charm lies in the readiness with which work can be resumed at a moment's notice after the instrument has been packed away on the shelf.

#### BEARD'S NEW CUT-OFF JET.

IN Beard's new cut-off jet the connexions for supply are as usual H and O, and the regulating screw-down valves A for oxygen and B for hydrogen. The index arrows show their method of adjusting. The lever L is attached to the cut-off plug, and the dotted line shows the position when gases are cut off, it



being stopped by coming in contact with the by pass adjusting screw C. The jet-holder D is a solid, having the pear-shaped hole for securing rigidly to the pin of ordinary lantern trays. The mixing chamber and nipple are constructed with the greatest care to obtain the best possible light combined with quietness and economy.

## REVERSED NEGATIVES BY DIRECT CONTACT PRINTING.

Mr. W. BISHOP, who also writes on the subject elsewhere, thus describes the process:—Having occasion to deal with some cases in which reversed negatives were needed, I have been much impressed by the advantage that would be gained could such be produced from original negatives by one process instead of by two or three, and some experiences which had occurred to me in connexion with the reversing action of light (now so fully recognised) led me to think that assistance might be found in that direction. I remembered that a good many years ago I carefully prepared a batch of emulsion for lantern plates, which was supposed to be very slow, but with which I could only print negatives. I wondered at the time what was wrong, and in my inexperience I threw the emulsion away, but since then I have learned to put the trouble down to the then practically unrecognised action of light reversal. Remembering this, and calling to mind what has been more recently written on the subject, I took up a series of experiments which have led me to a successful result.

I find that the process of making a negative from a negative by direct contact printing is as simple as printing an ordinary transparency or making a bromide print, the only difference being that the print is made on an ordinary bromide negative plate, and that the exposure is extended so as to secure the reversal of the image without overdoing the operation. Working with Ilford ordinary plates the exposure required with a good crisp negative I find to be about five seconds in strong daylight, not direct sunshine, the exposure being increased if the light be poor, even up to thirty seconds at about sunset. It is here, of course, that judgment becomes necessary, both as to the quality of the negative to be reproduced and the actinic power of the light employed, but only in the same degree as in bromide paper printing.

My earlier experiments were with the ordinary hydroquinone developer, and were successful, though development was slow. I prefer for this purpose to use pyro and ammonia, or best of all the new metol-Hauff, which, with a little bromide, works like a charm, the reversed negative coming up with all the crispness and force of an original. In the case of over-exposure, the image sometimes appears first as a ghost of a positive which sinks in and dies away as the negative comes up, but in such cases the result will not be satisfactory. If the exposure has been about correct, the negative will develop out in just the ordinary way, except that, the light having penetrated the film so deeply, care must be taken in judging density by looking through the film.

I find that I can depend definitely upon obtaining good reversed negatives every time by being careful, and I very cordially invite all who may be interested in such matters to take up the process, which theoretically should be a perfect one, and with the experience to be gained by more extended trial may, I believe, be made perfect in practice.

## PHOTOGRAPHIC PROPERTIES OF THE SALTS OF CERIUM.

MESSRS. A. & L. Lumière have been experimenting with the salts of cerium for producing photographic images, and in a note presented to the Académie des Sciences, they observe: It is well known that cerium yields two principal series of salts, the cerous and the ceric. The first are very stable, whilst the ceric compounds are reduced by feeble reducing agents; some intermediate compounds, and more especially organic salts, are even spontaneously reduced so soon as they are formed, so that so far it has been found impossible to isolate them. The easy reducibility of the ceric salts has led us to a study of the action of light upon them, and we have remarked that this action, followed by readiness of reduction, appears to us to form a basis for perfecting an interesting photographic process.

Among the mineral salts which have given us the best results we may mention ceric nitrate and sulphate, formed by dissolving ceric hydrate in nitric and sulphuric acids. Aqueous solutions of these salts were used to impregnate paper sized in the ordinary way or treated with gelatine, the ceric salt colouring it a deep yellow. After being dried in the dark, the paper was exposed to sunlight under a positive. In the transparent parts of the *cliché* the luminous rays reduced the ceric salt to the cerous state, and the paper is decolourised on those parts. This decolourisation enables one to watch the action of light, and to stop printing when necessary. The print should be treated with a suitable reagent that will differentiate the cerous salt from the unaltered ceric salt, and will thus fix the image. The process, it will be observed, is one for making positives from positives.

In an analogous process with manganic salts that we have already published, say MM. Lumière, we have utilised the oxidisable properties of the manganic salts to form with a great many bodies of the aromatic series insoluble colouring matters. In the same manner, if we treat cerium prints with these reagents, there is formed by oxidation, and fixed, coloured substances in those parts where the ceric salt has not been reduced by light. All that is then necessary is to eliminate by washing the excess of the reagent as well as the cerous salt to obtain definitely fixed prints.

It is important that the colouring matter should be insoluble, in order that it should not be removed in the washing.

We have discovered, in the course of our investigation of their photographic uses, and in making a comparative study of the action of the ferric, cobaltic, manganic and ceric salts on a great number of bodies of the aromatic series, that the last-named are capable of setting up colour reactions much more numerous than the others. Among the more characteristic of these reactions, the following may be mentioned:—

In acid solution, the prints are coloured grey with phenol, green with salts of aniline, blue with naphthylamine, brown with amidobenzoic acid, red with parasulphanalic acid, &c. Treated with ammonia, the colouration changes, becoming, for example, violet with aniline, red with naphthylamine, &c.

#### MM. LUMIÈRES' EXPERIMENTS IN 'COLOUR PHOTOGRAPHY.'

THE following particulars of the sensitive emulsion employed, which were supplied by MM. Lumière in a paper contributed to the Société Française de Photographie, may be of interest. The novelty, or point of departure, in the preparation of the emulsion consists of mixing gelatinous solutions of silver nitrate and potassium bromide, as recommended by Herr Valenta, of Vienna.

The emulsion was constituted as follows:—

|                        |            |
|------------------------|------------|
| A.                     |            |
| Distilled water .....  | 400 parts. |
| Gelatine.....          | 20 „       |
| B.                     |            |
| Distilled water .....  | 25 parts.  |
| Potassium bromide..... | 2.3 „      |
| C.                     |            |
| Distilled water.....   | 25 parts.  |
| Silver nitrate .....   | 3 „        |

One half of A is added to C, and the other half to B, the silver solution then being added to the bromide.

The emulsion is then treated with a solution of a colour sensitiser, such as cyanine, methyl violet, or erythrosine, the plate being coated with the emulsion

at a temperature of 40° C. When the plates are set, they are passed through a bath of alcohol, and are washed in water for a brief period, the films being very thin.

This method, according to Herr Valenta, obviates coarseness of grain, and gives a film of great transparency. A too great excess of bromide is to be avoided.

When the plates are dried, they are treated for two minutes with the following solution:—

|                      |            |
|----------------------|------------|
| Distilled water..... | 200 parts, |
| Silver nitrate ..... | 1 part,    |
| Acetic acid .....    | 1 ,,       |

which augments the brilliancy of the image and increases the sensitiveness of the plate, which, however, loses keeping properties. The plate is again dried, and exposed according to the method given by Professor Lippmann.

The developer employed by MM. Lumière is as follows:—

|                       |            |
|-----------------------|------------|
| 1.                    |            |
| Water .....           | 200 parts. |
| Acid pyrogallic ..... | 1 part.    |

|                        |            |
|------------------------|------------|
| 2.                     |            |
| Water.....             | 100 parts. |
| Potassium bromide..... | 10 ,,      |

|               |                  |
|---------------|------------------|
| 3.            |                  |
| Ammonia ..... | D=0960 at 18° C. |

The developer being thus mixed:—

|            |           |
|------------|-----------|
| 1 .....    | 10 parts. |
| 2 .....    | 15 ,,     |
| 3 .....    | 5 ,,      |
| Water..... | 70 ,,     |

The importance of a standard solution of ammonia is clear, as the least variation in strength affects the results. After development the plate is washed and fixed in a solution of cyanide of potassium, five to a hundred. MM. Lumière say that a developer consisting of an ammoniacal solution of copper chloride has given them good results, but they have had to abandon it on account of its instability.

MM. Lumière add that in photographing coloured objects the ultra-violet rays were cut off, and the violet and blue diminished by placing in the path of the luminous rays, in the camera, a vessel with parallel faces, containing a solution of yellow colouring matter, such as Victoria yellow, uranine, or primuline. This was how they obtained the results that have been referred to.

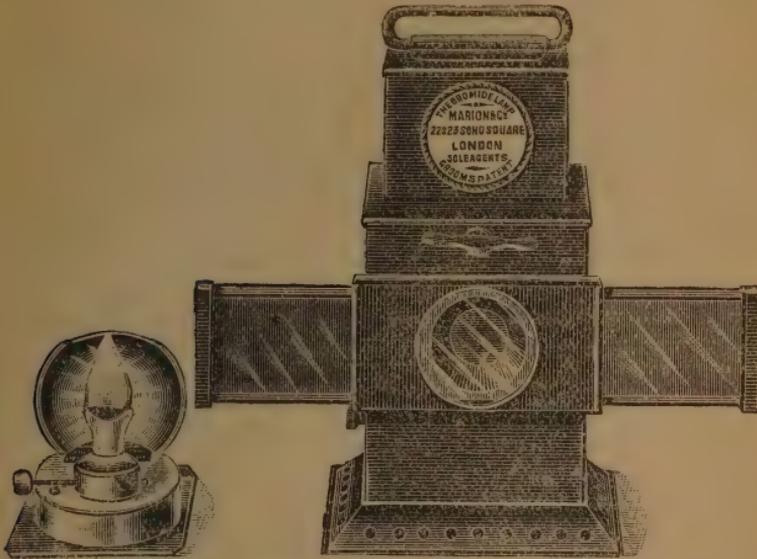
#### TO KEEP IRON AND STEEL FROM RUSTING.

THE number of articles in photographic use constructed from iron and steel, from rolling presses and head rests downwards, will render serviceable a couple of recipes, adapted for the purpose in other directions, which we append. One of the simplest, and which has been in use for many years, consists in coating the article with a solution of indiarubber in benzol made of about the consistency of cream. It may be applied with a brush, is easily rubbed off when needed, and effectually prevents rust. A coating of more use where the 'tooth' imparted by rubber would be disadvantageous, is prepared in the following way: Dissolve two parts of crystals of chloride of iron, two of antimony chloride, and one of tannin in four of water. Apply with a sponge or rag and allow to dry. A second or third coating, or more, is given in the same way

that a dark colour is produced. When dry, it is washed with water, again allowed to dry, and polished with linseed oil. The antimony solution should be as nearly neutral as possible.

#### THE BROMIDE LAMP.

This lamp, which is constructed by Messrs. Marion & Co. under Groom's patent, is primarily intended for contact bromide printing, for which it seems admirably adapted, but it can make a useful lamp for all-round purposes. The lamp proper, which is shown in the cut isolated from its framework, has its wick operated on by a pinion, and its flame is backed by a well-designed



reflector. When inserted in its casing, no light is emitted save through the aperture in front, and this is governed by slides fitted respectively with either colourless glass or ruby and yellow, the last two of which can be combined if desired. The lamp is so constructed as to consume kerosine without the necessity for employing a chimney. Total darkness is obtained by a shut-off actuated by a lever in front. The burner is regulated from the outside.

#### RAPID DRYING OF GELATINE NEGATIVES.

THE BRITISH JOURNAL OF PHOTOGRAPHY says: This operation is much abbreviated by the removal of surface water by mechanical means. The back may be dried at once by the application of a soft towel, after which it is laid down on a padded board and a piece of cambric spread over its surface, with a pad of blotting-paper supervening. Gentle pressure is then applied, either by a roller or by the hand. This operation, if properly done, leaves the negative surface dry. On no account ought the blotting-paper to be placed directly in contact with the surface of the negative, as numerous little fluffy hairs will become adherent, and their perfect removal is not always readily effected.

It may be thought that the texture of the cambric will be indented by the pressure into the soft surface of the gelatine. So it will, but after complete

drying it totally disappears. We have intentionally selected cambric with a pronounced pattern in it, and have applied a needlessly strong degree of pressure, one by which the pattern was rendered plainly visible on the gelatine; but it invariably became invisible upon drying.

Having removed all surface moisture by the method indicated, complete desiccation is attained with a surprising degree of rapidity by the adoption of either of the following means:—That by immersion in a dish of alcohol is so well known as only to require mentioning. The alcohol has such an affinity for water that the very small quantity remaining absorbed in the film is quickly abstracted, and, in consequence, the drying may be effected by heat if necessary, or by the rapid evaporation of the alcohol.

What we consider a more economical, if not, on the whole, a more preferable, method of drying is by a centrifugal machine, which we have had constructed for experimental purposes. Four arms, or more if desired, emerge from a pivoted spindle mounted vertically, and capable of being rotated with great velocity by means of a long horizontal rod geared with the spindle at the inner end, and terminating at the outer end by a winch handle. On these projecting arms are mounted frames or sheaths, into which the plates to be dried are dropped. The rotation of the handle causes the arms to revolve rapidly, and the impact of the air carries off all moisture. We have found that it is better to set the plates at a slight obliquity rather than in directly facing the line of the circle of rotation. We believe that, if some of our enterprising dealers would have this apparatus made and supply the public with it, there are few professional photographers who would care to be without it. Instead of the toothed wheel and pinion, a simple pulley and band may be employed with equal effect for causing the rotation.

An analogous means for effecting the rapid drying of a negative from which the surplus water has been removed is to submit the surface to a jet of air directed by a rubber pipe connected with a foot bellows. In such trials as we have made with this system, we found that the best means of applying the air current, as might have been anticipated, is to direct the jet at an acute angle to the plate when lying flat upon a table.

#### ANTIDOTE FOR CYANIDE OF POTASSIUM.

THE records of suicides in recent years show that cyanide is still the fashionable poison among photographers. Dr. Kossa says that permanganate of potash transforms the cyanide into cyanate, which is said to be inoffensive.

#### AMMONIUM HYPOSULPHITE.

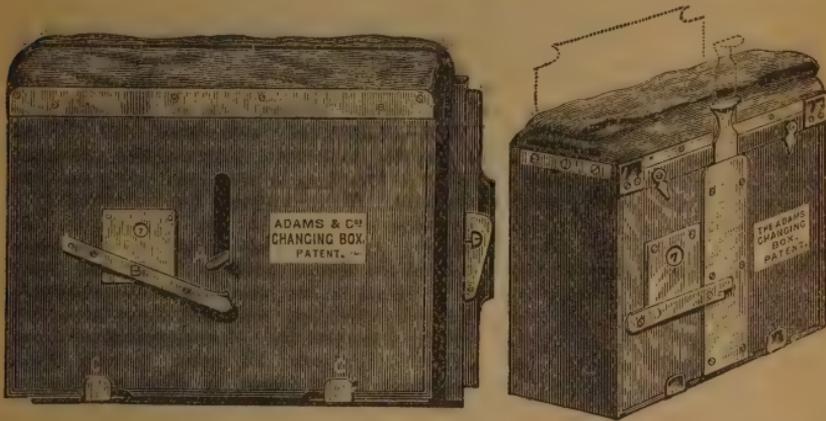
M. CH. HERMITTE writes in the *Revue de Photographie* that the ammoniacal odour given off by ammonium hyposulphite with which several Continental photographers have been experimenting as a substitute for sodium hyposulphite, may be obviated by the addition to the solution of a small quantity of chlorate of potash. This, however, does not apply to all samples of the new hypo that are prepared, considerable variations in its quality being experienced. M. Hermitte recommends the following bath:—

|                            |              |
|----------------------------|--------------|
| Water.....                 | 1 litre.     |
| Ammonium hyposulphite..... | 150 grammes. |
| Chlorate of potash.....    | 10 „         |

Negatives fixed in this bath are said to be beautifully clear, and in the quantity of solution mentioned fifty to sixty half-plates may be fixed. M. Hermitte finds an hour's washing in running water sufficient, but recommends for greater safety a longer immersion.

### THE ADAMS CHANGING BOX.

WHEN we say that we have, without previous experience in its use, effected the transformation from front to back of the twenty-four film sheaths enclosed in this new Changing Box of Messrs. Adams & Co., it will be seen that there is no difficulty in using it. It forms a neat package, and contains either twelve glass plates or twenty-four films. By drawing up a slide at the back, the first of the series, which we will imagine has been exposed, is pulled up partially into a flexible bag above, and when grasped by finger and thumb, and drawn up until it is entirely free of the box, it is pushed down again through a suitable recess behind all the others. And thus it goes on till the last one is exposed, when an automatic check catch comes in action, entirely preventing a second exposure of the already exposed plates.



The above cuts show the box as made in two forms, the one for large and the other for smaller plates. Every plate exposed is registered automatically, and plates of varying rapidities may be placed in the box and exposed out of turn if desired. The sensitive surface of the plates or films comes into contact with the register of the box, hence the thickness of these is of no consequence. The bag is made of very soft pliable leather, and is absolutely light-tight. Its construction is such as to afford ample room for transferring the plate from front to back without difficulty, and, taken all in all, the Adams Changing Box is singularly well adapted for its intended purpose.

### THE KEEPING PROPERTIES OF GELATINO-CHLORIDE POSITIVE PAPER.

THIS question is discussed in a leading article in THE BRITISH JOURNAL OF PHOTOGRAPHY, which says :—Gelatino-chloride has not yet been sufficiently long before the public to warrant much to be brought to bear upon its keeping properties, but from our own observation, extending to a period considerably over a year, it keeps quite as well as the best ready-sensitised albumen paper, and much better than most of what is procurable. A sample sheet that has been sent to us from the Antipodes, as having gone yellow, has induced us to institute inquiries as to the conditions most likely to promote such discolouration.

First of all, we have opened and examined a packet of this paper which

was placed in a flat envelope and sealed with ordinary paste, at the time mentioned. This packet has, since its receipt, been kept in a dry room free, in an average way, from gaseous or other deleterious emanations. When examined, every one of the cut sheets which it contained was found to be without spot or blemish, not the slightest discolouration being apparent. From this it is, we think, a fair inference that gelatino-chloride paper does not necessarily become discoloured for a considerable period when kept with reasonable precautions.

By what we must regard as a singular coincidence, a packet of ready-sensitised albumenised paper, 'warranted to keep,' was put away at the same time as the other, and with the same precautions as regards preservation. We also opened it, only to find that its contents, six  $5 \times 4$  sheets, had become hopelessly bad, having passed considerably beyond 'the colour of cheese' stage, and hence quite useless.

Exposing gelatino-chloride paper to a damp atmosphere will, we should think, speedily ensure its discolouring, and this with the more certainty if continued for any length of time in a hot climate, or in such hot weather as prevailed last summer. This has long been known in connexion with albumenised and other paper, and led to the introduction of Marion's preservative case three decades since. This consisted of a cylindrical case with an air-tight cover in which was a small chamber containing dried calcium chloride which absorbed the last traces of moisture left in the case, and thus ensured the dryness of the paper contained therein. We are aware of the discolouration from damp of at least one sheet of gelatine paper which was received in that state on being opened in New Zealand; but, as other sheets in the same packing-case were good, we conclude that the initial seeds of decay had been sown on the shelves of the merchant by whom it had been packed and shipped.

It may not be generally known that the oft-times offensive effluvia given off by albumenised paper conduces to the deterioration of both gelatine paper and plates. Some dealers, from motives of economy of space, or even from orderliness, keep printing papers of various kinds stored in close cupboards, gelatine paper being in immediate contact with albumen paper of foul-smelling quality. Can it be wondered at if gelatino-chloride paper, redolent of such an atmosphere and taken out to be closely packed up for a voyage of considerable duration to the other side of the tropics, shows indications of discolouration when received by the consignees? The wonder would be if it were otherwise. We have been made aware of well-certified instances in which this has occurred. Each one can test this for himself by interposing a piece of non-sensitised albumen paper between two sheets of gelatino-chloride and keeping them pressed in a warm moist atmosphere for some time.

We might expand upon this, but enough has been said to prove that as between sensitive albumen paper and sensitive gelatine paper the latter has immensely the advantage as regards keeping when both are treated alike; and that, when reasonable precautions are taken for its protection from moisture, deleterious atmospheric influences, and injurious vapours, there is no reason why gelatino-chloride or gelatino-bromide paper should not remain quite good for a time infinitely longer than even its makers would care to assign to it.

#### ANTIQUITY OF AMIDOL OR DIAMIDOPHENOL.

ACCORDING to an article in the *Wochenblatt*, diamidophenol or amidol, both as chlorhydrate and sulphate, was originally prepared by T. Gauche in 1869 by the reduction of dinitrophenol by means of iodide of phosphorus. Since then the body has been extensively studied, Hemilian, in 1875, showing that by the reduction of the dinitrophenol the salts of diamidophenol were formed, and, not as Gauche thought, those of diamidobenzole.

## A PLATINUM TONING BATH FOR SILVER PRINTS.

The following bath is recommended by a foreign contemporary :—

|                                                            |             |
|------------------------------------------------------------|-------------|
| Water.....                                                 | 500 c.c.    |
| Sodium chloride .....                                      | 35 grammes. |
| Tartaric acid .....                                        | 8    "      |
| Sulphate of soda .....                                     | 6    "      |
| Chloroplatinite of potassium (12 per cent. solution) ..... | 8    "      |

The salts are dissolved in the order named. The bath is said to give tones much resembling those of platinum prints, and to keep well.

## HYPO IN THE METOL DEVELOPER.

HERR SCHMIDT, of Wiesbaden, finds that hypo in the metol developer acts as a retarder, instead of, as is generally the case when it is added to the developer, an accelerator. He uses it in the proportion of from 30 to 40 drops of a hypo solution 1 : 10 per each 30 c.c. of metol solution.

## SALTED GELATINE PAPER.

'VIOLETTE,' in *L'Amateur Photographe*, publishes a plea for plain salted gelatine paper (*à la* albumenised paper) which could be sensitised and used according to the requirements of the individual, and he claims that, by its use, better tones than is the case at present could be obtained, that toning would be more rapid, and that yellowness, which is more or less evident with commercial sensitive gelatine papers, would be minimised, inasmuch as the elements of deterioration would be absent.

## SULPHOCYANIDE OF AMMONIUM IN URANIUM TONING.

PROFESSOR RODOLPHO NAMIAS, in the *Revista Scientifico-artistica di Fotografia*, recommends the addition of ammonium sulphocyanide to the uranium toning bath as a solvent of the ferrocyanide of silver and potassium which, he says is formed in toning, and to facilitate the deposition of the uranium ferrocyanide upon the image. The following is the formula he employs :—

|                               |              |
|-------------------------------|--------------|
| A.                            |              |
| Potassium ferridcyanide ..... | 2-3 grammes. |
| Water .....                   | 1000 c.c.    |
| B.                            |              |
| Uranium nitrate .....         | 10 grammes.  |
| Ammonium sulphocyanide .....  | 50    "      |
| Acetic acid .....             | 10 c.c.   "  |
| Water .....                   | 1000   "     |

Equal parts of the solutions are taken for use,

## DISCOLOURED GLASS POSITIVES.

AMONGST the odd work that photographers are frequently called upon to do is to produce copies or enlargements from old glass positive portraits. If the picture happens to be in a good state of preservation, nothing is easier to copy in camera than a glass positive; but, in the majority of instances, it is not. These pictures, from being carelessly produced, and seldom or never being varnished, after a time become discoloured unevenly by a highly non-actinic



## ORTHOCHROMATISING GELATINE PLATES.

COLONEL WATERHOUSE says: For some time past I have been orthochromatising my gelatine plates by bathing them for one or two minutes with the tincture containing erythrosin silver and ammonium picrate used for the orthochromatic collodio-bromide emulsion process detailed in the February number of the *Journal of the Photographic Society of India* for last year. The formula is as follows:—

|                                 |           |
|---------------------------------|-----------|
| Erythrosin .....                | 1 part.   |
| Silver nitrate .....            | 1 "       |
| Picric acid .....               | 1 "       |
| Ammonia (s.g., '880) about..... | 30 parts. |
| Spirits of wine.....            | 500 "     |
| Water .....                     | 500 "     |

One part of the above solution being diluted with 9 parts of water to make a solution containing 1 part of dye in 10,000 of fluid. More ammonia may be added, in the proportion of 1 part to 100 parts of diluted solution. This works exceedingly well for most purposes when orthochromatic plates are required, and for landscape work with the tele-photo lens no yellow screen seems to be necessary, unless there is much blue haze in the distance. The quantity of ammonium picrate may also be increased in such cases.

## A SENSITIVE SPHEROMETER.

THE spherometer is an instrument for measuring the curvature of the surfaces of lenses, and the first constructed was the design of the late Andrew Ross, and obtained the silver medal of the Society of just over half a century ago. It is a tool of great value to the manufacturer of either photographic or any kind of lenses, and has been gradually improved upon by succeeding inventors. It is a sort of low tripod, carrying a screw in its centre, the number of turns given by this screw before it meets the surface of the glass, when placed upon a lens, giving the depth of the curves. Ross's original form could measure to the thousandth of an inch, and by estimation to half that amount. The ordinary instrument will gauge to the ten-thousandth. Mr. A. A. Common proposed to the Royal Astronomical Society to increase this sensitiveness by placing the screw on one of the arms of the tripod. He now publishes a note describing a method he has devised for still further extending this suggested improvement. The new spherometer he states is capable of measuring to the marvellous minuteness of the three-hundred-thousandth of an inch!

## SPOTS.

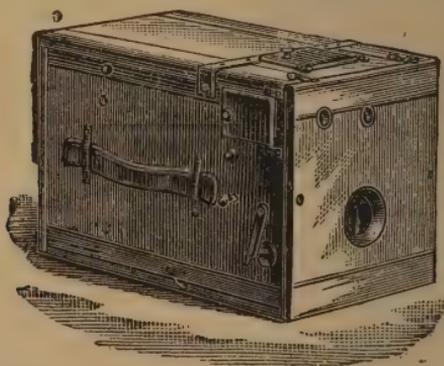
MR. E. DUNMORE says:—Spots on gelatine negatives are mostly attributable to either dust or bubbles. If we examine an unexposed plate, we may find round spots of clear glass or depressions, where the emulsion is much thinner than on other parts of the plates. These are produced by bubbles in the emulsion, which, as the emulsion sets, break, and leave clear glass, as the gelatine then becomes too thick to flow to fill up the space equally, or some part of the plate may not have been perfectly covered in coating. Such plates as these never ought to be sent out, and I have no doubt it is quite an oversight that they are not thrown to the waste instead of being packed, as no firm with any care for their reputation would put such on the market knowingly. Dust, again, is a prolific source of pinholes on exposed plates. Specks of dust adhere to the film, and protect the part they stick to from the action of the light, and the developer and fixing, of course, develops a pinhole wherever they have

been. No plates ought to be placed in the dark slides without first carefully dusting them and the slide too. Backed plates are apt to cause pinholes. Unless extra care is bestowed on them, small particles of the backing get loosened by the springs, and find their way to the surface by the shaking and vibration of travelling. It is an excellent plan to line round the edges of the rebate of the dark slide where the plates fit with strips of black velvet. It will not prevent the backing being loosened, but it will prevent it getting round to the front of the plate. It is a good plan to line with black velvet all those parts that give access to the plates where it can be done without putting undue strain on the slide, for it is a most effectual method of preventing access of dust, which will find its way through the best-fitting woodwork unprovided with such extra protection.

A pad of *cotton velvet*, such as used by hatters for polishing up silk hats, is better than a brush for removing dust from the surface of a plate before putting it in the slide. There is *no fear of scratching* the film even with considerable pressure, and it does not leave it in an electrical condition, as will the frequent passing over the surface of a camel's-hair brush, the film thereby becoming an attractive surface for stray notes. The slides and plates being free from dust they should be kept in a close-fitting waterproof case until required.

#### THE SIMPLEX FILM CAMERA.

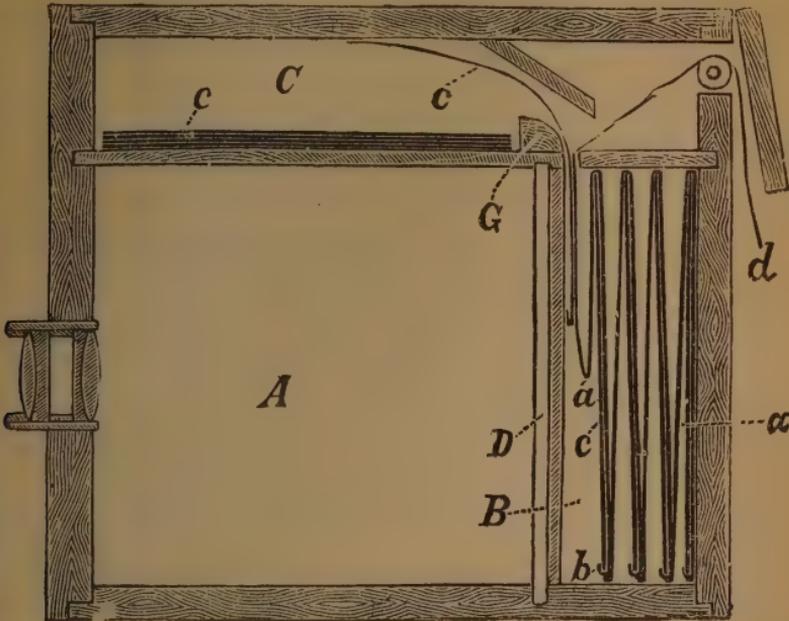
NUMEROUS are the inventions that have been introduced to solve the problem of the transference of sensitive films to the camera and their exposure with the maximum of certainty and the minimum of risk and trouble. This is claimed by Messrs. Marion & Co. to have been attained in the Simplex Film Camera, an external view of which we here give, and in which provision is made for



bringing fifty films into the field, transferring them to the focussing plane of the camera, and, after exposure, storing them in a reservoir, where they remain secure from the action of light. In what way all this is accomplished we shall endeavour to explain.

The films are cut to the size required and are flexible. A long band of opaque paper is provided, and is folded to the size of the plate. At certain intervals there are narrow slips of paper pasted on the band, underneath which one end of a film is slipped. The band is then folded zigzag fashion, a, b, c, when the second of the series of paper slips comes to the proper place for receiving another film, which is retained *in situ* by a repetition of the folding of the band; and this is repeated until the whole of the fifty films have been put up in a packet, which is then inserted in a recess at the back of camera,

Meantime, the front fold of the band has been passed over a roller, and brought out through a slot behind ready to be grasped by finger and thumb. The exposing or focal plane is a plate of optically worked glass, and by means of a spring behind the package is pressed against it. On drawing out the projecting end of the band D, the first of the series of films is brought up, hard pressed against the glass focussing plane, B. After exposure, D is pulled,



when the exposed film, C, rises, and, caught against the sloping cover, falls forward and flat down into the reserve, C, above. A continuation of the pulling at D results in the next film in the series replacing the previous one, and in due course it, too, is deposited on the antecedaneous pile, C. This goes on until the last of the fifty films have been exposed and lodged in the chamber above, when the services of a dark room or a changing bag must be had recourse to in order to effect the depletion of the chamber C and the refilling of chamber B. The other parts of the camera, its lens, shutter (time and instantaneous), focussing details, and other matters, including its two finders, its level, the means for applying tension to the shutter spring, can be easily conceived of.

TOLUOL MATT VARNISH.

TOLUOL is a product of the distillation of coal, from which it is obtained at a temperature of between 100° to 130° C. It is analogous to benzine. According to Lainer, the following formula with toluol gives a good matt varnish :—

|                |                 |
|----------------|-----------------|
| Ether .....    | 100 c.c.        |
| Sandarac ..... | 100 grammes.    |
| Toluol.....    | 350 to 400 c.c. |

The powdered sandarac is dissolved by agitation in the ether, and, after filtration, the toluol is added. The varnish is employed in the usual manner.

## FINDERS.

ON this subject, which receives little attention from either the makers or users of hand cameras, THE BRITISH JOURNAL OF PHOTOGRAPHY says:—We have heard complaints of some of the cheaper classes of hand cameras that the finders attached to them are only so in name, that they do not afford an adequate idea of the amount of subject that is actually impressed upon the sensitive plate; and, what is worse, that the centre of the one does not coincide with that of the other. Photographs have been seen by us in which all their bad qualities have been attributed to the finder.

The most pronounced of these defects has been the convergence of the perpendiculars, owing to the camera having been pointed upwards in order to get in the desired amount of subject. The finder does not always afford an opportunity of detecting this imperfect levelling of the camera. It is of minor consequence that the camera is not held level as from side to side, as the imperfection arising therefrom is remedied in trimming the print at the expense of a slight diminution of its size when cutting it square; but no trimming can rectify the effect of longitudinal mal-levelling when buildings are included in the view. In this case the operator should not trust to his finder, but rather to his own ability to hold the camera level, or, better still, to a small spirit level which may be placed alongside of the finder.

We have seen many photographs of otherwise real excellence obtained by hand cameras, their beauty being marred only by the defect spoken of, viz., convergence of their perpendiculars, and to those who uttered lamentations over this we have invariably recommended the adoption of the remedy we pointed out, with some fulness, in a chapter in our ALMANAC for 1890, which treats on the curing of distortion already existing in negatives, and which no one has ever known to fail. At the risk of repeating what many already know, but which, unfortunately, many seem *not* to know, we repeat in a few words the directions given, which are to make a transparency from the offending negative by superposition in a printing frame, and, having erected it in front of a plate of opal glass, make a copy of it by means of a camera having a swing back, and in doing so focus as sharply as possible with the largest aperture of the lens, and swing back the ground glass until the convergence of the building is seen to be neutralised, and the vertical lines rendered parallel. Now insert the smallest stop, so as to ensure top and bottom being equally sharp, and expose. The negative which results from this treatment will be rectilinear, and in every respect perfect, so far as drawing is concerned.

We have long thought that there is very much room for improvement in the lenses of finders. The great majority of these are formed of a double convex lens of short focus, with a stop or diaphragm outside. Now, if this lens is used without a stop, in order to secure the maximum of illumination on the small ground-glass pane usually left exposed to light from above and around, the image is exceedingly hazy owing to the imperfection of construction and use of the lens; while, if it be stopped so as to obtain a greater degree of sharpness, a shade of one kind or other must be erected around the screen to shield it from the light.

With a view to ascertain the best form of lenses for finders, we got a plano-convex of short focus (one of a class employed in the eyepieces of telescopes and microscopes), and tried it, convex side out, without any diaphragm. The image given was very bright in the centre, but fell off rapidly towards the margin. This, we may state, is not a *very* bad fault, for, if the centre be sharp and luminous, the object of a finder in a non-focussing hand camera has been attained. Still, and aiming at a greater degree of perfection, it was desirable that equal sharpness as that in the centre should extend to the sides; so we had the system entirely reconstructed, by adapting a powerful plano-convex front, convex side out, as before, with a double convex, having an

immense excess of negative aberration, mounted a little behind. This flattened the field, and gave an image on the finder screen which we have never seen even approached for luminousness. In optical parlance, it gives an intensity little over  $f-1$ . The whole combination may, from this description, be designated a Petzval; but the principle is carried to an extent far beyond what this philosopher aimed at, for here a visible image only is aimed at, and further, although from the large aperture there is a residuum of aberration, yet is such not appreciated, on account of the smallness of the image and the fact of its being viewed by the unaided eye, and not through a magnifier. Further, there need be no nicety aimed at in securing perfect achromatism, although, by the way, the front of ours happens to be an achromatic, because the coincidence of the visual with the actinic focus is not of the slightest consequence in this case, and even slight fringes of colour do not interfere materially in the image shown by a finder. The question of cost of construction need not, therefore, be an interfering element in the substitution of a finder possessing immeasurable advantages over that now so generally employed.

#### CLEARING NEGATIVES DEVELOPED IN IMPURE WATER.

M. E. FORESTIER, in *L'Amateur Photographe*, says that the quality of the water used in making up developing solutions is not always irreproachable, which causes the lights and half-tones of a negative to have their transparency degraded. In order to remove this veil, he recommends that the plate, after fixing and washing, should be immersed in a solution of—

|                       |             |
|-----------------------|-------------|
| Water .....           | 1000 c.c.   |
| Oxalate of iron ..... | 20 grammes. |
| Alum .....            | 80 „        |

This clears the negative, which should then be well washed.

#### THE NEW PHOTO-TELESCOPE FOR GREENWICH OBSERVATORY.

So long ago as 1885 the Treasury consented to give to the Greenwich Observatory a large telescope, for want of which the Astronomer-Royal and the astronomical staff had been somewhat crippled in their endeavours to adequately photograph the spectra of the stars.

The construction of the telescope was entrusted to Sir Howard Grubb, F.R.S., and some idea of the perfection aimed at, and happily attained, may be gleaned from the fact that three years were occupied by the Messrs. Chance in turning out perfect castings of the glasses which were to form the object-glass, which is twenty-eight inches in diameter. Precisely how many castings were made before the required perfection was attained we know not, but we understand they were numerous, as the slightest imperfection ensured rejection.

The object-glass was delivered at the observatory early in 1892 and the final erection has for some time been delayed by the construction of a suitable dome and the requisite fittings. These are now completed, and recently Sir Howard, along with Mr. Christie, the Astronomer Royal, devoted some time to the final testing, which, as Sir Howard mentioned to us at the time, had been much impeded by want of clearness in the atmosphere. It is gratifying to know that the 4500*l.*, which is the cost of the instrument and its equipment, could not have been better invested, as it is pronounced to be one of rare excellence, and one of which the nation may well be proud.

The talented optician by whom it has been constructed has shown himself to be such a master in regard to high-class objectives, that we can the more readily understand that, although this twenty-eight-inch one has been specially made for spectroscopic photography, it is also available, by the alleged reversal of

one of the lenses, for visual observation. We have not yet learnt the precise way by which this has been accomplished, although we know that chromatic correction—that is, from the visual to the actinic—can be effected by a slight separation of the components of the object-glass. Concerning this, however, we must wait for further information.

Comparing the diameter of the object-glass with some others, it will be seen that, while it is not the largest in the world, still it is believed that, owing to the perfection of its construction, it will be little behind any of them—even the best.

The telescope which it has superseded has an aperture of thirteen inches, and, by squaring the respective apertures of the two (784 as against 169), it will be seen what a great light-grasping power has been obtained. The scientific world will look with interest for the revelations that are confidently expected as the result of the work of this instrument.

#### DALLMEYER'S IMPROVEMENTS IN TELE-PHOTO LENSES.

MR. DALLMEYER'S most recent modification of his tele-photo lenses is thus described in THE BRITISH JOURNAL OF PHOTOGRAPHY:—While, in his earlier tele-photo lenses, Mr. Dallmeyer seemed to have had in view solely those who aimed at an exceedingly high degree of magnification, in his new series he has realised that there are many who do not care for the extreme of amplification, but would be content with a moderate degree of direct enlarging. In this we think he is right. The former having been attended to, he has now turned his attention to the latter.

While his general system of a compound amplifier, composed of a *pair* of achromatic concave lenses, has been adhered to, Mr. Dallmeyer has altered the internal structure of these concave appliances, and has pressed into his service certain properties obtainable only by the employment of Jena glass. His original concaves were composed of flint and crown glass, and were combined by what is known indiscriminately as the Gauss or Grubb forms inverted. In this, it need scarcely now be said, the flint glass had a much higher degree of refraction than the crown, although the familiar shapes of 'crown' and 'flint' are reversed. But in the present one—and, so far as we can see, he has no more worlds to conquer in this direction—he has adopted a form of double combination, each separate combination having a contact between two separate lenses, one of which, although it has a higher refractive index than the other, is convex in shape, these contacts tending to a better cure of astigmatism. If this form were adopted for very high magnifying systems of this nature, the reverse curvature of the field introduced would be more than is allowable. If a powerful negative lens be used, the reverse curvature of field is best remedied by the other form referred to. There are planes curved *towards* the lens, planes flat and very nearly flat, and planes with 'reverse' curvature, dependent upon the camera extension. In some cases an unsymmetrical form has been adopted in which there are two planes of perfect flatness at considerably different extensions, this being arrived at by reversing the negative combination in its cell.

The practical result of this is that a lens much larger in diameter can be employed, transmitting a ray of light considerably exceeding in obliquity anything previously obtained; that the astigmatism of the oblique pencils caused by the front lens is annihilated or practically so; and that the distortion of curvilinearity is done away with.

This improved back concave or tele-photo attachment can be employed in conjunction with any lens, whether a portrait combination or a rapid rectilinear. We have had it applied to a Petzval *carte* portrait combination of six inches focus, although warned by the maker that it was not by any means the

best for such an attachment, and have found that by its agency (its diameter is nearly one and a half inches, and its focus, negatively, four inches) the old *carte* lens, which was corrected to cover a plate of three and a quarter inches, now covers a plate the full size capable of being contained in a 10×8 camera, the largest on which we have as yet tried it. In doing this there is so much light transmitted as to admit of the employment of a drop shutter in good light, or the giving of an exposure of from half a second to three seconds in light of a less intense character.

The distance apart of the front positive system and the back negative one is the factor which determines the magnitude of the image, of course taken in conjunction with the position of the focussing screen relative to both. No matter how much or how little the camera is extended, there is a relation between the two lens systems which, when ascertained and adjusted by actual trial, ensures sharpness. The smaller the separation of the positive and negative systems, the greater will be the magnification of the image, and the farther must the camera be extended. This cannot be explained by instituting a comparison between it and the ordinary camera and lens in which, if the focussing screen be placed either within or without the focus, the image will be blurred without the power of being sharpened. But an analogy exists between it and the screen of the optical lantern, on which to project an enlarged image. An equally sharp result is not obtained on a screen shifted from the twelve-foot position on which the focus had been adjusted away to twenty or forty feet. But sharpness at any distance is obtained by readjustment of the objective. And thus it is with the tele-photo objective. A slight manipulation of the rack and pinion ensures perfect sharpness, no matter how much or how little the camera is expanded.

This constitutes one of the beauties of the system of mounting that has been adopted, for, by its agency, the photographer can, within certain limits make a distant object of any size he chooses either to cover a quarter-plate, or one of 12×10 inches or more in dimensions. A short time since an American optician applied for a patent for a rigid tube in which to mount both positive and negative elements of a tele-photo objective. But from what we have said it will be seen that this adaptability of size of image to the space which it is found desirable to cover is totally wanting in such a system; whereas, by that adopted by Mr. Dallmeyer, there is absolutely no practical limit to the dimensions to which an object at a distance may be carried.

With regard to exposure, it will, of course be well understood that, the greater the magnifying of the image, the less is the rapidity, seeing the intensity of the lens is reduced by magnification; so that, according to the intensity of the entire instrument, must one determine for himself whether he will choose a positive lens, *per se*, of high or moderate intensity.

#### A NEW ANTI-HALATION DEVICE.

MESSRS. F. W. EDWARDS AND H. RANSOM have patented an improvement in the manufacture of sensitive plates for photographic purposes. Its object is to give a grain, stipple, or line to the pictures printed therefrom, and also to diminish the liability to halation and solarisation (or reversal of the image), which are incidental to photographic plates prepared in the ordinary way.

They say: By employing plates made according to our invention, it is possible to produce photographs in which the subject appears as a series of fine lines or dots, instead of the usual flat tones, thus obtaining in the one operation of printing the special character required for photo-mechanical reproductions.

Our invention consists in giving to the surface of the sensitive film, or its support, a series of fine lines or dots by any of the ordinary printing or sten-

cilling methods, preferably by a specially prepared roller, or a perforated plate. These lines or dots, consisting of a suitable medium, will thus allow the action of the light on the sensitive parts only, and hence the resulting negative will appear as a series of fine lines or dots.

By this method of graining the negative, with a medium easily removable, in whole or in part, after development, the light and shade of the print can be modified as required.

This lining or graining of the sensitive surface will also have a tendency to break up the rays of light reflected from the surface of the support of the sensitive medium, and thus prevent halation or solarisation.

The claim is:—The preparation of sensitive photographic plates or films, with a grained, dotted, stippled, or lined surface, such lining or stippling consisting of any suitable medium applied by any mechanical or other method.

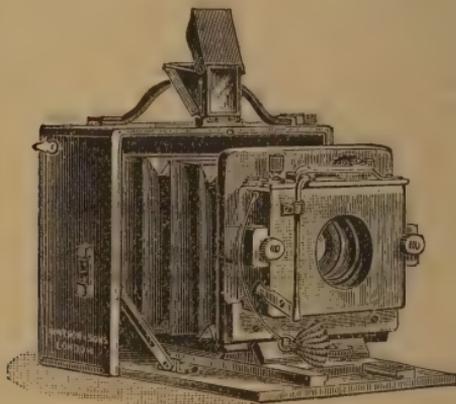
#### A NEW ENAMEL FOR IRON.

MESSRS. FLETCHER, RUSSELL, & Co., of Warrington, have introduced a new enamel which promises to prove both useful and ornamental, even to such utilitarian objects as cast-iron gas-burners, as it entirely prevents rust and stands heat. The film of enamel is so thin that the most microscopic details on the metal are unchanged. The application is new, and admits of a large extension for permanent decorative work of all kinds; castings protected in this manner are not only capable of fine artistic treatment, but they are absolutely permanent and proof against dirt and smoke, which disfigure other work so rapidly.

#### WATSON'S ALPHA CAMERA.

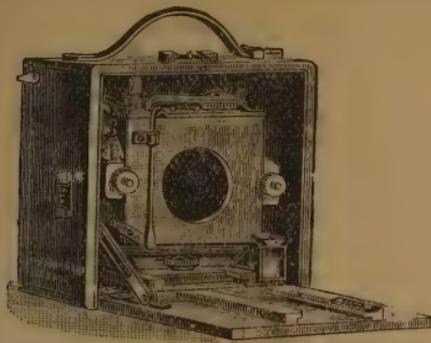
ALTHOUGH we have some time since spoken of the pretty little 'Alpha' camera, the following description of it as it now exists will interest the reader:—

It is made in box form, of sufficient size to contain when closed the bellows, front, the R.R. lens, shutter and finder. The front of the box falls down to



form a base, and is held rigid and horizontal by a strut, which is fixed by being pressed home into a notch at its upper end; to close the camera, slightly lift the strut, and it will then fold in as the box is closed. The front of the camera is extended along the base, and there is a scale with distances marked

on it, by which the focus can be immediately set, but a ground glass screen is also supplied to use if desired. A socket is fixed in the side and base to attach to a tripod. The finder is so arranged that the view may be seen either by looking into or through it, according to the position in which the camera is held; there are two fittings to receive it—for vertical and horizontal pictures



The shutter is a specially small Thornton-Pickard Time and Instantaneous fitted with mechanical discharger. The whole apparatus is of highest quality, workmanship and finish, and is among the smallest complete apparatus yet introduced.

The lenses sold by this firm, at any rate those bearing their name, are all manufactured by themselves, in brass and aluminium. Although we cannot speak of their performances from personal knowledge, yet from a perusal of some Kew certificates which were shown us, we would consider them excellent. They are made in four forms, rapid, rectilinear, euryscope, portable or mid angle and wide angle.

#### THE PANORTHOSCOPIC TELE-PHOTO LENS.

THE following particulars of the Panorthoscopic Tele-photo lens introduced to this country by Messrs. G. Houghton & Son will be of interest. In the first place, there is what seems to us a well-made 'rapid rectilinear,' eight inches in focus, fitted with iris diaphragm, and which, when unscrewed and used alone, fits the flange of the tele-photo system screwed on the camera front. This lens covers a half-plate to the corners, judging from a specimen of its work sent us. When screwed into the outer flange of the tube (which is four inches long), carrying at its nearer end that which is next the camera, the tele-photo system is now complete. The image on the focussing screen is seen magnified up to eight times; but, by operating a rack and pinion, the concave lens can be brought nearer to or farther from the rectilinear lens in front, and can thereby be made to increase or diminish the telescopic effect to the desired extent.

In the views submitted to show its various powers, there is, first, a print from a negative by the rapid rectilinear alone, and this, we may say, leaves nothing to be desired as regards definition. We have next four other photographs, taken from exactly the same standpoint, showing degrees of enlargement, respectively three, four, five, and six times that of the primary picture. These, as they ascend in magnifying power, show a corresponding increase of detail, ornamental ironwork which is merely suggested by the original lens now showing its pattern with very desirable distinctness; while distant trees, still more feebly suggested in the primary picture, are shown individualised in the tele-photo ones.

An engraved scale on the sliding tube which is actuated by the rack and pinion permits one to see at a glance to what extent the camera has to be extended in order to produce the degree of magnification that is to be adopted in any special case, and this, in our opinion, is a great convenience.

The lenses, of Parisian make, are by the house of Clement & Gilmer (late Laverne), whose reputation is good. The concave lens, which acts such an important part in tele-photo combinations, is of the same diameter as those forming the rapid rectilinear. It is a crossed double concave, the deeper curve being to the front, the surface to the back being concave in only a slight degree. They are all said to be formed of Jena glass.

To magnify three times, the camera requires racking out six and a half inches; six times necessitates sixteen inches, and so on, according to the indications on the scale.

#### REDUCING ACTION OF SULPHITE OF SODA.

THE question of the ability of sulphite of soda, in conjunction with pyro, to develop a dry plate without any addition of alkali, has often been raised, and it has been assumed occasionally that the development obtained by such means was due to the presence of a small quantity of carbonate of soda, in the sulphite employed. But that sulphite alone may act as a reducing agent is known to chemists, and quite recently we may note in this connexion an important chemical process has been founded on that property. Messrs. Augustus Lumière and A. Seyewetz have succeeded in isolating several amido-phenols in a pure state by utilising for the decomposition of their salts neutral sulphite of soda, which, in consequence of its reducing properties, prevents the oxidation of the base formed. When this reducing action is thoroughly understood, it is capable of explaining many of the little-understood properties of sulphite, which is now a chemical absolutely necessary in many photographic processes. Yet it seems only the other day that the late Mr. Herbert Berkeley called attention to its value, and this he had to do repeatedly before its use became at all general.

#### HYDROQUINONE AND RODINAL.

THE *Deutsche Photo-Zeitung* recommends the following combined hydroquinone and rodinal developer, as giving harmonious results without the hardness of the one or the want of contrast of the other.

|                           |             |
|---------------------------|-------------|
| A.                        |             |
| Hydroquinone .....        | 10 grammes. |
| Rodinal 1·10 .....        | 40 "        |
| Sodium sulphite .....     | 50 "        |
| Distilled water .....     | 500 "       |
| B.                        |             |
| Potassium carbonate ..... | 30 "        |
| Distilled water .....     | 500 "       |

For normal development start with A, and if it develops slowly add little by little of B; for instantaneous work take equal parts of the solutions.

#### REDUCIN.

This is the name which the Berlin Society of Chemists has given to the very newest developer, which is one of the series of which amidol is the best-known type. It develops without alkali, according to Dr. Vogel, who is

also reported to have said that it is superior to pyro. The following is the formula :—

|                       |             |
|-----------------------|-------------|
| Sodium sulphite ..... | 50 grammes. |
| Water .....           | 1000 „      |
| Reducin .....         | 5 „         |
| Sulphuric acid .....  | 12 drops.   |

The latter neutralises the alkalinity of the sulphite, which, in an alkaline state, immediately discolours the solution.

#### INTENSIFICATION OF GELATINE PRINTS.

THE *Photographisches Archiv* suggests the intensification of gelatine prints by means of physical development. It is unimportant whether the prints have been toned or not, but it is necessary that all traces of the fixing agent should have been removed. Briefly, the prints may be intensified in the same way as gelatine negatives.

A print on aristotype paper, fixed and dried, is placed in a solution containing hydroquinone, tartaric acid, and silver nitrate. The proportions of these substances can be varied without inconvenience, except that there should be a quantity of the acid sufficient to prevent any reaction between the hydroquinone and the silver. A few drops of ammonia are added to the solution to neutralise it. This will effect a slight deposition of silver on the image, which may be increased by the addition of more ammonia to the solution.

Instead of hydroquinone other developing agents may be employed. It is essential that the print before the solution is applied should have its gelatine surface flooded with water, otherwise the silver has a tendency to be deposited in the gelatine on a powdery form instead of acting as an intensifier of the image.

#### STRONG HYPO.

We learn that a chemical company in Massachusetts is manufacturing a hypsulphite of soda of a strength one-fifth greater than has ever before been accomplished. Although primarily intended for chrome tannage in the manufacture of morocco leather, it will, doubtless, soon find its uses in photography also.

#### CLEANING AND PHOTOGRAPHING OLD OIL PAINTINGS.

A WRITER in the *American Journal of Photography*, who has had experience in copying oil paintings, gives the following as his mode of cleaning old paintings previous to their being photographed :—After dusting, wash the painting with a sponge and rain water, and then sponge over the surface the following :—The white of two eggs, beaten up and cleared, a tablespoonful of glycerine, and half a litre of water. The object of adding the glycerine is to prevent the albumen from drying in spots, which would appear dull, and prove of injury to the reproduction.

#### BLACKENING BRASS.

HERE are some details of the blackening of metal diaphragms, given by Mr. H. H. Buckwalter. He dissolves an ounce of copper nitrate in three or four ounces of water. The diaphragms are then heated in the flame of a spirit lamp, and dipped in the copper solution. Without drying, they are again heated in the alcoholic flame until the metal gets a red colour, which instantly changes to black on withdrawal from the flame. It is sometimes necessary to repeat the dipping. When cool, clean the metal with a damp cloth.

## TEST FOR TARTARIC AND CITRIC ACIDS.

As these two substances, the latter especially, are of considerable importance in photographic technics, a delicate means of discovering their presence when suspected will naturally be of value. M. L. Crismer, in the *Bulletin Société Chimique*, has given a new mode of doing this. If powdered citric acid is mixed with an equal weight of twenty per cent. solution of molybdic acid, and a few drops (ten or fifteen per cent. in bulk) of pure dilute peroxide of hydrogen, and heated for three minutes in a water bath, shaking frequently meanwhile, a pure yellow colour is produced if no tartaric acid be present. But if there be any of the latter substance, even so small a quantity as .2 per cent., a very distinct blue colour is perceptible.

## THE 'LOTHIAN' RAPID SOLUTION JAR.

MR. A. H. BAIRD, 15, Lothian Street, Edinburgh, is making a new rapid solution jar, the principle of which is similar to that brought before the London and Provincial Association some time since by Mr. W. M. Ayres, who, as a practical man, advocated it strongly. Mr. Baird's jar is of white porcelain, perforated with holes in sides and bottom, and is of such dimensions as to be easily suspended in the mouth of a jug or jar of water. To use it, all that is necessary is to place therein the crystals, such as hyposulphite of soda, that are to be dissolved, and lower it into the water. One cannot speak in too high terms of the utility of this simple piece of apparatus.

## ON THE TONING OF SOLIO PAPER.

MR. J. B. B. WELLINGTON says: The formula recommended by the Eastman Company is as follows:—

*Stock Solution No. 1.*

|                                         |           |
|-----------------------------------------|-----------|
| Hypo .....                              | 6 ounces. |
| Potash alum.....                        | 1½ "      |
| Sodium sulphate (Glauber's salts) ..... | 4 "       |
| Water, make up to.....                  | 60 "      |

First dissolve the hypo and alum in the water, then add the sodium sulphate.

*Stock Solution No. 2.*

|                                       |            |
|---------------------------------------|------------|
| Gold chloride .....                   | 15 grains. |
| Acetate of lead (sugar of lead) ..... | 50 "       |
| Water.....                            | 7½ ounces. |

*Note.*—An orange precipitate is formed in No. 2 solution, which, however, redissolves on its being added to the No. 1 solution

To form a combined bath take of—

|                            |           |
|----------------------------|-----------|
| Stock solution No. 1 ..... | 8 ounces. |
| Stock solution No. 2 ..... | 1 ounce.  |

Do not use until the mixture has become quite clear.

In all solutions composed of hypo and alum it will be found that there is always a slight white precipitate. This, however, does not interfere with toning. This bath is very useful indeed for giving soft prints from hard negatives. It is not advisable to attempt to produce purple or black tones with this bath.

For those who prefer a separate toning and fixing bath, and one that will produce warm black tones, there is nothing better than the sulphocyanide bath. In order to have this bath under greater control, the addition of acetate

of soda is of very great advantage; not only does it slow down the toning action, but the prints are not so liable to take that very objectionable blue surface tint which sulphocyanide, *per se*, is so apt to produce; the tones of the prints can be more closely watched. Where possible, it is certainly better to tone by daylight rather than by artificial, as with the latter it is far more difficult to watch the various changes of tone. Of course it must be done in very subdued light. As I said before, no hypo must come anywhere near the prints during the toning, otherwise the prints will be irretrievably ruined with red stains that will refuse to tope.

Owing to the softening action of sulpho-cyanide on the prints, they should be washed in two changes of water, and then passed through a bath of alum water (alum half an ounce, water twenty ounces). After this they should be well washed in three changes of water, and then placed in the toning bath, as follows:—

*Stock Solution A.*

|                     |             |
|---------------------|-------------|
| Sodium acetate..... | 600 grains. |
| Water.....          | 20 ounces.  |
| Gold chloride ..... | 15 grains.  |

*Stock Solution B.*

|                             |            |
|-----------------------------|------------|
| Ammonia sulphocyanide ..... | 50 grains. |
| Water.....                  | 20 ounces. |

For use, take of A two ounces, B two ounces, water four ounces. Allow to stand one hour before using.

The toning may be stopped at any stage by immersion in a bath of

|                   |            |
|-------------------|------------|
| Common salt ..... | 1 ounce.   |
| Water .....       | 32 ounces. |

For securing still greater control and regularity of toning it is advantageous to use two-thirds of an old bath and one-third of a new one, omitting the water.

After removal from the salt bath, the prints should then be transferred to the fixing bath. This should not be made too strong.

*Fixing Bath.*

|                           |           |
|---------------------------|-----------|
| Sodium hyposulphite ..... | 3 ounces. |
| Sodium sulphite .....     | 1½ "      |
| Water .....               | 20 "      |

The addition of sulphite is to preserve the purity of the tones.

There are some amateurs, in contradistinction to those who will have the greatest simplicity, who prefer formulæ of the greatest complication (take, for instance, some of the developing formulæ published), and it is for these that I bring forward the following not too complicated method of toning, in two toning baths, the second being a toning and fixing combined.

First tone very slightly indeed to a light brown in the following, the prints having been previously washed, as usual):—

|                                 |            |
|---------------------------------|------------|
| Potassium chloroplatinite ..... | 5 grains,  |
| Sodium chloride .....           | 40 "       |
| Citric acid.....                | 40 "       |
| Water.....                      | 20 ounces, |

and immediately transfer direct to the combined toning and fixing bath at first mentioned in my paper until the desired tone is obtained. This produces tones of a rich warm black; but, if purple tones are desired, tone first in the sulphocyanide, and then follow with the combined bath. Certainly the tones produced by it are very fine.

Where prints are desired of a nice sepia, tone a little deeper in the platinum

bath, and fix as usual in the ordinary way. Care must be taken not to go beyond the brown stage. Prints produced in this platinum bath only are best finished off with a matt surface.

### GOERZ' DOUBLE-ANASTIGMAT LENS.

MESSRS. GOERZ AND VON HOEGH in their specification say :—

Our invention relates to doublet lenses for photographic purposes, and is illustrated in the sectional views (figs. 1, 2, and 3 of the accompanying drawing).

Within the last few years, as the result of the labours of the scientific glass laboratory in Jena, there have been made available for optical industries new kinds of glass, which by reason of their optical properties, differing from those of the kinds of glass which alone were previously to be obtained, have given rise to improvements in optical instruments, and especially in photographic objectives. The conditions of the elimination of the astigmatic errors of pencils of rays entering obliquely require that the crown glass should be of a refractive power higher than that of the flint glass combined with it. Varieties of glass which render combinations of this kind possible have been regularly manufactured since 1886, and since that time attempts have been made in various quarters to utilise the new kinds of glass for the elimination of the astigmatic error in photographic objectives. Thus, for instance, amongst others, the 'anastigmat' of Hartnack, calculated by Dr. Miethe, was introduced in the year 1887. This objective is free from astigmatism when the image is approximately plane; but, like all other objectives manufactured by various opticians upon the same principle, it has the disadvantage that the spherical error cannot be eliminated, and hence the system has an illuminating power too feeble for most of the needs of practical photography, and is especially ill adapted for instantaneous exposures.

The reason for this fact is that in order that the spherical error may be compensated for, the refractive power of the crown glass must of necessity be lower than that of the flint glass which is combined with it. The construction of an 'anastigmat' of good illuminating power, with the spherical error corrected, that is to say, without injury to the sharpness of the image, thus appears to be prevented by the interposition of two incompatible conditions, standing in opposition to each other, and, as a matter of fact, it has been customary in the best-informed scientific circles for a long time to consider it impracticable to devise a method of construction which should combine the two properties above referred to.

Dr. P. Rudolph, of Jena, the inventor of the recently introduced 'anastigmat' of Zeiss, forming the subject of a German patent, No. 56,109, was the first who succeeded in bringing forward proof of the possibility of constructing 'anastigmats' of good illuminating power.

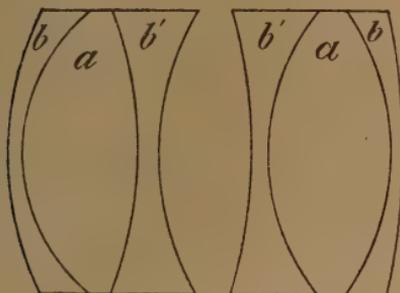
We have endeavoured to gain greater approximation to the ideal form by a method differing essentially from that adopted by Dr. Rudolph.

For this purpose we have made extensive calculations, directed at first to the single object of determining whether, as a fundamental principle of a new objective, the astigmatic error could be reduced as far as possible, in the expectation, which appeared, humanly considered, to be justifiable, that, even if it should prove to be impossible to eliminate the astigmatic error absolutely, it might yet be hoped to effect important improvements in the direction indicated.

Starting from the above-mentioned facts, well established theoretically, in accordance with which a crown glass of lower refractive power than that of the flint glass combined with it must be used to eliminate the spherical error, and a crown glass of higher refractive power than the flint glass component for the elimination of the astigmatic error, it was sought to determine, by strict

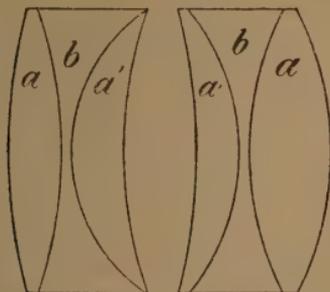
calculation, how far a doublet, each half of which was built up of three lenses, would be able to fulfil the conditions required for the elimination of the two aberrations, the spherical and the astigmatic. The separate components of such a system might, with reference to the result, be conceived to be so made up that they should consist either of a negative flint glass ( $b$ , fig. 1), enclosed

*Fig. 1.*



between two positive crown glasses,  $a$ , and  $a^1$ , in such a way that one of the two latter, say  $a$ , should have a higher refractive index, and the other, say  $a^1$ , a lower refractive index, than that of the enclosed flint glass,  $b$ , or be made up of two negative flint glasses,  $b$ ,  $b^1$  (fig. 2), enclosing a crown glass,  $a$ ,

*Fig. 2.*



in which case one of the two flint glasses, say  $b$ , should have a refractive index higher, and the other, say  $b^1$ , lower than that of the enclosed positive crown glass,  $a$ .

It was found to be possible in both methods of construction, whilst compensating for the spherical and chromatic aberrations, not only to reduce the astigmatism, but to eliminate this last in a manner theoretically perfect. Of the two methods of construction under consideration, the latter (crown glass between two flint glasses) is found to involve unfavourable forms for the separate components, and the employment of such kinds of glass as have their practical applicability limited by disadvantageous peculiarities, so that the

former combination (flint glass between two crown glasses) was exclusively adopted in the further working out of the problem, and the determination of the constants of an objective capable of being carried out in practice. As an example, there is depicted in fig. 3 of the appended drawing an objective of

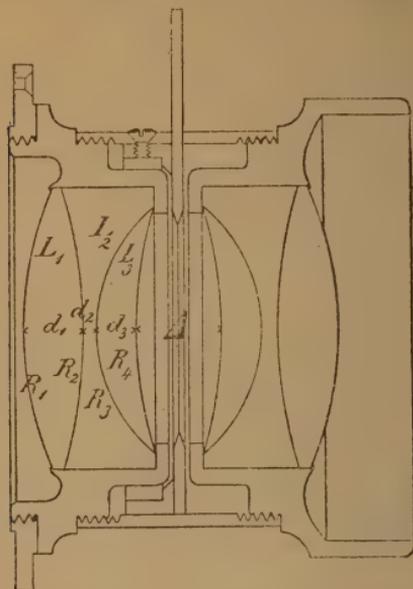


Fig. 3.

the kind described, of an equivalent focal length of 240 mm., and a free aperture of 36 mm., of the natural size, and in axial section.

The maximum effective aperture is 30 mm., corresponding to one-eighth of the focal length.

The constants required for the construction of the objective are as follows:—

| Radii of Curvature. | Thickness of Lenses.        | nD<br>Kind of Glass.                    | nG      |
|---------------------|-----------------------------|-----------------------------------------|---------|
| R1 = - R8 = 45.835  | d1 = d6 = 7.334             | L <sup>1</sup> = L <sup>6</sup> 1.61310 | 1.62683 |
| R2 = - R7 = 54.324  | d2 = d5 = 1.833             | L <sup>2</sup> = L <sup>5</sup> 1.56804 | 1.58182 |
| R3 = - R6 = 19.853  | d3 = d4 = 4.584             | L <sup>3</sup> = L <sup>4</sup> 1.51497 | 1.52663 |
| R4 = - R5 = 49.088  | Δ (distance apart) = 11.00. |                                         |         |

All measurements, radii, thickness, distance, &c., are expressed in millimetres; the kinds of glass are designated by their exponents of refraction for the line D (nD) of the solar spectrum, and for the line H<sub>β</sub> (NG<sup>1</sup>) of the spectrum of hydrogen.

If a principal ray, inclined at an angle of 30° to the axis, be calculated through the system, and the position upon it of the image point of the sagittal rays, and those of the meridional rays, be determined, a measure of the residual astigmatism is found in the distance of the two points. This distance amounts, in the case of the objective chosen as a specimen, to 1.2 mm. when the image formed by the meridional rays is flat, and this residual amount of astigmatism has no greater unfavourable effect upon the sharpness of the image formed by the marginal rays than that caused by the secondary spherical aberration in the axis.

The lens just referred to as an example, based upon strict calculation, is symmetrically constructed, but the combination of two absolutely identical halves is not to be regarded as a special characteristic of the objective system under consideration. The only characteristic mark of objectives of the new kind is rather the combination of separate systems independently corrected for spherical, chromatic, and astigmatic error, each made up of three lenses, the glass of these last having refractive indices properly graduated in the manner described; indeed, one system of the objective might have an external form differing from that of the other, or in the same objective one system might be built up as in fig. 1 and the other as in fig. 2. Any such modifications may be undertaken by a calculating optician without difficulty; but from a practical standpoint, they are to be regarded as purposeless, since the more simple symmetrical form satisfies all the conditions hereir taken into account to a sufficient extent. Furthermore, since each of the two separate systems constitutes in itself an objective corrected for spherical, chromatic, and astigmatic errors, each may be employed alone as a simple photographic objective.

Having now particularly described and ascertained the nature of our said invention, and in what manner the same is to be performed, we declare that what we claim is:—

1. A photographic doublet, the two component systems of which are each corrected for spherical, chromatic, and astigmatic errors, being to this end made up of three lenses, as follows:—either

- (a) of a negative lens enclosed between two positive lenses, one of which has a higher, and the other a lower, refractive index than the enclosed negative lens, or
- (b) of a positive lens, enclosed between two negative lenses, of which one has a higher, and the other a lower, refractive index than that of the enclosed positive lens.

2. The employment of a single system of the kind described in claim 1 as an independent photographic objective, substantially as hereinbefore described.

#### PHOTO-CRAYON.

FOR the benefit of the younger readers of this ALMANAC we reproduce from the JOURNAL some particulars of the Photo-crayon process. In 1869 the photographic world had its interest roused by an announcement that the then well-known photographer, the late Oliver Sarony, of Scarborough, was about to introduce quite a novelty in portraiture, one by which excellent and wonderful effects could be obtained by a minimum of trouble and expense; not only so, but that portraits which might fairly lay claim to be artistic could by its agency be produced by photographers devoid of art culture. In due course specimens were shown to the public, and were everywhere greatly admired. They were vignettes of 15×12 inches in dimensions, were delicate in gradation, and surrounded or partially so by crayon hatchings, which merged from the figure into the coarse drawing-paper on which they appeared to be produced. In brief, there was a singular charm about these photo-crayons, as they were designated, and, as the process had been potentiated, many photographers obtained licences for making them, in most instances to their financial advantage.

These pictures were nothing but enlargements produced by the wet-collodion process on plates of glass. They were, of course, transparencies, but so thin and delicate were they that the half tints could scarcely be seen until the glass had been dried and a sheet of paper brought in close contact with the image, which then appeared as if it were on the material placed behind it. In truth, so deceptive were they in this respect, that the most minute examination failed in establishing the fact that the image was not on the drawing-paper employed

as the backing. If what we have now to say aids in resuscitating this process, improved as it may be by greater knowledge than prevailed a quarter of a century since, we feel sure that it will conduce to the pleasure of many, and possibly to the profit of not a few.

We have said that the photo-crayon of the past epoch was an enlargement. It was made by placing an ordinary *carte* negative in a lantern, and projecting the head and shoulders upon a large plate of collodionised glass. The exposure was brief, a strip of magnesium ribbon being usually employed as the source of illumination, although any other light might be used. The glass was prepared by coating it with bromiodised collodion, and, after allowing it to set, laying it face upwards in a flat dish containing a solution of nitrate of silver of about the strength of thirty-five grains to the ounce of water. While this was becoming sensitised, which occupied two or three minutes, and a cover placed over the dish, the portrait was being adjusted and focussed on a plate similar to the one which was to bear the picture, but faced with white paper. This was supported in a vertical position, a simple easel, in our own case, sufficing for this purpose.

The lens is covered with a cap in which is fitted a disc of yellow glass, the sensitive plate made to take the place of the paper-covered one, and any final adjustment effected by the yellow cap, the removal of which permits of the exposure being made, which, with a single strip of magnesium, requires thirty seconds more or less. But during exposure, it must be vignetted by the interposition, immediately in front of the sensitive plate, of a large sheet of cardboard, having in it an aperture about the size of the head and shoulders of the enlargement; and this must be kept gently moving all the time in order that the vignette shall have a very soft margin.

The image is developed by—

|                      |           |
|----------------------|-----------|
| Pyrogallic acid..... | 2 grains. |
| Citric acid.....     | 2½ "      |
| Water.....           | 2 ounces. |

This ought to be poured on in such a way as not to wash off the solution of nitrate of silver with which the surface is still covered. If it does not flow smoothly, the addition of a few drops of alcohol will impart this needed property. The development will proceed slowly, but on no account must it be allowed to proceed beyond the formation of an exceedingly thin image. Those who try this process for the first time invariably make the mistake of carrying the development too far, producing a heavy, black-looking picture. It is fixed in hyposulphite of soda, washed and dried.

The image is examined by pressing the film side against a white sheet of paper. The margins and high lights ought to be quite white, or as white as permitted by the interposition of clean glass. If there is any degradation of tone, it indicates fog, which with such a developer ought not to be present. This fog may be prevented by using an older or riper collodion, or by adding to it a few drops of tincture of iodine. This, in almost every instance, will ensure the absence of fog. Should the half-tones be heavy and smudgy, over-development and possibly over-exposure are indicated.

It is in the mounting that the effect which gave the special name to the process is produced. Instead of backing with plain paper, Sarony employed drawing-paper on which had been printed by lithography peculiar, sketchy, crayon-like lines which, intermingled with and extended beyond the soft outlines of the vignette, gave it the appearance of freedom and artistic effect. In many instances, the photographer produced these hatchings himself by a black-lead pencil; but, in any case, it was impossible to say by examination that they were not highly finished and artistic crayon portraits executed by skilled artists. They created a *furor*, and the journals and societies of that period devoted much attention to the process.

Why, then, did they fail to secure lasting recognition? The public had not in those days been educated to relish black tones, preferring those of warm tint; and the fatal mistake was made of toning them with bichloride of mercury, followed by hyposulphite of soda; and, while by these agents the most beautiful tones were obtained, the photograph itself faded to an unpleasant light yellow colour, but as the crayon hatchings still maintained their original darkness the ultimate effect was most incongruous. Hence the decadence of the photo-crayon.

Tastes have changed since the days when the photo-crayon reigned with such supremacy, and we know that, if untampered with in the way indicated, there is no reason why it should not be permanent. Again, the backing of the transparency may be of any material and of any colour. If one of dark colour be selected for the sake of a special effect, touches of high lights may be put in by the crayon or otherwise.

There is a question of optics involved in this process, into which we cannot now enter, beyond saying this, that it is not only necessary, while there is the closest possible mechanical contact of the backing paper with the transparency—which, by the way, must have been varnished—that they should not be placed in optical contact, else will the whole effect be lost. A film of atmospheric air must intervene.

#### INDIA TINTING OF PHOTOGRAPHS.

A FEW hints on how to accomplish this may be useful: Take up a photograph of almost any kind and observe the effect on the judgment of interposing glasses of various colours between it and the eye. Just such a similar effect is produced on the observer by staining the photograph itself, a fact of which albumenisers and other preparers of sensitive paper seem to be well aware, as witness the rose-tinted or pearl-tinted papers now in commerce.

We some years since indicated the means by which photographs may be immensely improved by having a suitable tone imparted to the paper after they are finished, so far as the mere photographic operations are concerned. If, previous to being dried after washing, the prints are immersed for a few minutes in water in which a few drops of any of the aniline dyes have been dissolved, Judson's dyes for instance, they will be found to have acquired an even and beautiful tint that will be more or less permanent, that is, if they be not such colours as will bleach under protracted exposure to sunshine. It was in this way that some sensational and greatly admired moonlight views of Venice, still to be seen in the shop windows of printsellers, were produced, the white moonbeams tipping the waves and forming the high lights on some of the buildings being bleached out by judicious touches of a pen dipped in a diluted acid, by which the colour of the aniline is discharged. Hydrochloric or other acids serve either to discharge the dyed colour altogether, as in the formation of a moon, or to lower the tone when by an error of judgment this has been too pronounced. The degree of dilution is the factor by which the reduction of the tint is determined.

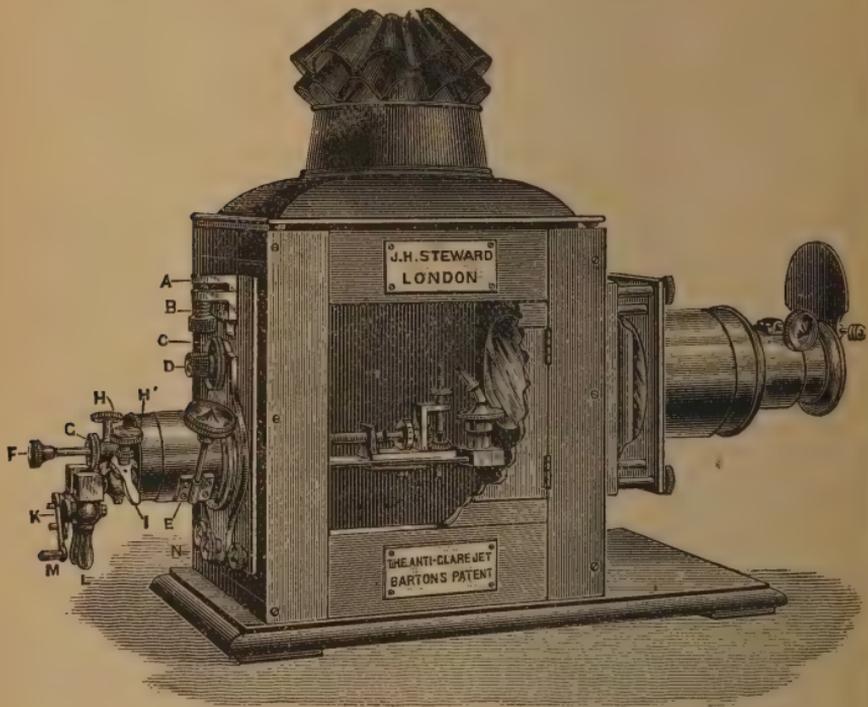
We have not found any of the aniline dyes produce quite such a good India tint on a photograph as can be imparted by a simple aqueous infusion of coffee. This, as our lady readers are aware, forms the means by which *old* lace is created out of the newer productions of that material, and we are aware of one gentleman, Mr. Weir Brown, who has been employing it of late with much success.

In such trials as we have made in India tinting, we have tried both coffee and tea infusions with nearly equal success, the strength of these being about such as that adopted in certain dry-collodion processes of a past period. But the balance of advantage seems to lie in favour of the former both in tone and

in principle. The tannin in tea is not perhaps great, still we know that it reacts upon certain silver salts. This will be realised when we state that we have repeatedly developed negatives by its agency, and hence an application of such a potent agent to a silver photograph would certainly be a risky proceeding. Coffee infusion, on the other hand, would possess no harmful action; we at any rate have not found it to do so.

### BARTON'S PATENT JET.

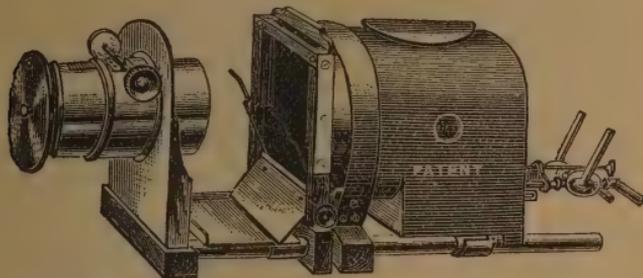
MR. J. H. STEWARD has introduced Barton's 'Anti-Glare Jet,' one of the chief advantages of which is that no light can stream in to the eyes of the audience at the back of the lantern. All adjustments are made from the lantern out-



side in a simple manner, so as to prevent confusion. The working of the Jet may be understood by referring to the cut, in which B is the vertical adjustment, obtained by means of the screw working against the stop A. The side adjustment is controlled by the milled head C, and clamped by the nut D. The screw-down valves, H H', permit of the easy adjustment of the light; M is the cut off for checking the light down; E, the lime turning-rod working through G, which is screwed at the end into the lime support, and so moves the lime to and from the nipple. A spring click to the lime turner, F, is provided, so as to tell how much the lime has been turned. The Jet is fitted to one of Mr. J. H. Steward's lanterns, but can be adapted with little, if any, alteration to existing lanterns.

## MATTHEWS'S NEW PORTABLE OPTICAL LANTERN.

THIS Lantern is designed to combine efficiency with portability and extreme facility of manipulation. To attain these advantages, telescopic tubes furnish a base, upon which run blocks to carry the condenser and objective, as well as the carrier stage and the jet stage; on these tubes perfect adjustment to suit the focal length of the objective, and the necessary distance of illuminant from the condenser, are readily obtained. The rear block is shaped as a crutch or cradle, in which the condenser is firmly held by a brass band furnished with slot and tightening screw, so that, in case of fracture, a condenser of somewhat



larger or smaller diameter could be substituted. The front block carries a rigid brass standard, to which the objective is secured by means of a screwed flange. The carrier stage is of novel design, and, being provided with a rising platform, permits the use of various sizes of slides at one uniform level, without the inconvenience of loose slips as usually supplied; the carrier is also attached to the stage by an entirely new method, bevelled-edge plates super-seeding springs, and forming a rigid and central attachment. Springs are, however, supplied in case of need, and these are fixed to the stage and removed from it with great facility. The jet is designed for use with this lantern, and is furnished with all necessary movements for centering and obtaining the proper distance from the condenser, a convenient lamp of Russian iron covering the light. The box in which the lantern is packed is provided with a rising lid, and forms a stand, with ready means of raising the picture to the desired position on the screen.

## FILM WORKING.

MR. W. H. BARNES thus sums up the pros and cons of celluloid films:—

The question is frequently asked whether films keep as well as glass plates, and I have heard many condemnatory remarks concerning films in this respect, not at all justified by my own experience of them. An emulsion which keeps well when coated on glass will, so far as my observation goes, keep equally well on celluloid.

With regard to the suitability of the material, from a chemical point of view, to take the place of glass, I have already stated that the celluloid film is, when the solvents have evaporated, composed of substances which are photographically inert. We know this to be the case as regards the pyroxyline so long used as a vehicle in the wet-collodion process. With regard to the camphor, some of which undoubtedly remains in the film, and is supposed to tend to deterioration, with a view to set this matter at rest, I have made a few experiments.

A plate was exposed as taken from the box, without being treated in any way.

Another plate from the same box had a slab of camphor three inches square, with one face carefully scraped over a straight edge to make it as level as possible, pressed closely in contact with the emulsion side of the plate, and allowed to remain in this position for thirty-six hours.

A third plate from the same box was placed in a grooved box with a quantity of broken camphor, and left for thirty-six hours.

These plates were all exposed on the same subject, for the same time, and developed together in one dish, and there is no evidence of any effect produced by the camphor.

As to negatives taken on films treated to ascertain the effect of pressure. A packet of six half-plate films in the paper envelopes only were placed in the ordinary letter-copying press, six pennies were laid singly on the package, and the press screwed down very tightly; after thirty-six hours the films were taken out, exposed, and developed, and, although the pressure was sufficient to cause a perfectly glossy circular mark on the face of the film, where the penny had rested, no difference is observable after development.

There is an idea prevalent in the minds of some that an emulsion coated on celluloid is less sensitive than when coated on glass. I frequently try films and glass plates coated with the same emulsion, and do not find this to be the case.

We now come to the question of exposure. Celluloid films may easily be exposed in ordinary dark slides by placing black cardboard of the same size at the back of the film to keep them flat and take the pressure of the spring. This method works well when the rebate of the slide is fairly wide; but, with narrow rebates, some difficulty arises, and film-carriers to hold the film are certainly more generally convenient. The films should slip quite loosely into the carrier, as, if they fit at all tightly, this causes a buckling of the film, and there is also a danger of stripping the emulsion from the celluloid by the sharp edge of the metal grooving. Several patterns of film-carriers are in the market. One has been recently introduced by Messrs. B. J. Edwards & Co., which is very simple, and can be easily worked by following the directions printed on the back of the card.

In this way films can be worked very conveniently in ordinary slides; but, to gain the fullest measure of advantage from their use, slides specially designed for films should be used, as these can be made much lighter and less bulky.

There is a dark slide specially designed for films, but which can also be used for plates. This, like the film-carrier I have just mentioned, is the invention of Mr. B. J. Edwards. It will hold two films or plates, and two of these slides take up about the same space as an ordinary wooden one, and weigh considerably less. The shutter is of xylonite, coloured black on one side and red on the other. Black outside indicates unexposed films or plates; this draws right out, and after exposure is replaced, red outwards, which not only shows at a glance exposed and unexposed films or plates, but the red side can be written on with lead pencil, and thus affords space to make memoranda in reference to exposure, &c. Afterwards the writing can be erased with a damp sponge or cloth.

The development of films may be conducted in the same way as plates, if it is only required to do one at a time. It is well, however, to have a full quantity of developer, and the use of a brush to ensure the absence of air bells is certainly to be recommended; but, even when developing them singly, films are less convenient to handle than glass plates, and, unless some contrivance is used to prevent them floating over one another, several cannot satisfactorily be developed at once. I have utilised for this purpose the metal frame of the film-carrier I have just shown, after giving it a coat of varnish. The films are simply slipped into the groove, without the card backing, in which they remain during the operations of developing, fixing, washing, and

drying. The opening in the frame allows you to judge of density during development. This is, however, somewhat of a makeshift contrivance.

In this way a film becomes as easy to manipulate as a glass plate, and several may be developed at the same time.

*Developers.*—With respect to the developers most suitable for films, it is best to use the developer with the peculiarities of which you are best acquainted; a developer suitable for plates will answer equally well for films.

Personally, I have always given pyro and ammonia the premier position as regards the quality of the negatives obtained.

Pyro and soda has, to a considerable extent, superseded it of late years, but the pyro and soda developing formulæ generally in use appear to me to give negatives lacking something of the quality obtained with pyro and ammonia.

In order to arrive, if possible, at a pyro and soda formula equal to pyro and ammonia, I have recently made a somewhat exhaustive series of trials, with varied proportions of soda and sulphite, in this developer, and have also tried various modifications of it. The following formula is the outcome of these trials, and I believe it to be decidedly superior to those generally in use. It is the only one I have employed that gives negatives quite equal to those developed with pyro and ammonia.

*No. 1 Solution.*

|                                   |            |
|-----------------------------------|------------|
| Pyrogallic acid .....             | 1 ounce.   |
| Metabisulphite of potassium ..... | 1 "        |
| Water.....                        | 80 ounces. |

*No. 2 Solution.*

|                                    |            |
|------------------------------------|------------|
| Carbonate of soda (crystals) ..... | 12 ounces. |
| Water .....                        | 80 "       |

*No. 3 Solution.*

|                           |           |
|---------------------------|-----------|
| Bromide of potassium..... | 1 ounce.  |
| Water.....                | 9 ounces. |

To develop, mix equal parts of Nos. 1 and 2. For most purposes the addition of five minims of No. 3 to each ounce of the mixed developer is recommended (or one and a half ounces of No. 3 may be added to the eighty ounces of No. 2). For instantaneous exposures, where under-exposure is probable, the bromide may be omitted, and also for studio work. This point, as to the addition of bromide, must, in fact, be left to the discretion of the operator.

If the colour of negative given by this developer is not considered grey enough, a greyer image may be obtained by adding two ounces of sulphite of soda to the No. 2 solution.

*Fixing.*—Very little need be said on this point. If the film negatives are manipulated without holders, it is advisable to fix in a *deep* dish, and to see that the films are well under the surface of the solution, otherwise stains may result. An acid fixing bath may be used. A ready method of mixing this is to add two ounces of metabisulphite of potassium to each pound of hypo crystals. One ounce of the metabisulphite will answer, but I prefer the larger proportion.

*Washing.*—When a holder is not used, it is best, in placing the films in the washing tank, to place two back to back in one groove.

*Drying.*—After washing, they are best hung up to dry by means of spring clips; the clips answer very well. The method of hastening the drying of negatives by immersing them in alcohol must not be practised with film negatives, as the alcohol attacks the celluloid.

*Varnishing.*—It is certainly advisable to varnish the film negatives, and this can be readily accomplished by means of this varnish, which is specially prepared for the purpose. Some of the varnish is poured into a dish, and the film is immersed for one or two minutes, and then hung up for the varnish to dry and harden; no warming of the negative is required.

*Cleaning the Varnish off a Negative.*—Should the removal of the varnish from a varnished film negative be necessary for intensification or other purpose, this is best effected by soaking the negative in some of the varnish for five or ten minutes, rubbing the surface with a pledget of cotton-wool, and then well washing it under the tap.

#### A NEW STYLE OF STATUARY PORTRAITURE.

AN American artist, Mr. C. W. Motes, of Atlanta, Georgia, has produced the finest 'statuary' group we have seen. But he has entirely disregarded the meretricious aid of plaster or marble, and has produced his effects solely by lighting. A reduced copy of a large picture 21×17, entitled *The Sisters of Bethany*, is given in *Wilson's Photographic Magazine*, and this, as hinted, comes nearer to our beau ideal of a statuary group than any similar work yet presented for public inspection.

The Sisters are clothed in white attire, and suitably posed on a plinth composed of square slabs of granite. We shall say nothing concerning their bare arms, their attire, or their banged hair, because, after all, the Bethany mentioned may not necessarily be that of Palestine, but the name of a town, village, or even a villa residence in Georgia, for in the United States of America Palestine, no less than Great Britain and the Continent, are laid under contribution in supplying names for their rapidly increasing towns and villages; hence a possible explanation of the costumes and personal accessories of these Sisters of Bethany. But, apart from this hypercriticism, the idea is so good and so well carried out, that in the interests of our professional brethren who are longing for something new to give a fillip to business we shall, with the aid of the description of Motes's methods, say a few words more on the subject.

The figure is attired in white and posed against a black background. A black velvet or a green baize background, we learn from Mr. Wilson, is used, a ground of this nature conducing greatly to the effect in general—to the roundness, fulness, and detail of the figure. It is essential that the drapery as well as the figure be artistically posed and hang gracefully. This it is quite possible to do even with our nineteenth century female costumes. But alas for those of the male sex! Unless something of the old time cloak or the Inverness cape be adopted, and these constructed of some white material, the photographer has to face an insuperable, if not unsurmountable, difficulty.

The lighting has to be very soft and diffused so as to avoid deep-cast shadows, and yet there must be a dominant light to prevent flatness. The carrying out of these conditions must be left to the skill and taste of each individual artist. As the maximum of softness and avoidance of heavy shadows are paramount considerations, a generous exposure is necessary.

We have spoken of the background as being black. Where this is not the case in any special picture not expressly produced for 'sculpturesque photography,' it is not a difficult matter to effect it by a subsequent operation. We have lying beside us a negative as yet undried, by which we have satisfactorily demonstrated this, by obliterating every portion of the background that surrounds the figure. The means adopted were the making up of a strong solution of potassium cyanide in which was dissolved iodine in such proportion that the solution would have remained of a permanent purple colour but for the further addition of a small lump of cyanide, by which it became colourless. This forms an exceedingly powerful solvent of a negative image. To prevent

its spreading, a little gum arabic should be dissolved in it so as to impart a body. When, by means of a camel's hair pencil or fine quill pen, this is passed round the outline of the image, the parts thus acted upon immediately become transparent, all that is then necessary being to wash it off very quickly before the detergent has had time to spread and attack the outlines of the figure. Slightly tepid water dashed on in a spray serves the purpose very well.

While on this topic, we may say that striking effects may often be produced in lantern photographs of portraits by denuding the backgrounds of the negatives of all detail, thus causing in the slide the picture to be seen with a black background.

### THE PHOTO CORRECTOR.

CONSIDERABLE interest was excited early last year by an invention of Mr. Henry Van der Weyde's, designed to enable a photographer to reduce or amplify parts of a portrait at will. The following is the specification of the patent:—

My invention relates to an improvement in photography, particularly portrait photography, and has for its object to enable the photographer to idealise, to a certain extent, the subject without sacrificing the fidelity of the portrait, and so remove the artistic reproach under which photography has always suffered, that it is incapable of foreshortening without exaggeration (*e.g.*, a hand or foot extended towards the camera), and cannot give that appearance of dignity to a figure which a master in portrait-painting is able to impart by slightly enlarging, reducing, or otherwise modifying, certain portions of the figure.

My improvement, therefore, has for its object not only to enable the proportions of certain parts of the subject to be varied, for instance, to reduce the size of a lady's head, or increase the length of her neck or waist, or of the skirt of her dress, or to lengthen a gentleman's legs, for the purpose of imparting greater dignity to the figure, but also to correct the distortion due to the effect of foreshortening, or to produce other effects, whether artistic or grotesque—such, for further example, as to cause the apparent rotundity of an obese figure or face to be diminished, instead of being exaggerated, as is usually the case in a photograph, or the size of the hands to be diminished, or the fingers to be lengthened or tapered, or the eyes to be enlarged and the size of the mouth to be reduced, without necessarily altering the shape, size, or expression, or changing the character of the other features, or sacrificing the likeness of the portrait, all these artistic modifications being quickly effected and visible to the manipulator, so that their effect can be readily appreciated, the degree of modification obtainable being almost infinite.

It is preferable to apply my invention in the copying or enlarging of an ordinary transparency, negative, or photograph, with which comparison of effect may be readily made with a view to avoid undue distortion, but the invention is equally applicable while photographing the original subject.

For the purposes of caricature, the image can be so distorted as to produce the most comical effects, such as exaggerating the head, diminishing the lower members, or lengthening or broadening the whole figure, or contorting it into eccentric attitudes.

In landscape photography a great variety of artistic effects may be obtained according to the direction in which the distortion is effected; for instance, a picture of ordinary landscape proportions can be photographically distorted or altered in its proportions to fit any frame, even an elongated upright panel, without losing any of the details.

The method whereby these modifications or distortions are effected consists in interposing between the subject (whether it be a person, landscape, picture, photograph, or negative, to be copied or enlarged) and the photographic lens,

or between the lens and the sensitive plate, of a transparent medium having lens-like properties, so as to vary the direction of the whole or any portion of the rays of light according to the effect to be produced.

The curvature of the lens-like medium would, of course, depend upon the effect it is desired to produce; for instance, for the purpose of varying the relative proportions of the whole or part of the image, say, the lower half, in one direction only, the curvature of the lens would be in one direction, but for altering the proportions, or changing the shape of the isolated details, lens-like surfaces of spherical, oval, regular, or eccentric curvature would be used, and, to prevent any shadows or lines of demarcation being visible on the picture, the curvatures of the lens-like surfaces would be reversed or otherwise gradually merge with a plane surface, so as to allow the distortion or modification produced by the interposition of the lens-like surface to melt or flow into the surroundings.

For the purpose of varying in a more or less conventional or general way the broader proportions of the subject, I would employ lens-like media formed partly with plane and partly with curved surfaces, such media being formed beforehand and kept in stock for general use.

For this purpose glass plates having curved or partly curved surfaces or lenses cemented to glass plates, or independent lenses supported in any suitable manner, would be used, but for artistically varying the smaller details of the subject it is necessary to prepare a special lens-like medium for each particular subject, and my invention comprises the novel method of artistically preparing such a medium, and the novel application of the material employed for the purpose.

For the purposes of this part of the invention, it is necessary to have a clear, transparent crystalline material, whose surface is capable of being easily scraped, engraved, or fashioned by melting at the ordinary, or at a very moderate, temperature, without necessitating recourse to the troublesome operation of polishing.

Amongst other substances available for this purpose, I especially claim the employment of ice in the form, say, of a plane slab of moderate thickness, upon the surface of which I operate by means of tools of suitable curvatures, it being sufficient to apply the tool to the surface of the ice in order to cause the latter to be locally melted by the conduction of heat from the tool itself.

For the purpose of operating on the surface of the ice, the slab would be placed in the same position with regard to the subject and to the eye of the operator as it will occupy in regard to the photographic lens in the operation of photographing, the subject being clearly visible through the slab, so that the necessary modifications of surface may be effected in correct local position to produce the effects desired.

In order to preserve the ice during the operations of working on, and photographing through it, the ice slab would be enclosed in a sort of frame containing a freezing mixture, by which to cool the surrounding atmosphere sufficiently to prevent the melting away of the ice.

My invention further has for its object to impart to a photograph the effect of a line or other engraving, in which the modelled effect is produced by deviations and variations of breadth and spacing of the lines.

For this purpose I prepare, as last-above described, a lens-like surface in correct relation with regard to the outlines and details of the subject of the picture; but, instead of photographing the picture through such lens-like surface, I photograph a surface upon which an engraved line or stipple tint has been printed, the effect being to produce a negative in which the wavy line effects are produced by the local distortion of the lines to correspond to the outlines and contours of the picture, so that, by stripping such negative and superposing it upon the negative of the picture, a compound negative will be formed, in which the engraving effect will be superposed in the form of

white lines upon the soft gradations of the photographic modelling, or in black lines by the process of double printing.

Claims:—1. The herein-described process of locally modifying the dimensions of the image in the operation of photographing, copying, or enlarging, by causing the light rays transmitted from a portion or portions of the original subject, negative, or picture, to be refracted through a lens-like medium, interposed in the pencil of rays either before or after transmission through the camera lens, substantially as specified. 2. In the herein-described process, the employment, in combination with a photographic camera, of a refracting plate, having a local lens-like portion, whose curvilinear surface flows or graduates into the plane surface or surfaces of the plate, the plate being interposed in the pencil of rays before or after transmission through the camera lens, whereby to cause certain of the rays to be so deflected as to produce local modification of the image photographed in the camera, substantially as specified. 3. In the herein-described process, the employment, in combination with a plane plate of glass, of plano-convex lenses, whose curvatures are reversed so as to gradually flow into, or merge with, the plane surface of the plate to which they are caused to adhere, as and for the purpose specified. 4. In and for the purposes of the herein-described processes, the method of fashioning a refracting medium so as to produce therein a local plano-concave lens, which consists in superficially and locally melting the plate, substantially as specified.

#### THE SANDELL FILMS.

THE Sandell film introduced by Messrs. R. W. Thomas & Co., is an application of the principle embodied in the Sandell plates, the films of celluloid having a multiple coating of gelatine emulsion. One by one the principal makers are selecting celluloid as a support for the sensitive medium, and we have no doubt that ere long there will be none left who have not added the coating of cut films to their specialities. Including, of course, among their characteristics the advantages of lightness and portability, the Sandell films also embody the leading features of the Sandell plates, and yield negatives of a similar character. Consequently, what we have before written of the Sandell plates applies with equal force to the films, at any rate in respect of the quality of the results. Celluloid is notoriously more difficult to coat than glass, with an equal certainty of escaping from mechanical defects and irregularities; but, judging from the sample of the Sandell films, Messrs. Thomas appear to have surmounted these obstacles, and to have produced a film which leaves nothing to be desired on the score of technical excellence. It should be said that the manipulation of the films is precisely the same as the multiple coated plates.

#### FOCAL PECULIARITIES OF WIDE-ANGLE LENSES.

THE BRITISH JOURNAL OF PHOTOGRAPHY thus treats of some peculiarities of focussing: Every one who is acquainted with the most elementary principles of optics as affecting photographic lenses knows that a deep meniscus lens will not, unless it be stopped down to a considerable extent, give an image at the focal plane any part of which is sharp, and that, the more pronounced the meniscus form is, the smaller will have to be the stop or diaphragm requisite to minimise the spherical aberration by which sharp definition is prevented. This applies, not alone to a single meniscus, whether achromatised or left uncorrected for colour, but is also the case when two such forms of lenses are mounted together so as to form a wide-angle, non-distorting objective.

When an objective of this class, single or compound, is focussed with its largest available aperture, say, for example,  $f$ -15, upon any suitable object, so

as to produce the sharpest image of which it is capable under the circumstances, and a very small diaphragm is then inserted, disappointment is apt to be experienced at the small gain in sharpness that has resulted.

It is a common habit with those who employ lenses of this nature to focus with the largest diaphragm supplied, and then use one much smaller for making the exposure. For this there is a certain excuse which is plausible although not valid, viz., that a wide-angle lens of short focus admits an insufficiency of light to permit of any focussing being effected with a small stop, and that hence the largest one must be made to serve the purpose both of arranging the subject on the ground glass, and also of focussing; and it is reasoned that after this has been done the sharpness will be increased by the insertion of the small or working stop.

But it must be borne in mind that, when working thus, there are two focal planes situated at a certain distance apart, the one for the largest stop being closer to the lens than when the smallest one is employed. Hence a readjustment of the focus is imperatively demanded between the focussing with the large and the exposure with the small diaphragm. A clever casuist may say that, if he makes the image sharp with the larger aperture, the reduction of the aperture cannot make the image less sharp, seeing that the same rays by which the former was produced are utilised in the production of the latter. To which we reply, that we deny the *acme* of sharpness in the first case, on account of the amount of spherical aberration present, for, be the focussing effected with the utmost care, there are still transmitted rays which cross the axis at a greater distance than the mass of those by which the image is formed, and it is only when the lens is aplanatic (which no wide-angle deep meniscus ever is) that all the rays cross the axis at one point. We repeat what has already been said, that, in order to obtain the extreme of definition when employing only those attenuated rays transmitted by the small diaphragm, the focussing screen must be placed in the plane at which they cross the axis, and which, as we have said, is at a greater distance from the lens than is the case when the bundle of rays is larger.

Practice supports theory in this. We have made a series of careful tests relative thereto, and have employed for the purpose a wide-angle deep meniscus combination of the most recent construction, and bearing an honoured name. The solar focus is eight inches, and the largest stop equals  $f$ -16. We focussed upon the meshes of a piece of rather fine network, such as that employed for window curtains, using a Ramsden eyepiece carefully adjusted and attached to the ground glass of the camera. The camera was thirteen feet distant from the network, which was erected so as to be backed by the sky. Having got the greatest sharpness capable of being obtained with the stop mentioned, we marked on the camera the stage to which it had been extended, and then 'turned on' the  $f$ -32 stop and focussed again. There was a very marked increase in the definition of the lace, which was exceedingly crisp and sharp, the meshes being as if cut with a finely pointed graver. Another mark was now made on the camera. The  $f$ -16 stop was then made to supplant the  $f$ -32 one, and the image again examined, revealing now a serious falling off in sharpness. This was repeated several times, and established the fact that for the apertures mentioned there were two focal planes. On measuring the distance apart of one mark on the camera from the other, it was found, to be three-sixteenths of an inch.

We have entered into this matter somewhat at length in order to enforce advice we have repeatedly given, and which is to the effect that, while the largest possible aperture of the lens is by far the most convenient to make use of when arranging the subject on the focussing screen, it is of vital importance where the highest degree of definition is desired, that the focussing be effected when using the same stop as that by which the photograph is to be made.

When the lens partakes more of the aplanatic character than the deep

meniscus that we have been describing, the same amount of difference in the focal planes does not exist, and we have seen lenses of the 'rapid' class in which the focal plane with the full aperture and that the smallest stop showed no marked difference between them. Lenses of this type, however, are not capable of including an angle of view so great as those of the deep meniscus form. Just observe the axial excellence of definition of the highest type of aplanatic lens that is known—the object-glass of an astronomical telescope; by no amount of stopping down can its defining power be improved, but, on the contrary, it rather deteriorates. In it the amount of spherical aberration left uncorrected is practically non-existent. The external form of such a lens when made of ordinary optical glass is that known as crossed, which, while right for axial rays, is hostile to the transmission of oblique ones, for which purpose we must have recourse to lenses of meniscus form. The deeper the meniscus form the better is an extremely oblique ray transmitted, and hence the necessity of the deep meniscus for wide-angle lenses, which on account of the aberration of sphericity, renders a small stop imperative.

It is no fault in the construction of such objectives as we have been speaking of that there is the difference spoken of between their foci when using a large stop contrasted with a small one. It is an optical necessity of their construction. We have known of more than one who made a speciality of copying fine line engravings of large dimensions who adjusted and focussed with a large stop on account of the superior illumination, and then inserted a small one, and who, failing to get the sharpness desired, blamed the lens, and laid it aside, whereas the fault lay with themselves in not knowing how to use such a lens aright. We hope that, from a perusal of what we have written, they will be able to do so in future.

A writer on the subject of focussing, eight years since, said: 'To focus with the working aperture, as some writers recommend, is not only useless, unless the lens is imperfect, but it is practically impossible with the small apertures required for the rapid plates now used.' We have adduced sufficient evidence to show the utility of the course recommended, and have only to add that if, owing to the feeble light transmitted through the smallest stop, correct focussing is not possible with its use, this can be ensured by the expedient of focussing with a large stop, and racking the camera out the extent necessary, and which has been previously ascertained by experiment, to ensure absolute definition by the small or working stop. Photographers should study the peculiarities of each lens they employ.

#### INDURATION OF THE GELATINE FILM—A SUBSTITUTE FOR VARNISHING.

DR. W. P. JENNEY says:—The following formula has been used for two years, and found to give uniformly good results:—

|                  |            |
|------------------|------------|
| Alum .....       | 2 ounces.  |
| Tannic acid..... | 1 drachm.  |
| Water .....      | 16 ounces. |

The negatives, after fixing and washing, are immersed for three or five minutes in the above solution, rocking the tray to ensure uniformity in action. The colours of the negative become darker, the appearance more brilliant, and the surface of the film glass-like to the touch. The negative is washed for fifteen minutes and dried.

The induration should not be prolonged beyond the time given, lest the adhesion of the film to the glass be destroyed. It is impracticable to intensify an indurated negative.

Treated in this manner, the gelatine film is nearly waterproof, so much so that water may be poured over the plate and wiped off with a cloth without

injury. Indurated gelatine is transparent and slightly elastic, resembling parchment in appearance.

The indurating solution may be used repeatedly until the strength is exhausted. The employment of induration with films that it is desirable to strip from their supporting surface is suggested.

#### THE EQUIVALENT FOCUS OF A COMBINATION OF LENSES.

As some readers of this ALMANAC may be not aware of how to ascertain the equivalent focus of a compound lens, we give the following plan:—

It is the equivalent or solar focus that concerns photographers, although the back or the flange focus may prove useful to the camera-maker in affording some idea as to his measurements when making a camera. The equivalent focus may be defined as the focus measured from the optical centre of the combination when such centre has been determined for a distant object.

If there is one blunder that has more frequently been made than another in trying to determine the equivalent focus of a combination, it is the recommendation, so frequently met with, to focus upon an object situated at such a distance from the lens as to make the image upon the ground glass of the camera of precisely the same dimensions as the object, which we may assume to be an engraving or a photograph that has to be copied its own size, and then divide the distance between the object and the image by four, which, it is alleged, will give as the quotient the precise equivalent focus of the objective. But this method is incorrect for a combination of lenses separated from each other by being mounted apart in a tube, and the amount of their separation not admitted as a factor in this calculation. We mention this method first on account of the widespread belief in its accuracy, which, as we have shown, is incorrect. The method is only correct in the case of a single biconvex lens of infinite thinness, could such a lens be made, or even conceived of, in connexion with the optics of photography.

A simple method, and one which is within the powers of every one, by which to ascertain the focus of a lens, consists in directing the camera to any subject situated at a distance, and focussing it by aid of a magnifier, so as to insure sharpness. Have the subject so arranged that a well-marked object, *e.g.*, a lamp-post, or the trunk of a tree, shall occupy positions at opposite margins of the ground glass. Now, having marked on the focussing screen the exact positions occupied by these two respective objects, unscrew the lenses from the mount and insert anywhere—by preference, and for convenience, in the slit for the diaphragm—a thin piece of metal punctured with a pinhole, and, having thrown a focussing cloth over the camera, examine the image and rack the camera in or out until the pinhole image on the ground glass exactly coincides with that produced by the lens, the two marks to which we have referred aiding in this. This coincidence of images having been obtained, measure with accuracy the distance between the thin metallic plate pierced with the pinhole and the ground-glass focussing screen, and this represents the equivalent focus of the lens.

The only drawback to this method lies in the difficulty of projecting an image on the screen with such a degree of sharpness and luminosity as is necessary, for if the pinhole be too large the sharpness is defective, and if too small there may not be light enough to see the image. We have, however, by making use of lighted gas lamps as test objects, been able to employ a very small pinhole, and thus to secure a very high degree of accuracy in the measurement.

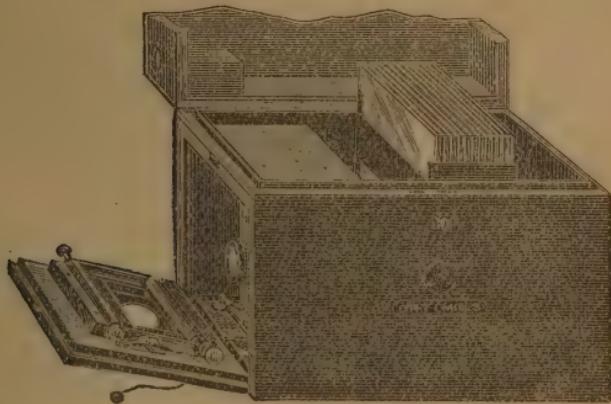
There is no method of ascertaining the true focus of a lens more beautiful and accurate than that of making the camera itself do duty as a theodolite—a method that will always be associated with the name of the late Mr. Thomas

Grubb. In adopting this system, a table, on which is spread a large sheet of white paper, is brought up to a window, and the camera is placed thereon. The only preparation of the camera necessary is to draw a pencil line at each end, and from top to bottom of the ground glass, say, one inch from the edge, although any definite distance is quite immaterial so long as both sides are alike. Now, having selected any object at a distance, such as a church spire, a tree, or a chimney of a house, focus this sharply upon one of the lines drawn on the ground glass, and then with a pencil draw a straight line on the sheet of paper on the table, using the edge of the baseboard of the camera as a ruler. Without altering the focus of the lens, rotate the camera until the same selected object falls upon the second of the vertical pencilled lines, and draw another straight line on the sheet of paper, using the same side of the camera, as before, as a ruler.

The camera may now be lifted down, as the measurement is to be deduced from the paper, which contains as yet only two lines. These are to be prolonged until they meet at a point; and by a pair of compasses opened out to the distance between the two marks on the focussing screen, these two lines are connected by a cross line like that in the letter A, that is to say, the cross line must equal the distance between these marks. The true equivalent focus of the lens by which the experiment was conducted is equal to the distance between the centre of the cross line and the junction of the two side lines.

#### 'OPTIMUS' IMPROVED MAGAZINE HAND CAMERA.

THE original 'Optimus' Magazine Camera was well received on all sides, as, being the least complicated of reservoir cameras. The 1893-4 model is, however, superlatively perfect in the simplicity of its construction and absence of complicated mechanism. The changing of plates does not necessitate passing from box to box through a slot, or the performance of any such acrobatic feat, for the plate falls by its own weight, guided by a continuous groove, from the



upper to the lower or exposure chamber. A 'Rapid Euryscope' can be accurately focussed from outside the box by rack and pinion arrangement. Finders are fitted which give proportionate images. A roller-blind shutter, capable of giving exposures of varying speeds, is fixed within the instrument. Those who appreciate efficiency will find this unobtrusive, black leather-covered box their *vade mecum*.

## EASTMAN'S NEW MODEL FOLDING KODAKS.

THE folding form of Kodaks issued by the Eastman Company have for a long time been greatly in demand by the more advanced among the innumerable 'Kodakers,' but the latest series which we have recently inspected leave nothing to be desired by the most expert and critical workers.

There has now been added to the No. 4 (5×4) and No. 5 (5×7) a No. 6 Folding Kodak for whole plate and stereoscopic work. Each of these three cameras is fitted with rectilinear lenses working at F 8, and Bausch & Lomb's new Automatic diaphragmatic shutter working from one-hundredth of a second to 3 seconds. The time-exposures are made by the simple movement of a lever from one side to the other. The lenses and shutters are un-shipped from the camera-front in a manner that may be said to be truly American, and which we have repeatedly advocated, viz., by means of a bayonet joint. Another great advantage with these instruments is that the long focus rapid rectilinear lenses can be unscrewed, and wide-angle lenses used with the same shutter, thus making the one shutter do duty with both sets of lenses. The folding tail-board has been introduced for use with the wide angle or stereoscopic lenses, and will be appreciated by those who make architectural work a speciality.

The Eastman Co. has never been slow to recognise the wants of the photographic public, and has certainly done the right thing in fitting these cameras with rising and sliding fronts and double swing backs.

The Nos. 5 and 6 are adaptable for stereoscopic work, and can be fitted with accurately paired lenses and double Bausch & Lomb shutters.

We must congratulate the manufacturers upon the advance that has been made in this series of cameras, which must give the greatest satisfaction alike to purchaser and seller.

## PAYNE'S CRYSTAL CAGE.

MR. J. H. PAYNE, Mexborough, Rotherham, has devised a modification of such crystal cages as we have previously seen. As the name implies, the 'cage' is a porcelain vessel, perforated with holes, into which the crystals to be dissolved are placed. There is a flange, which may rest on a beaker, tumbler, or other vessel containing water, and by a series of projections on the cage and notches in the flange, the former may be lowered down to any desired depth. A small calico bag is supplied for inserting in the cage, which permits of solution and filtration proceeding automatically and simultaneously.

## BIBLIOGRAPHY OF THE YEAR.

THE Bibliography of the year includes:—*The Lantern Slide Manual*, by J. A. Hodges; *Photographs of the year*; *Photographs at the Pall Mall Exhibition*; *Handbook of Regulations of the Chicago Exhibition*; *Aide-Memoire Pratique de Photographie*; *Die Photo-Keramik*, by Kruger and Husnik; *Elementary Photography*, by John A. Hodges; *Hints on Enlarging*, by the London Stereoscopic Co.; *Practical Pocket Book of Photography*, by Dr. E. Vogel; *Amateur Photography*, by W. I. Lincoln Adams; *Official Catalogue of the Chicago Exhibition*; *The A B C Guide to the making of Autotype prints* (new edition), by J. R. Sawzer; *La Fotografia, secondo I Processi Moderni*, by Dr. L. Gioppi; *The Martial Annals of the City of York*, by Rev. Cæsar Caine; *Half-Holidays with the Camera*, by Bernard Alhieri; *The Great Barrier Reef of Australia*, by W. Saville Kent, F.L.S.; *Traite Pratique de Photo-lithographie*, by Leon Vidal; *The Art of Projection*, by an Expert; *Pictorial Effect in Photography* (new edition) by H. P. Robinson.

# FORMULÆ.

## DEVELOPING FORMULÆ.

### METOL.

#### SINGLE-SOLUTION DEVELOPER.

|                          |            |
|--------------------------|------------|
| Metol .....              | 40 grains. |
| Sulphite of soda .....   | 120 "      |
| Hydroquinone .....       | 48 "       |
| Carbonate of potash..... | 240 "      |
| Water .....              | 8 ounces.  |

Apply heat if necessary to dissolve the metol, and afterwards add the sulphite, and allow that to dissolve before adding the other ingredients.

For use under normal conditions, one part of the above is to be diluted with three parts of water.

#### TWO-SOLUTION DEVELOPER.

|                             |            |
|-----------------------------|------------|
| A. Metol .....              | 40 grains. |
| Hydroquinone .....          | 48 "       |
| Sulphite of soda .....      | 120 "      |
| Water .....                 | 8 ounces.  |
| B. Carbonate of potash..... | 1 ounce.   |
| Water .....                 | 1 quart.   |

For use, mix one part of A with three parts of B for ordinary exposures; for over-exposures use less of B, or else add a few drops of a ten per cent. solution of bromide of potassium, or of a five per cent. solution of citric acid; for slight under-exposure, increase B.

#### THREE-SOLUTION FORMULA.

|                        |            |
|------------------------|------------|
| A. Metol .....         | 40 grains. |
| Sulphite of soda ..... | 120 "      |
| Water .....            | 8 ounces.  |



|                             |            |
|-----------------------------|------------|
| B. Hydroquinone .....       | 40 grains. |
| Citric acid .....           | 10 "       |
| Water .....                 | 8 ounces.  |
| C. Carbonate of potash..... | 1 ounce.   |
| Water .....                 | 20 ounces. |

For use under similar conditions to those already mentioned, take one part each of A and B and two parts of C.

If required for use with plates of the more rapid type, or such as are difficult to work up to density, the proportion of B to A may be increased, as, for instance, making the mixture one part of A to two each of B and C. In some instances a better result is obtained by increasing the proportions of A and B equally, keeping C the same, say one and a half part to each of A and B to two parts of C.

### METOL-HAUFF.

#### *Solution A.*

|                     |            |
|---------------------|------------|
| Water .....         | 100 parts. |
| Metol .....         | 1 part.    |
| Soda sulphite ..... | 10 parts.  |

#### *Solution B.*

|                                        |            |
|----------------------------------------|------------|
| Water .....                            | 100 parts. |
| Carbonate potash (or substitute) ..... | 10 "       |
| Crystallised carbonate soda .....      | 20 "       |

For use, three parts A to one of B, with 40 minims of bromide of potassium solution (1 : 10).

### METOL-ANDRESEN.

The formula for development issued with Metol-Andresen is as follows:—

|                            |                       |
|----------------------------|-----------------------|
| Water .....                | 1 quart.              |
| Metol .....                | $\frac{3}{4}$ ounce.  |
| Sulphite of soda .....     | 7 ounces.             |
| Carbonate of potash .....  | $3\frac{1}{2}$ "      |
| Bromide of potassium ..... | $\frac{1}{10}$ ounce. |

## ILFORD ORDINARY PLATES.

### PRICES, per Dozen :—

|                                    |                                    |               |                                    |                                    |                         |              |                                    |              |
|------------------------------------|------------------------------------|---------------|------------------------------------|------------------------------------|-------------------------|--------------|------------------------------------|--------------|
| $3\frac{1}{4} \times 3\frac{1}{4}$ | $4\frac{1}{4} \times 3\frac{1}{4}$ | $5 \times 4$  | $6\frac{1}{2} \times 4\frac{1}{4}$ | $6\frac{1}{2} \times 4\frac{3}{4}$ | $7\frac{1}{2} \times 5$ | $8 \times 5$ | $8\frac{1}{2} \times 6\frac{1}{2}$ | $9 \times 7$ |
| 1/-                                | 1/-                                | 1/7           | 2/2                                | 2/3                                | 3/5                     | 3/9          | 4/3                                | 5/-          |
|                                    |                                    | $10 \times 8$ | $12 \times 10$                     | $15 \times 12$                     |                         |              |                                    |              |
|                                    |                                    | 7/3           | 10/6                               | 18/-                               |                         |              |                                    |              |

*The Finest Plate for all-round work ever made.*

To photographers who prefer to work with separate solutions the following is recommended:—

|                         |                      |
|-------------------------|----------------------|
| A. Water .....          | 1 quart.             |
| Metol .....             | $\frac{3}{4}$ ounce. |
| Sulphite of soda .....  | 7 ounces.            |
| B. Water .....          | 3 quarts.            |
| Carbonate of soda ..... | 7 ounces.            |

Of these one part of A is mixed with three parts of water for use, bromide of potassium being added as required for the prevention of fogging.

### ANDRESEN'S GLYCIN.

The directions for using Dr. Andresen's glycin are as follows:—

#### I. For soft development:

*Solution A (warm slightly).*

|                                 |          |
|---------------------------------|----------|
| Glycin .....                    | 4 parts. |
| Carbonate of potash .....       | 1½ "     |
| Sulphite of soda (cryst.) ..... | 12 "     |
| Water .....                     | 100 "    |

*Solution B.*

|                           |       |
|---------------------------|-------|
| Carbonate of potash ..... | 10 "  |
| Water .....               | 100 " |

For use mix one part of A with two parts of B.

#### II. For hard development:

|                                 |          |
|---------------------------------|----------|
| Glycin .....                    | 5 parts. |
| Carbonate of potash .....       | 25 "     |
| Sulphite of soda (cryst.) ..... | 25 "     |
| Water .....                     | 100 "    |

For use to be diluted three times its volume.

### GLYCIN-HAUFF.

The concentrated developer is made up as follows:—350 grains of sodium sulphite crystal are dissolved in one ounce of water, 150 grains of glycin are then added and heated to boiling point, and one and a half ounces of potash carbonate are added (begin adding the potash in small



quantities, on account of the carbonic acid gas). When cold, this concentrated developer—forming a thin, pasty solution—may be kept as stock. For use, shake the solution first, and dilute the required quantity twelve times for ordinary purposes. For use when development is to be left to itself the stock solution is diluted fifty times.

#### A ONE-SOLUTION FORMULA.

|                           |            |
|---------------------------|------------|
| Sodium sulphite.....      | 40 grains. |
| Glycin .....              | 20 "       |
| Potassium carbonate ..... | 80 "       |
| Water .....               | 4 ounces.  |

#### PARA-AMIDOPHENOL.

|                                        |            |
|----------------------------------------|------------|
| Para-amidophenol chlorhydrate .....    | 5 grammes. |
| Crystallised carbonate of sodium ..... | 50 "       |
| Crystallised sulphite of sodium .....  | 50 "       |
| Water .....                            | 1000 "     |

For use, dilute with an equal bulk of water.

|                                     |            |
|-------------------------------------|------------|
| Para-amidophenol hydrochlorate..... | 60 grains. |
| Sodium sulphite .....               | 60 "       |
| " carbonate .....                   | 400 "      |
| Water .....                         | 20 ounces. |

#### DR. ANDRESEN'S FORMULA.

|                                     |          |
|-------------------------------------|----------|
| Para-amidophenol chlorhydrate ..... | 8 parts. |
| Sodium sulphite .....               | 80 "     |
| " carbonate .....                   | 40 "     |
| Water .....                         | 1000 "   |

#### AMIDOL.

|                       |            |
|-----------------------|------------|
| Amidol .....          | 80 grains. |
| Sodium sulphite ..... | 800 "      |
| Water .....           | 8 ounces.  |

For use, one ounce of the solution is diluted with three ounces of water, with one and a half grains of potassium bromide to the ounce of developer.

## ILFORD RAPID PLATES.

### PRICES, per Dozen :

|         |         |         |         |          |         |         |         |     |
|---------|---------|---------|---------|----------|---------|---------|---------|-----|
| 3½×3½   | 4½×3½   | 5×4     | 6½×4½   | 6½×4½    | 7½×5    | 8×5     | 8½×6½   | 9×7 |
| 1/3 ... | 1/3 ... | 2/- ... | 2/9 ... | 3/- ...  | 4/6 ... | 4/9 ... | 5/6 ... | 6/6 |
|         |         |         | 10×8    | 12×10    | 15×12   |         |         |     |
|         |         |         | 9/6 ... | 13/- ... | 23/-    |         |         |     |

FOR HAND CAMERA WORK IS UNEQUALLED.

### AMIDOL-HAUFF.

The following are the official instructions for the use of Amidol-Hauff:

#### I.—CONCENTRATED STOCK SOLUTION.

|                                    |            |
|------------------------------------|------------|
| Water .....                        | 7 ounces.  |
| Sodium sulphite, cryst., pure..... | 1½ „       |
| Amidol .....                       | 60 grains. |

May be kept for a long time in full bottles well corked.

For use, mix one ounce of this concentrated solution with three ounces of water, and according to the make of the plates, add a small quantity, at most twenty drops, of potassium bromide (1 : 10). In this state the solution may be used four or five times successively, without much loss of developing power, but it is not advisable to leave the developer standing too long, or to prepare more of it than necessary for the work in hand.

For landscapes, or strongly lighted subjects, the developer may be employed in a still more diluted form.

#### II.—TWO-SOLUTION DEVELOPER.

|                                     |            |
|-------------------------------------|------------|
| Water .....                         | 20 ounces. |
| Sodium sulphite, cryst., pure ..... | 1 ounce.   |

This solution will keep for any length of time.

For use, eight to ten grains of amidol powder and a few drops of potassium bromide (1 : 10) are added to four ounces of the above solution. To be saved the trouble of frequent weighings, keep a little horn or bone spoon for measuring the required quantity of amidol. To retard development, use a ten per cent. solution of bromide, and to accelerate it add a twenty per cent. solution of sodium sulphite. On very hot days, or for plates inclined to fog, it is recommended to add a few drops of citric acid (1 : 10). With normal exposures the image should appear in from eight to ten seconds, and be fully developed in about four minutes. Over-exposure is recognised by the immediate appearance of the picture, in all its details, as soon as the developer is applied, the deep shadows becoming veiled, and all more or less fogged. For over-exposure it is necessary to use a weak developer, and to increase very largely the quantity of bromide, using, in extreme cases, even up to one-quarter bulk of the amidol solution. In every case of unknown exposure it is advisable to begin with a weak developer, or one which has done duty before, and increase the strength, when, from first indications, it is found safe to do so. For under-exposures, a strong developer or a large addition of the sulphite is



recommended, and these also help to give greater density, which end may likewise be secured by prolonging the development. The degree of intensity is best judged of by transmitted light, remembering always to make allowance for reduction in the fixing process.

### III.—SPECIAL DEVELOPERS.

#### *Solution A.*

|                               |            |
|-------------------------------|------------|
| Water .....                   | 20 ounces. |
| Potassium metabisulphite..... | 2 „        |
| Amidol .....                  | 1 ounce.   |

This solution will keep for a very long time if well corked.

#### *Solution B.*

|                     |            |
|---------------------|------------|
| Water .....         | 20 ounces. |
| Soda crystals ..... | 2 „        |

#### *Solution C.*

|                                     |            |
|-------------------------------------|------------|
| Water .....                         | 20 ounces. |
| Sodium sulphite, cryst., pure ..... | 4 „        |

Results similar to pyro may be obtained with

|                        |           |
|------------------------|-----------|
| Solution A .....       | 10 parts. |
| „ B .....              | 6-10 „    |
| Water .....            | 70 „      |
| Bromide (1 : 10) ..... | 3 „       |

But this formula may be considerably modified, according to requirements; it is not, however, advisable to increase the quantity of alkali, for fear of inducing fog.

For over-exposed plates, add the solution B in the above formula little by little, until the desired effect is obtained, never exceeding the amount above prescribed.

Images of a softer character are obtained as follows:—

|                        |                                     |
|------------------------|-------------------------------------|
| Solution A .....       | 10 parts.                           |
| „ B .....              | 20-40 „                             |
| Water .....            | 70 „                                |
| Bromide (1 : 10) ..... | $\frac{1}{2}$ - $\frac{3}{4}$ part. |

### IV.—SEPARATE DEVELOPER.

#### *Solution D.*

|                                   |                      |
|-----------------------------------|----------------------|
| Water .....                       | 20 ounces.           |
| Sodium sulphite, pure cryst. .... | $\frac{2}{5}$ ounce. |
| Amidol .....                      | 2 ounces.            |

## ILFORD SPECIAL RAPID PLATES.

### PRICES, per Dozen :

|                                    |                                    |              |                                    |                                    |                         |              |                                    |              |
|------------------------------------|------------------------------------|--------------|------------------------------------|------------------------------------|-------------------------|--------------|------------------------------------|--------------|
| $3\frac{1}{2} \times 3\frac{1}{2}$ | $4\frac{1}{2} \times 3\frac{1}{2}$ | $5 \times 4$ | $6\frac{1}{2} \times 4\frac{1}{2}$ | $6\frac{1}{2} \times 4\frac{3}{4}$ | $7\frac{1}{2} \times 5$ | $8 \times 5$ | $8\frac{1}{2} \times 6\frac{1}{2}$ | $9 \times 7$ |
| 1/6 ...                            | 1/6 ...                            | 2/6 ...      | 3/3 ...                            | 3/8 ...                            | 5/3 ..                  | 5/6 ...      | 6/6 ...                            | 8/-          |
|                                    |                                    |              | $10 \times 8$                      | $12 \times 10$                     | $15 \times 12$          |              |                                    |              |
|                                    |                                    |              | 10/-                               | 16/-                               | 24/-                    |              |                                    |              |

*We challenge Competition for Speed, Density, and Gradation.*

This solution keeps colourless for a long time in full and air-tight vessels. When opened it goes from yellow to red, which, however, does not affect the developing power, or colouration of plates.

*Solution C.*

|                                   |            |
|-----------------------------------|------------|
| Water .....                       | 20 ounces. |
| Sodium sulphite, pure cryst. .... | 4 ,,       |

For use take—

|                     |          |
|---------------------|----------|
| Solution D .....    | 5 parts. |
| Water .....         | 50-70 ,, |
| Solution C .....    | 20-30 ,, |
| Bromide (1 : 10) .. | 1½ ,,    |

This formula also has the advantage, by gradually adding solution C, of controlling development up to the point desired, which is specially important for over-exposed plates.

As the image loses on fixing it is recommended to develop more strongly.

FOR BROMIDE PAPER.

Both for prints and enlargements either of the above formulæ may be used, and the freedom from stains will prove of great advantage. With diluted solutions clear grey tones are obtained.

FOR CHLORIDE PLATES AND LANTERN SLIDES.

Transparencies of the blackest tones are developed with :—

|                                     |            |
|-------------------------------------|------------|
| Water .....                         | 20 ounces. |
| Sodium sulphite, cryst., pure ..... | 1 ounce.   |
| Amidol .....                        | 40 grains. |

Warmer tones are obtained through longer exposure and the liberal addition of bromide, even up to one ounce in the four ounce developer.

EIKONOGEN.

- No. 1. A. Crystalline sulphite of soda ..... 40 grammes.  
 Eikonogen..... 3 ,,  
 Distilled water ..... 500 c.cm.
- B. Carbonate of potash (or calcined soda) 60 to 75 grammes.  
 Distilled water ..... 500 c.cm.
- For use, mix equal volumes of A and B.



## FOR PORTRAITS AND LANDSCAPES.

No. 2. A. Four parts sulphite of sodium are dissolved in sixty parts of water. To this solution add one part of crystallised eikonogen, which has been previously finely powdered by means of a mortar, and dissolve by shaking. Should a mortar be wanting, the solution can also be prepared in the following manner:—To four parts sulphite of sodium and one part eikonogen, which are placed either in an earthen or enamelled vessel, ten parts water are added, and the dissolution brought about by boiling and stirring. The hot solution is then poured into a flask containing fifty parts cold water.

B. Three parts crystallised carbonate of soda are dissolved in twenty parts cold water. Immediately before developing mix three parts of solution No. 1 with one part of solution No. 2.

FOR INSTANTANEOUS PHOTOGRAPHS WITH HAND CAMERAS (ABOUT  $\frac{1}{5}$ TH OF A SECOND EXPOSURE).

No 3. For this purpose Formula No. 1 is to be used, with the exception that for the crystallised carbonate of soda is substituted the same quantity of carbonate of potassium.

## FOR VERY SHORT INSTANTANEOUS EXPOSURES, AND FOR INCREASING THE POWER OF THE DEVELOPERS NOS. 1 AND 2 IN CASES WHERE THE PLATE HAS NOT BEEN SUFFICIENTLY EXPOSED.

No. 4. Five parts sulphite of sodium, two parts carbonate of potassium, and one part eikonogen, are placed in an earthen or enamelled vessel, and to these are added thirty parts water, the dissolution being brought about by boiling and stirring. After having been allowed to cool, the developer, which is now ready for use, is preserved in a tightly closed bottle. The developer, if it has been prepared exactly according to the above method, keeps in good condition for a long time.

## FIXING BATH FOR PLATES WHICH HAVE BEEN DEVELOPED WITH EIKONOGEN.

Plates which have been developed by means of eikonogen should be well washed, and will greatly benefit by being fixed in a bath composed of four parts hyposulphite of soda, one part bisulphite of soda, twenty parts water. The advantages of fixing in this bath are that (1) the negatives have a perfect tone, which enables very fast printing; (2) the new fixing bath remains, even after frequent usage, clear and water-white; (3) the plate need not be bathed in a solution of alum before fixing, and it is therefore not possible that the plate should be covered with a white layer in consequence of insufficient rinsing. Should the

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nature of the plate require that the coating be hardened, then there is no objection to an alum bath being used either before or after fixing, yet the quantity of alum added must not exceed one part to each twenty parts of water, as a stronger solution might cause the gelatine to blister. The bisulphite of soda can be replaced by ordinary neutral sulphite of soda (the same as is used when developing with eikonogen), provided that the bath be acidulated by means of a little sulphuric acid. In this case it should be made up in the following manner:—Dissolve twenty parts hyposulphite of soda and five parts neutral sulphite of soda in one hundred parts water, to which add slowly one part concentrated sulphuric acid. This bath, if properly prepared, answers the same purpose as the other, also remaining clear and water-white.

#### FORMULA FOR DEVELOPING GELATINE-BROMIDE PAPER WITH EIKONOGEN.

The paper, having been exposed to the light, is soaked in forty parts water. The paper is hereupon taken out, and ten parts of a solution prepared according to Formula 3 are added to the bath. Should the picture be slow in appearing, and the details not be perceptible, then add gradually a further quantity of solution 3. If the paper has been exposed too long, only a small quantity of solution 3 must be used from the commencement. The addition of bromide of potassium is often the cause of the details not being forthcoming; it should therefore not be employed. After developing, the picture should be well washed, and then placed for several minutes in an alum bath, whereupon it is again washed and fixed.

The crystallised soda employed in formula need not be pure, but the same quality that is used in every household.

#### GOTTHEL'S ONE-SOLUTION DEVELOPER.

|                                     |           |
|-------------------------------------|-----------|
| Sulphite of soda in crystals .....  | 8 ounces. |
| Carbonate of soda in crystals ..... | 3 "       |
| Distilled water.....                | 80 "      |
| Eikonogen .....                     | 1 ounce.  |

#### HYDROQUINONE.

ALTHOUGH somewhat diversified in composition and proportion, the following are each employed and recommended by successful workers:—

|        |                         |          |
|--------|-------------------------|----------|
| No. 1. | Hydroquinone .....      | 1 part.  |
|        | Sulphite of soda.....   | 2 parts. |
|        | Carbonate of soda ..... | 10 "     |
|        | Water .....             | 67 "     |



|                         |                                 |            |
|-------------------------|---------------------------------|------------|
| No. 2. A.               | Hydroquinone .....              | 4 grains.  |
|                         | Meta-bisulphite of potash ..... | 4 "        |
|                         | Bromide of potassium .....      | 1 grain.   |
|                         | Distilled water .....           | 1 ounce.   |
| B.                      | Potassium hydrate .....         | 10 grains. |
|                         | Distilled water .....           | 1 ounce.   |
| Equal parts of A and B. |                                 |            |

With some plates the bromide may be omitted.

|           |                                        |             |
|-----------|----------------------------------------|-------------|
| No. 3. A. | Hydroquinone .....                     | 80 grains.  |
|           | Citric acid .....                      | 10 "        |
|           | Sulphite of soda (recrystallised)..... | 80 "        |
|           | Distilled water .....                  | 20 ounces.  |
| B.        | Caustic potash (fused).....            | 160 grains. |
|           | Sulphite of soda .....                 | 160 "       |
|           | Distilled water.. ..                   | 20 ounces.  |
| C.        | Bromide of potassium .....             | 24 grains.  |
|           | Distilled water .....                  | 1 ounce.    |
| D.        | Caustic potash .....                   | 160 grains. |
|           | Distilled water .....                  | 20 ounces.  |

For normal exposures use equal parts of A and B, adding five minims of C for every ounce of solution.

For over-exposed plates use D instead of B, with an extra quantity of C.

For under-exposed plates omit C, and in extreme cases add six or eight grains more of sulphite of soda to each ounce of the developer. The object of increasing or decreasing the quantity of sulphite is to give greater or lesser density.

|                   |                                  |             |
|-------------------|----------------------------------|-------------|
| No. 4. A.         | Hydroquinone .....               | 160 grains. |
|                   | Sulphite of soda .....           | 2 ounces.   |
|                   | Citric acid .....                | 60 grains.  |
|                   | Bromide of ammonium .....        | 20 "        |
|                   | Water to.....                    | 20 ounces.  |
| B.                | Carbonate of potash.....         | 2 ounces.   |
|                   | Carbonate of soda (crystal)..... | 2 "         |
|                   | Water to.....                    | 20 "        |
| Take equal parts. |                                  |             |
| No. 5. A.         | Hydroquinone .....               | 15 grains.  |
|                   | Sulphite of soda .....           | 75 "        |
|                   | Water .....                      | 5 ounces.   |

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- B. Carbonate of potash..... 90 grains.  
Water ..... 5 ounces.

C. Ten per cent. solution of bromide of potassium.

Use equal parts of A and B, and add two or three minims of C. With some plates no bromide restrainer will be required.

- No 6. Sulphite of soda..... 40 grammes.  
Hydroquinone ..... 5 "  
Carbonate of soda ..... 75 "  
Water ..... 200 c.c.

For use, dilute ten c.c. with water to thirty-five c.c.

For a single stock solution prepare as follows :—

- No. 7. A. Hydroquinone ..... 50 grains.  
Meta-bisulphite of potash ..... 80 "  
Water ..... 4 ounces.  
B. Carbonate of potash ..... 840 grains.  
Water ..... 4 ounces.

Filter solution B, and then mix A and B.

For use, take half an ounce of this solution and add to five ounces of water. The picture takes perhaps rather longer to appear, but gradually and evenly works up to the required density. If the plate should prove to have been over-exposed, add a little water to the developer, but avoid the use of bromides. Some may prefer to keep the solutions separate, when they would keep indefinitely; in this event prepare as follows :—

- No. 8. A. Hydroquinone ..... 15 grains.  
Meta-bisulphite of potash ..... 20 "  
Water ..... 1 ounce.  
B. Carbonate of potash ..... 180 grains.  
Water ..... 20 ounces.

For use, add two drachms of A to five ounces of B. Plates can be developed in the same solution one after another, even after it has attained the colour of light port wine.

- No. 9. Bitartrate of potash ..... 90 grains.  
Sulphite of potash ..... 45 "  
Carbonate of potash ..... 4 ounces.  
Water ..... 16 "

Filter, and add—

- Hydroquinone .....  $\frac{1}{2}$  ounce.

For use, one part is diluted with sixteen parts water.

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'SPECIAL' LANTERN PLATES.

Brilliancy. Latitude. Clear High Lights.



(Having dissolved the sulphite of soda, add sufficient citric acid in solution to cause a piece of blue litmus paper inserted therein to become reddened.)

|                            |            |
|----------------------------|------------|
| B. Carbonate of soda ..... | 3 ounces.  |
| Carbonate of potash .....  | 1 ounce.   |
| Water .....                | 32 ounces. |

When about to develop, mix these in equal proportions with two parts the bulk of water, or, if the weather be *very* hot at the time, even a greater proportion of water.

|                                  |           |
|----------------------------------|-----------|
| No. 2. A. Sulphite of soda ..... | 4 ounces. |
| Warm distilled water .....       | 4 "       |

When cooled to 70° Fahr., add—

|                                             |            |
|---------------------------------------------|------------|
| Sulphurous acid water (strongest to be had) | 3½ ounces. |
| Pyrogallol .....                            | 1 ounce.   |

|                              |           |
|------------------------------|-----------|
| B. Carbonate of potash ..... | 3 ounces. |
| Water .....                  | 4 "       |
| Sulphite of soda .....       | 2 "       |
| Water .....                  | 4 "       |

Mix separately, and then combine in one solution.

To make two ounces of developer, pour into the graduate one drachm of A (equivalent in all to six grains of pyro) and twenty minims or a quarter of a drachm of B, then fill the graduate to two ounces with water. If after two or three minutes no trace of the image appears in the brilliant high lights, add to the graduate twenty minims more of the potash solution, mix with the developer, and return to the plate. Do not exceed two and a half drachms of the alkaline solution.

In addition to the above a large number of formulæ for pyrogallie developers are given in a tabulated form on pages 786, 787.

### FERROUS OXALATE.

|                                                     |          |
|-----------------------------------------------------|----------|
| No. 1. Saturated solution of sulphate of iron ..... | 1 part.  |
| Saturated solution of oxalate of potash .....       | 3 parts. |

Mix *quant. suff.* by pouring the iron into the oxalate. In hot weather the proportion of the iron solution may be diminished with advantage.

### FOR TRANSPARENCIES ON GELATINO-CHLORIDE PLATES.

|                                           |            |
|-------------------------------------------|------------|
| No. 2. A. Neutral oxalate of potash ..... | 2 ounces.  |
| Chloride of ammonium .....                | 40 grains. |
| Distilled water .....                     | 20 ounces. |



|                           |            |
|---------------------------|------------|
| B. Sulphate of iron ..... | 4 drachms. |
| Citric acid .....         | 2 „        |
| Alum .....                | 2 „        |
| Distilled water .....     | 16 ounces. |

For black tones mix the above in equal volumes.

## ORTHOCHROMATIC DRY PROCESSES.

F. E. IVES'.

Use any good bromide collodion emulsion that contains no free nitrate of silver. Flow plate as usual, and, as soon as the emulsion film sets, flow several times with strong alcoholic solution of chlorophyl from blue myrtle or plantain leaves, then immerse in water strongly tinted with blue shade eosine, and keep in motion until smooth.

Sensitises for all colours, including deep ruby red. A very light yellow screen is sufficient to secure correct rendering of colour tone.

V. SCHUMANN'S.

Soak the plate in 200 c.c. of water and 2 to 4 c.c. of ammonia for two to three minutes, then immerse in

|                                              |          |
|----------------------------------------------|----------|
| Distilled water .....                        | 200 c.c. |
| Alcohol .....                                | 10 „     |
| Ammonia .....                                | 4 „      |
| Alcoholic solution of cyanine, 1 : 500 ..... | 10 „     |

DRS. MALLMANN AND SCOLIK'S.

### *Preliminary Bath.*

|                |          |
|----------------|----------|
| A. Water ..... | 200 c.c. |
| Ammonia .....  | 2 „      |

Soak the plate for two minutes.

### *Colour Bath.*

|                                    |         |
|------------------------------------|---------|
| Erythrosine solution, 1:1000 ..... | 25 c.c. |
| Ammonia .....                      | 4 „     |
| Water .....                        | 175 „   |

The plate should not remain longer in this bath than one and a quarter minute. A longer time depresses the general sensitiveness.

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|                     |           |
|---------------------|-----------|
| Alcohol .....       | 500 c.c.  |
| Chinoline red ..... | 1 gramme. |

To which are added 50 c.c. of a solution of

|                                |           |
|--------------------------------|-----------|
| Alcohol .....                  | 500 c.c.  |
| Chinoline blue (cyanine) ..... | 1 gramme. |

The above solution is identical with the liquid dye sold under the name 'Azaline.'

## THE WET-COLLODION PROCESS.

### IODISED COLLODION (for Negatives).

|                          |                  |
|--------------------------|------------------|
| Ether, s.g. .725 .....   | 10 fluid ounces. |
| Alcohol, s.g. .805 ..... | 8        "       |
| Pyroxyline .....         | 120 grains.      |
| Iodide of ammonium ..... | 12       "       |
| "    cadmium .....       | 20       "       |

### BROMO-IODISED COLLODION (for Negatives).

|                          |                  |
|--------------------------|------------------|
| Ether, s.g. .725 .....   | 10 fluid ounces. |
| Alcohol, s.g. .805 ..... | 10       "       |
| Pyroxyline .....         | 120 grains.      |
| Iodide of ammonium ..... | 40       "       |
| "    cadmium .....       | 40       "       |
| Bromide of   "    .....  | 20       "       |

### BROMO-IODISED COLLODION (for Positives or Ferrotypes).

|                           |                  |
|---------------------------|------------------|
| Ether, s.g. .725 .....    | 10 fluid ounces. |
| Alcohol, s.g. .805 .....  | 10       "       |
| Pyroxyline .....          | 100 grains.      |
| Iodide of cadmium .....   | 50       "       |
| Bromide of ammonium ..... | 20       "       |

### THE NITRATE BATH (for Negatives).

|                                          |                  |
|------------------------------------------|------------------|
| Nitrate of silver (recrystallised) ..... | 6 ounces.        |
| Distilled water .....                    | 80 fluid ounces. |
| Nitric acid (pure).....                  | 10 minims.       |

Saturate with iodide of silver and filter.

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(For Positives or Ferrotypes.)

|                                            |                  |
|--------------------------------------------|------------------|
| Nitrate of silver (recrystallised) .....   | 5 ounces.        |
| Distilled water .....                      | 80 fluid ounces. |
| Nitric acid (pure).....                    | 12 minims.       |
| Saturate with iodide of silver and filter. |                  |

DEVELOPER.

FOR NEGATIVES.

|                                       |                      |
|---------------------------------------|----------------------|
| No. 1. Protosulphate of iron .....    | $\frac{1}{4}$ ounce. |
| Glacial acetic acid .....             | $\frac{1}{4}$ "      |
| Alcohol .....                         | $\frac{1}{8}$ "      |
| Water .....                           | 8 ounces.            |
| No. 2. Ammonio-sulphate of iron ..... | 75 grains.           |
| Glacial acetic acid .....             | 75 "                 |
| Sulphate of copper .....              | 7 "                  |
| Water .....                           | 3 ounces.            |

FOR COLLODION POSITIVES OR FERROTYPES.

|                             |                       |
|-----------------------------|-----------------------|
| Protosulphate of iron ..... | $1\frac{1}{2}$ ounce. |
| Nitrate of baryta .....     | 1 "                   |
| Water .....                 | 1 pint.               |
| Alcohol .....               | 1 ounce.              |
| Nitric acid .....           | 40 drops.             |

FOR COLLODION TRANSFERS.

|                       |              |
|-----------------------|--------------|
| Pyrogallic acid ..... | 5 grains.    |
| Citric acid .....     | 3 "          |
| Acetic acid .....     | 45 minims.   |
| Water .....           | 1 ounce.     |
| Alcohol .....         | quant. suff. |

PYROXYLINE FOR DRY-COLLODION PROCESSES.

FOR COLLODIO-BROMIDE OR UNWASHED EMULSION.

|                                   |                |
|-----------------------------------|----------------|
| Nitric acid, s.g. 1.45 .....      | 2 fluid ounces |
| Sulphuric acid, s.g. 1.845 .....  | 4 "            |
| Water .....                       | 1 fluid ounce. |
| Cotton (cleaned and carded) ..... | 100 grains.    |
| Temperature .....                 | 150° Fahr.     |
| Time of immersion .....           | 10 minutes.    |



## FOR WASHED EMULSION.

|                                     |                 |
|-------------------------------------|-----------------|
| No. 1. Nitric acid, s.g. 1·45 ..... | 2 fluid ounces. |
| Sulphuric acid, s.g. 1·845 .....    | 6    "          |
| Water .....                         | 1 fluid ounce.  |
| Cotton (cleaned and carded) .....   | 100 grains.     |
| Temperature .....                   | 140° Fahr.      |
| Time of immersion .....             | 10 minutes.     |
| No. 2. Nitric acid, s.g. 1·45 ..... | 2 fluid ounces. |
| Sulphuric acid, s.g. 1·845 .....    | 3    "          |
| White blotting-paper .....          | 145 grains.     |
| Temperature .....                   | 100° Fahr.      |
| Time of immersion .....             | 30 minutes.     |

## COLLODIO-BROMIDE EMULSION.

|                                       |                 |
|---------------------------------------|-----------------|
| Ether, s.g. ·720 .....                | 5 fluid ounces. |
| Alcohol, s.g. ·820 .....              | 3    "          |
| Pyroxyline .....                      | 50 grains.      |
| Bromide of cadmium and ammonium ..... | 80   "          |
| or Bromide of zinc .....              | 76   "          |

Sensitise by adding to each ounce fifteen grains of nitrate of silver, dissolved in a few drops of water and one drachm of boiling alcohol. This is suitable for slow landscape work or for transparencies.

## WASHED EMULSION (for Landscapes).

## No. 1.

|                                           |                   |
|-------------------------------------------|-------------------|
| Ether, s.g. ·720 .....                    | 4 fluid ounces.   |
| Alcohol, s.g. ·820 .....                  | 2 $\frac{3}{4}$ " |
| Pyroxyline .....                          | 40 grains.        |
| Castile soap (dissolved in alcohol) ..... | 30   "            |
| Bromide of ammonium and cadmium .....     | 84   "            |

Sensitise with one hundred grains of nitrate of silver dissolved in one ounce of boiling alcohol; and, after standing ten days, add a further twenty grains of silver dissolved as before in two drachms of alcohol.

---

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---

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## No. 2 (rapid).

|                                       |                 |
|---------------------------------------|-----------------|
| Ether, s.g. .720 .....                | 4 fluid ounces. |
| Alcohol, s.g. .820 .....              | 2½ „            |
| Pyroxyline .....                      | 40 grains.      |
| Castile soap .....                    | 30 „            |
| Bromide of ammonium and cadmium ..... | 56 „            |

Sensitise with 125 grains of nitrate of silver, dissolved, as before, in one ounce of alcohol with the aid of heat. In twelve hours' time add thirty grains more of the double bromide of ammonium and cadmium dissolved in half an ounce of alcohol.

## FOR WASHED EMULSION (for Transparencies).

|                                       |                 |
|---------------------------------------|-----------------|
| Ether, s.g. 720 .....                 | 5 fluid ounces. |
| Alcohol, s.g. .820 .....              | 3 „             |
| Pyroxyline or papyroxyline .....      | 60 grains.      |
| Bromide of cadmium and ammonium ..... | 100 „           |
| or Bromide of zinc .....              | 96 „            |
| Hydrochloric acid, s.g. 1.2 .....     | 8 minims.       |

Sensitise with twenty grains of nitrate of silver to each ounce, dissolved in a minimum of water with two drachms of boiling alcohol. Allow to stand for two or three days.

N.B.—In the three last formulæ, the emulsion, after being allowed to ripen for the time stated, should be poured into a dish and allowed to become thoroughly dry. The mass of dry emulsion is then washed, to remove all the soluble salts, and is then again dried and redissolved in equal parts of ether and alcohol, at the rate of from twenty to twenty-four grains to the ounce of solvents.

## ORGANIFIERS (for Unwashed Emulsions).

*For Landscape Work.*

|                     |                  |
|---------------------|------------------|
| No. 1. Tannin ..... | ½ ounce.         |
| Gallic acid .....   | 60 grains.       |
| Water .....         | 20 fluid ounces. |
| No. 2. Tannin ..... | 300 grains.      |
| Water .....         | 20 fluid ounces. |

## ILFORD BROMIDE PAPERS

*Give a Brilliancy of Image, Clearness of Shadows,  
and Purity of High Lights quite unequalled.*

*For Landscapes or Transparencies (warm brown tone).*

|       |                             |          |
|-------|-----------------------------|----------|
| No 3. | Freshly ground coffee ..... | 1 ounce. |
|       | Boiling water .....         | 1 pint.  |

*For Transparencies (brownish-black tone).*

|       |                       |                  |
|-------|-----------------------|------------------|
| No 4. | Tannin .....          | 30 grains.       |
|       | Pyrogallic acid ..... | 60 „             |
|       | Water .....           | 20 fluid ounces. |

DEVELOPING SOLUTIONS FOR COLLODION EMULSION.

SOLUTION A.

|                       |                |
|-----------------------|----------------|
| Pyrogallic acid ..... | 96 grains.     |
| Alcohol .....         | 1 fluid ounce. |

SOLUTION B.

|                            |                |
|----------------------------|----------------|
| Bromide of potassium ..... | 10 grains.     |
| Water .....                | 1 fluid ounce. |

SOLUTION C.

|                                 |                   |
|---------------------------------|-------------------|
| Liquor ammoniæ, s.g. '880 ..... | 1 fluid drachm.   |
| Water .....                     | 15 fluid drachms. |

OR D.

|                             |                |
|-----------------------------|----------------|
| Carbonate of ammonium ..... | 12 grains.     |
| Water .....                 | 1 fluid ounce. |

For each drachm of developer take, for a normal exposure, five minims of A, one or two minims of B, and one or two minims of C; or, if D be used, add the above quantities of A, B, and C, to one drachm of D. When the details of the image are out, add double the quantities of B and C.

INTENSIFYING SOLUTIONS FOR COLLODION EMULSION.

|                         |            |
|-------------------------|------------|
| Nitrate of silver ..... | 60 grains. |
| Citric acid .....       | 30 „       |
| Nitric acid .....       | 30 minims. |
| Water .....             | 2 ounces.  |

To each drachm of a three-grain solution of pyrogallic acid add two or three minims of the above, and apply until sufficient density is attained.

# ILFORD BROMIDE PAPERS.

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|                              |                  |                     |                                  |                         |
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| 4½ × 3½, 6d. ....            | 5 × 4, 9d. ....  | 6½ × 4½, 1/1 ....   | 8 × 5, 1/5 ....                  | } Per doz.<br>} sheets. |
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| 18 × 15, 5/3 ...             | 20 × 16, 5/9 ... | 23 × 17, 6/9 ...    | 24½ × 19, 7/6 per ½-doz. sheets. |                         |
| Rolls, 10 ft. × 24½ ins. ... |                  |                     | 8/6                              |                         |

All four qualities One Price.

## NEGATIVE REDUCERS.

## FARMER'S.

Saturated solution of ferridecyanide of potassium. 1 part.  
 Hyposulphite of soda solution, 1.5 ..... 10 parts.

## L. BELITZKI'S.

Potassium ferric oxalate ..... 1 to 10 grains.  
 Hyposulphite of soda solution, 1 to 5 ..... 1 ounce.

## INTENSIFIERS.

## MONCKHOVEN'S.

1. A. Bromide of potassium ..... 10 grains.  
 Bichloride of mercury ..... 10 ,,  
 Water ..... 1 ounce.
- B. Pure cyanide of potassium ..... 10 grains.  
 Nitrate of silver ..... 10 ,,  
 Water ..... 1 ounce.

Place the negative in A till it is white, then rinse and transfer it to solution B. If the intensification has been carried too far, it may be reduced by treatment with a weak solution of hyposulphite of soda.

2. A. Bichloride of mercury ..... 1 ounce.  
 Chloride of ammonium ..... 1 ,,  
 Potassic iodide ..... 1 ,,

Dissolve the mercury and ammonium salts in ten ounces of water, putting them both in together, and add sufficient of the strong iodide of potash solution; shake well, and make up to twenty ounces with water.

- B. Silver nitrate .....  $\frac{1}{2}$  ounce.  
 Potassium cyanide, sufficient to dissolve out the first precipitate.

Now make up this bulk to twenty ounces with water.



This solution should not be used at full strength when little density is required, but diluted to half. The fixed and well-washed negatives should be placed in a dish containing the A solution, and gently kept in motion for a few seconds. Examine from time to time until it appears quite dense, take out and well wash again until the film is an even yellow all over, then place in a dish containing the B solution, and let remain until the film becomes a beautiful olive-brown, then lift out and set aside to dry.

## HYP0 ELIMINATORS, CLEARING SOLUTIONS, &c.

### TO RESTORE FADED NEGATIVES.

Mr. W. E. Debenham recommends the following solution for the purpose of restoring printing force to negatives which have faded after mercurial intensification:—

|                       |            |
|-----------------------|------------|
| Schlippe's salt ..... | 10 grains. |
| Water .....           | 1 ounce.   |

Wet the film thoroughly by soaking in a dish of water, and immerse in the restoring solution until the desired effect is obtained.

### TO REMOVE THE LAST TRACES OF HYP0 FROM THE FILM.

#### HYDROXIL.

|                                           |           |
|-------------------------------------------|-----------|
| Peroxide of hydrogen (twenty vols.) ..... | 1 drachm. |
| Water .....                               | 5 ounces. |

After washing the negative well it is immersed for a couple of minutes in the solution and again rinsed in water, when the intensification with silver can be at once proceeded with.

#### ANOTHER.

Where peroxide of hydrogen is not obtainable the following may be used as a substitute, the solution containing that substance in combination with others:—

|                           |           |
|---------------------------|-----------|
| Barium dioxide .....      | 1 ounce.  |
| Glacial acetic acid ..... | 1 „       |
| Water .....               | 4 ounces. |

Reduce the barium dioxide to a fine powder and add it gradually to the acid and water, shaking until dissolved. A few minutes' immersion in this solution will effectually remove or destroy the last traces of hypo.

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M M 2

## ALUM.

A simple plan brought forward by Captain Abney for this specific purpose consists in employing a saturated solution of alum in place of the solution of hydroxyl or peroxide of hydrogen.

## EAU DE JAVELLE.

|                                             |           |
|---------------------------------------------|-----------|
| Dry chloride of lime (hypochlorite of lime) | 2 ounces. |
| Carbonate of potash .....                   | 4 "       |
| Water.....                                  | 40 "      |

Mix the chloride of lime with thirty ounces of the water; dissolve the carbonate of potash in the remainder. Mix, boil, and filter.

## LABARRAQUE'S SOLUTION.

|                         |           |
|-------------------------|-----------|
| Chloride of lime .....  | 2 ounces. |
| Carbonate of soda ..... | 4 "       |
| Water.....              | 40 "      |

Mix the chloride of lime with thirty ounces of the water, and dissolve the carbonate of soda in the remainder. Mix, boil, and filter.

## CLEARING SOLUTIONS.

|                  |            |
|------------------|------------|
| Alum .....       | 2 ounces.  |
| Citric acid..... | 1 ounce.   |
| Water.....       | 10 ounces. |

Wash moderately after fixing, and immerse the negative in the above.

## ANOTHER.

|                                      |            |
|--------------------------------------|------------|
| Saturated solution of alum .....     | 20 ounces. |
| Hydrochloric acid (commercial) ..... | 1 ounce.   |

Immerse the negative after fixing, having previously washed it for two or three minutes under the tap; wash well after removal from the alum and acid.

## FORMULÆ FOR NEGATIVE VARNISHES.

|                       |            |
|-----------------------|------------|
| No. 1. Sandarac ..... | 4 ounces.  |
| Alcohol .....         | 28 "       |
| Oil of lavender.....  | 3 "        |
| Chloroform .....      | 5 drachms. |

Post Free.

|                          |         |     |
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| ILFORD 'MANUAL' ... ..   | 1/- ... | 1/3 |
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| ILFORD 'EXPOSURE METER'  | 5/- ... | 5/3 |
| ILFORD ISO. SCREEN... .. | 7/6 ... | 7/9 |

|                                 |            |
|---------------------------------|------------|
| No. 2. White hard varnish ..... | 15 ounces. |
| Methylated alcohol.....         | 25 "       |

This will be found a good and cheap varnish if durability is not required, as it is easily rubbed up for retouching upon and easily cleaned off. Very suitable for enlarged negatives that are not to be retained.

Tough, hard, and durable;—

|                         |                 |
|-------------------------|-----------------|
| No. 3. Shellac .....    | 1½ ounce.       |
| Mastic .....            | ¼ "             |
| Oil of turpentine.....  | ¼ "             |
| Sandarac .....          | 1½ "            |
| Venice turpentine ..... | ¼ "             |
| Camphor .....           | 10 grains..     |
| Alcohol .....           | 20 fluid ounces |
| No. 4. Sandarac .....   | 90 ounces.      |
| Turpentine .....        | 36 "            |
| Oil of lavender.....    | 10 "            |
| Alcohol .....           | 500 "           |

This one may be rubbed down with powdered resin, and gives a splendid surface for retouching:—

|                                 |                  |
|---------------------------------|------------------|
| No. 5. Sandarac .....           | 2 ounces.        |
| Seed lac.....                   | 1 to 1½ ounce.   |
| Castor oil .....                | 3 drachms.       |
| Oil of lavender.....            | 1½ drachm.       |
| Alcohol .....                   | 18 fluid ounces. |
| No. 6. Best orange shellac..... | 1½ ounce.        |
| Methylated alcohol .....        | 1 pint.          |

Keep in a warm place until dissolved; then add a large teaspoonful of whiting or prepared chalk; set aside to clear, and then decant. This is specially recommended for gelatine negatives.

#### RETOUCHING VARNISH.

|                  |            |
|------------------|------------|
| Sandarac .....   | 1 ounce.   |
| Castor oil ..... | 80 grains. |
| Alcohol .....    | 6 ounces.  |

First dissolve the sandarac in the alcohol, and then add the oil.

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*Monthly Journal. Fifth year.*

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## GROUND-GLASS VARNISH.

|                |                                        |
|----------------|----------------------------------------|
| Sandarac ..... | 90 grains.                             |
| Mastic .....   | 20 "                                   |
| Ether .....    | 2 ounces.                              |
| Benzole .....  | $\frac{1}{2}$ to $1\frac{1}{2}$ ounce. |

The proportion of the benzole added determines the nature of the matt obtained.

## PERMANENT SENSITISED ALBUMEN PAPER.

1.—Sensitise the paper in the usual bath, drain well, and when superficially dry float the back of the paper for twenty minutes on a solution of

|                  |            |
|------------------|------------|
| Citric acid..... | 1 ounce.   |
| Water .....      | 30 ounces. |

Or,

2.—Sensitise as usual, drain well, and wash the paper in three or four changes of water, then float the back on a solution of

|                            |           |
|----------------------------|-----------|
| Nitrite of potassium ..... | 5 ounces. |
| Water .....                | 100 "     |

When dry, roll the paper up, coated side out, and wrap in blotting-paper soaked in the nitrite of potash solution, and dried.

## GELATINO-CHLORIDE FOR PRINTING-OUT.

## BARKER'S FORMULA.

|                                                      |             |
|------------------------------------------------------|-------------|
| Gelatine (Nelson's No. 1 and Coignet's, equal parts) | 175 grains. |
| Chloride of ammonium .....                           | 18 "        |
| Rochelle salts.....                                  | 50 "        |
| Nitrate of silver .....                              | 75 "        |
| Alcohol .....                                        | 4 drachms.  |
| Water .....                                          | 5 ounces.   |

Heat to 100° Fahr., and allow to remain at this temperature after all is dissolved for ten minutes, after which proceed in the usual way.

## ILFORD EXPOSURE METER

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*Settles once and for all the two great questions of Plate  
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**SIMPLE, SCIENTIFIC, AND CHEAP.**

## TONING BATHS FOR THE FOREGOING.

Wash the prints in clean water and then *tone* in the following:—

1. A. Distilled water ..... 25 ounces.  
 Acetate of soda (recrystallised) ..... 1 ounce.  
 Into which pour a solution of 1 per cent. of  
 chloride of gold..... 2 ounces.
- B. In ten ounces of distilled water, dissolve two drachms of  
 sulphocyanide of ammonium, and add one ounce solution  
 of 1 per cent. chloride of gold.

For toning, mix in the proportion of twenty ounces of A to six of B, if possible the evening before using.

## ANOTHER.

2. A. Water ..... 3 ounces.  
 Chloride of gold ..... 2 grains.
- B. Water ..... 3 ounces.  
 Sulphocyanide of ammonium ..... 40 grains.  
 Hyposulphite of soda..... 1 grain.  
 Carbonate of soda ..... 3 grains.

These are mixed together by one part of A being poured into an equal part of B; in no case the reverse.

**O**UR annual increase in sales (since we commenced business in 1879) is the surest proof of the appreciation kindly meted out to our goods. We hold the premier position, but are not content to remain stationary. Everything that common sense, practical experience, and unlimited resources make possible, will be done to still further improve and extend the business.

—◆—

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---

## TONING FORMULÆ FOR GELATINO-CHLORIDE PAPERS.

COMBINED TONING AND FIXING BATH FOR EASTMAN SOLIO PAPER.

### No. 1.

|                       |            |
|-----------------------|------------|
| Hypo .....            | 20 ounces. |
| Alum .....            | 5 "        |
| Soda sulphate .....   | 10 "       |
| Potash sulphate ..... | 2 "        |
| Water .....           | 160 "      |

### No. 2.

|                     |            |
|---------------------|------------|
| Gold chloride ..... | 15 grains. |
| Lead acetate .....  | 64 "       |
| Water .....         | 8 ounces.  |

For use, eight ounces of No. 1 solution; one ounce of No. 2.

A red precipitate is thrown down in the gold solution, but, if shaken before addition to the hypo, it will be redissolved.

### *Formula for Blue Tones.*

### No. 1.

|             |             |
|-------------|-------------|
| Borax ..... | 600 grains. |
| Water ..... | 160 ounces. |

# ILFORD POP



THE FINEST  
PRINTING PAPER  
IN THE WORLD.

THE BRITANNIA WORKS COMPANY, LIMITED,  
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## No. 2.

|                    |            |
|--------------------|------------|
| Gold chloride..... | 15 grains. |
| Water .....        | 15 ounces. |

For use, eight ounces of No. 1; half ounce of No. 2. The solutions must be kept separate.

## TONING BATH FOR ILFORD PRINTING-OUT PAPER.

|                                 |            |
|---------------------------------|------------|
| Water.....                      | 16 ounces. |
| Sulphocyanide of ammonium ..... | 30 grains. |
| Gold chloride .....             | 2½ "       |

This can be used the moment it is made, but preferably it should stand twenty-four hours before use. The bath keeps indefinitely, and works better as it grows older.

## A COMBINED TONING AND FIXING BATH.

|                                |            |
|--------------------------------|------------|
| Water.....                     | 20 ounces. |
| Hypo .....                     | 5 "        |
| Citric acid .....              | 60 grains. |
| Acetate of lead .....          | 60 "       |
| Sulphocyanide of ammonium..... | 240 "      |

These are added, and dissolved in the order given, and the solution allowed to stand for twenty-four hours. A precipitate will then be thrown down, and the clear solution decanted off. Then add—

|                        |           |
|------------------------|-----------|
| Chloride of gold ..... | 3 grains. |
|------------------------|-----------|

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### TONING FORMULÆ FOR ALBUMEN PRINTS.

|                               |            |
|-------------------------------|------------|
| No. 1. Chloride of gold ..... | 1 grain.   |
| Acetate of soda .....         | 30 grains. |
| Water.....                    | 8 ounces.  |

This must not be used till one day after preparation. It keeps well, and gives warm, rich tones.

|                               |           |
|-------------------------------|-----------|
| No. 2. Chloride of gold ..... | 1 grain.  |
| Bicarbonate of soda .....     | 4 grains. |
| Water.....                    | 8 ounces. |

This is ready for immediate use after preparation, but it will not keep.

|                               |            |
|-------------------------------|------------|
| No. 3. Chloride of gold ..... | 1 grain.   |
| Phosphate of soda .....       | 20 grains. |
| Water.....                    | 8 ounces.  |

This gives rich tones of a deep purple nature, but must be used soon after preparation.

|                            |             |
|----------------------------|-------------|
| No. 4. Gold solution ..... | 10 drachms. |
| Acetate of lime .....      | 20 grains.  |
| Chloride of lime .....     | 1 grain.    |
| Tepid water .....          | 20 ounces.  |

The 'gold solution' before mentioned is prepared by neutralising as much as is required of a one-grain solution of chloride of gold by shaking it up with a little prepared chalk, then allowing it to settle, and filtering off the clear liquid. This toning bath improves by keeping.



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SECOND.—We have the largest premises and plant for the manufacture of these goods.

THIRD.—We manufacture the largest variety of these goods.

To use, add two ounces of it to eight ounces of tepid water, which will prove sufficient to tone a full-sized sheet of paper.

|                               |            |
|-------------------------------|------------|
| No. 5. Chloride of gold ..... | 15 grains. |
| Water.....                    | 5 ounces.  |

Neutralise with lime water, make up to fifteen ounces with water, and add two drachms of chloride of calcium. This stock solution will keep for a long time for use. Dilute one ounce with ten ounces of water.

#### TONING AND FIXING IN ONE BATH.

|                                 |            |
|---------------------------------|------------|
| No. 6. Chloride of gold .....   | 1 grain.   |
| Phosphate of soda .....         | 15 grains. |
| Sulphocyanide of ammonium ..... | 25 „       |
| Hyposulphite of soda .....      | 240 „      |
| Water.....                      | 2 ounces.  |

Dissolve the gold separately in a small quantity of water, and add it to the other solution.

#### 'DUSTING-ON' FORMULÆ.

|                                                     |            |
|-----------------------------------------------------|------------|
| No. 1. Saturated solution of bichromate of ammonium | 5 drachms. |
| Honey .....                                         | 3 „        |
| Albumen .....                                       | 3 „        |
| Distilled water.....                                | 20 to 30 „ |

**'Quality with Uniformity.'**

THIS IS THE KEYNOTE

TO THE

**GREAT SUCCESS**

OF

**ILFORD PLATES & PAPERS.**

**THE BRITANNIA WORKS COMPANY, LIMITED,**  
ILFORD, LONDON, E.

|        |                           |                      |
|--------|---------------------------|----------------------|
| No. 2. | Dextrine .....            | $\frac{1}{2}$ ounce. |
|        | Grape sugar .....         | $\frac{1}{2}$ "      |
|        | Bichromate .....          | $\frac{1}{4}$ "      |
|        | Water .....               | $\frac{1}{2}$ pint.  |
| No. 3. | Gum arabic .....          | 6 parts.             |
|        | Bichromate of potash..... | 2.5 "                |
|        | Grape sugar .....         | 4 "                  |
|        | Water .....               | 72 "                 |
| No. 4. | Honey .....               | 4 drachms.           |
|        | Glucose .....             | 8 "                  |
|        | Albumen .....             | 6 "                  |
|        | Dextrine .....            | 3 "                  |
|        | Bichromate of potash..... | 8 "                  |
|        | Water .....               | 20 ounces.           |

### MISCELLANEOUS.

(In employing the following formulae, it should be well understood that the glass plate to be silvered must be scrupulously clean.)

#### SILVERING MIRRORS (MARTIN'S METHOD).

- A. Nitrate of silver ..... 175 grains.  
Distilled water ..... 10 ounces.
- B. Nitrate of ammonium ..... 262 grains.  
Distilled water ..... 10 ounces.
- C. Pure caustic potash ..... 1 ounce (avoirdupois).  
Distilled water ..... 10 ounces.
- D. Pure sugar candy .....  $\frac{1}{2}$  ounce (avoirdupois).  
Distilled water ..... 5 ounces.

Dissolve and add—

Tartaric acid ..... 50 grains.

Boil in a flask for ten minutes, and when cool add—

Alcohol ..... 1 ounce.

Distilled water *quant. suff.* to make up to 10 ounces.

For use take equal parts of A and B. Mix together also equal parts of C and D, and mix in another measure. Then mix both these mixtures together in the silvering vessel, and suspend the mirror face downward in the solution.

#### INK FOR RUBBER STAMPS.

Aniline red (violet) ..... 90 grains.

Boiling distilled water ..... 1 ounce.

Glycerine ..... half a teaspoonful.

Treacle ..... half as much as glycerine.

## TO RECOVER FOGGED PLATES.

Make a solution as follows :—

|                           |            |
|---------------------------|------------|
| Chromic acid .....        | 30 grains. |
| Bromide of potassium..... | 60 „       |
| Water.....                | 10 ounces. |

And immerse the plates for five minutes. Afterwards wash very thoroughly, and rear up to dry.

Or, instead of the above, make the following :—

|                            |            |
|----------------------------|------------|
| Bichromate of potash ..... | 1 ounce.   |
| Hydrobromic acid.....      | 2 drachms. |
| Water .....                | 10 ounces. |

If hydrobromic cannot be obtained, use hydrochloric acid or a soluble bromide ; in the last case a few drops of sulphuric acid being added to the solution. Use as before.

## SOLUTION FOR MOUNTING PRINTS WITHOUT THEIR COCKLING.

|                                            |           |
|--------------------------------------------|-----------|
| Nelson's No. 1 photographic gelatine ..... | 4 ounces. |
| Water .....                                | 16 „      |
| Glycerine .....                            | 1 ounce.  |
| Methylated alcohol .....                   | 5 ounces. |

Dissolve the gelatine in the water, then add the glycerine, and lastly the spirit.

## ENCAUSTIC PASTE.

|                           |            |
|---------------------------|------------|
| Pure wax .....            | 500 parts. |
| Gum elemi .....           | 10 „       |
| Benzole.....              | 200 „      |
| Essence of lavender ..... | 300 „      |
| Oil of spike .....        | 15 „       |

## SENSITISING SOLUTION FOR CARBON TISSUE.

|                           |                  |
|---------------------------|------------------|
| Bichromate of potash..... | 1 ounce.         |
| Water .....               | 20 to 30 ounces. |
| Liquor ammoniaë .....     | 20 minims.       |

## WAXING SOLUTION.

FOR CARBON PRINTS, OR FOR REMOVING COLLODION FILMS.

|                           |            |
|---------------------------|------------|
| No. 1. Beeswax .....      | 20 grains. |
| Benzole rect. No. 1 ..... | 4 ounces.  |

FOR FLEXIBLE SUPPORTS (Autotype).

|                                       |            |
|---------------------------------------|------------|
| No. 2. Yellow resin.....              | 3 drachms. |
| Yellow beeswax .....                  | 1 drachm.  |
| Rectified spirits of turpentine ..... | 10 ounces, |

## GELATINE EMULSION PROCESSES.

## W. K. BURTON'S FORMULA.

|                               |             |
|-------------------------------|-------------|
| A. Bromide of ammonium .....  | 260 grains. |
| Iodide of potassium .....     | 20 "        |
| Gelatine (Nelson No. 1) ..... | 80 "        |
| Distilled water .....         | 10 ounces.  |
| B. Silver nitrate (dry) ..... | 200 grains. |
| C. Silver nitrate .....       | 200 grains. |
| Distilled water .....         | 1 ounce.    |
| Converted to ammonio-nitrate. |             |
| D. Gelatine, hard (dry) ..... | 600 grains. |

## BURBANK'S FORMULA.

|                           |                  |
|---------------------------|------------------|
| Water .....               | 1 ounce.         |
| Bromide of ammonium ..... | 15 to 20 grains. |

Or,

|                                                                   |                  |
|-------------------------------------------------------------------|------------------|
| Bromide of potassium .....                                        | 18 to 25 grains. |
| Nitrate of silver, proportioned to the amount<br>of bromide ..... | 25 to 30 "       |
| Gelatine .....                                                    | 30 to 40 "       |

## CAPTAIN ABNEY'S FORMULA.

|                                  |            |
|----------------------------------|------------|
| 1. Potassium bromide .....       | 10 grains. |
| 2. Ammonium bromide .....        | 140 "      |
| 3. Nelson's No. 1 gelatine ..... | 30 "       |
| 4. Silver nitrate .....          | 200 "      |
| 5. Nelson's No. 1 gelatine ..... | 80 "       |
| 6. Coignet's special .....       | 80 "       |

## CHARLES BENNETT'S FORMULA.

|                        |            |
|------------------------|------------|
| Ammonium bromide ..... | 70 grains. |
| Silver nitrate .....   | 110 "      |
| Gelatine .....         | 200 "      |
| Distilled water .....  | 6 ounces.  |

## DR. EDER'S AMMONIA FORMULA.

|                            |              |
|----------------------------|--------------|
| 1. Potassium bromide ..... | 370 grains.  |
| Gelatine .....             | 520 to 700 " |
| Water .....                | 10½ ounces.  |
| 2. Silver nitrate .....    | 460 grains.  |
| Water .....                | 10½ ounces.  |

Strong ammonia is added to No. 2 until the precipitate is just re-dissolved.

## DR. VAN MONCKHOVEN'S FORMULA.

1. Hydrobromic acid (sufficient to dissolve 150 grains of silver nitrate).  
 Gelatine ..... 40 grains.  
 Water ..... 7 ounces.
2. Silver nitrate ..... 150 grains.  
 Bicarbonate of soda ..... *q.s.* to precipitate the carbonate.
3. Gelatine ..... 30 grains.  
 Water (hot) ..... 7 ounces.

Nos. 2 and 3 are mixed and then No. 1 added, 150 grains of gelatine being finally introduced.

## A. L. HENDERSON'S FORMULA.

|                           |                  |
|---------------------------|------------------|
| Silver nitrate .....      | 120 grains.      |
| Water .....               | 3 ounces.        |
| Potassium carbonate ..... | 60 to 90 grains. |
| Water .....               | 3 ounces.        |
| Potassium bromide .....   | 90 grains.       |
| "    iodide .....         | 1 grain.         |
| Gelatine .....            | 20 grains.       |

## FORMULA FOR GELATINO-BROMIDE EMULSION.

|                        |                        |
|------------------------|------------------------|
| Ammonium bromide ..... | 75 grains.             |
| Gelatine .....         | 10 "                   |
| Silver nitrate .....   | 120 "                  |
| Nitric acid .....      | $\frac{1}{2}$ minim.   |
| Water .....            | $4\frac{1}{2}$ ounces. |

## FOR GELATINO-BROMO CHLORIDE.

|                        |                        |
|------------------------|------------------------|
| Ammonium bromide ..... | 65 grains.             |
| "    chloride .....    | 5 "                    |
| Gelatine .....         | 10 "                   |
| Silver nitrate .....   | 120 "                  |
| Nitric acid .....      | $\frac{1}{2}$ minim.   |
| Water .....            | $4\frac{1}{2}$ ounces. |

## FOR GELATINO-BROMO IODIDE.

|                         |                        |
|-------------------------|------------------------|
| Potassium bromide ..... | 84 grains.             |
| "    iodide .....       | 5 "                    |
| Gelatine .....          | 10 "                   |
| Silver nitrate .....    | 120 "                  |
| Nitric acid .....       | $\frac{1}{2}$ minim.   |
| Water .....             | $4\frac{1}{2}$ ounces. |

### RATES OF POSTAGE FOR INLAND LETTERS.

The rates of postage to be prepaid are as follow, viz. :—

|                                             |      |
|---------------------------------------------|------|
| For a letter not exceeding 1 oz. ....       | 1d.  |
| „ exceeding 1 oz., but not exceeding 2 ozs. | 1½d. |
| „ „ 2 „ „ 4 „                               | 2d.  |
| „ „ 4 „ „ 6 „                               | 2½d. |
| „ „ 6 „ „ 8 „                               | 3d.  |
| „ „ 8 „ „ 10 „                              | 3½d. |
| „ „ 10 „ „ 12 „                             | 4d.  |
| „ „ 12 „ „ 14 „                             | 4½d. |

And so on at the rate of ½d. for every additional two ounces.

### INLAND PARCEL POST.

EVERY Post Office is open to the public for Parcel Post business on Week Days during the same hours as for general postal business. On Sundays Parcel Post business is not transacted.

RATES OF POSTAGE AND WEIGHT.—Three-halfpence for each pound after the first, which is threepence.

PREPAYMENT OF POSTAGE.—All parcels must be prepaid. LIMITATION OF WEIGHT.—No Parcel exceeding 11 lbs. in weight can be received for transmission by Parcel Post. LIMITATION OF SIZE.—No Parcel may exceed 3 ft. 6 in. in length, or 6 ft. in length and girth combined. POSTING OF PARCELS.—Parcels must be handed in at a Post Office Counter, and must not be dropped into a Letter Box.

## WEIGHTS AND MEASURES.

## APOTHECARIES' WEIGHT.

## SOLID MEASURE.

|            |   |           |   |            |
|------------|---|-----------|---|------------|
| 20 Grains  | = | 1 Scruple | = | 20 Grains. |
| 3 Scruples | = | 1 Drachm  | = | 60 "       |
| 8 Drachms  | = | 1 Ounce   | = | 480 "      |
| 12 Ounces  | = | 1 Pound   | = | 5760 "     |

## FLUID.

|           |   |                 |
|-----------|---|-----------------|
| 60 Minims | = | 1 Fluid Drachm. |
| 8 Drachms | = | 1 Ounce.        |
| 20 Ounces | = | 1 Pint.         |
| 8 Pints   | = | 1 Gallon.       |

The above weights are those usually adopted in formulæ.

All Chemicals are usually sold by Avoirdupois Weight, in which there are 437½ grains to the ounce.

The Precious Metals, such as Silver and Gold, are sold by Troy Weight, containing 480 grains to the ounce.

## FRENCH WEIGHTS AND MEASURES,

## AND THEIR EQUIVALENTS IN ENGLISH.

|                      |   |                                   |
|----------------------|---|-----------------------------------|
| 1 Cubic Centimètre   | = | 17 minims nearly.                 |
| 3½ "                 | = | 1 drachm.                         |
| 28·4 "               | = | 1 ounce.                          |
| 50 "                 | = | 1 ounce, 6 drachms, 5 minims.     |
| 100 "                | = | 3 ounces, 4 drachms, 9 minims.    |
| 1000 "               | } | = 35 ounces, 1 drachm, 36 minims. |
| or 1 litre,          |   |                                   |
| = to 61 cubic inches |   |                                   |

The unit of French liquid measures is a cubic *centimètre*.

A cubic *centimètre* of water measures nearly 17 minims (16·896); it weighs 15·4 grains, or 1 *gramme*. A cubic *inch* of water weighs 252·5 grains.

The unit of French weights is the *gramme* = 15·4 grains; thus a drachm (60 grains) is nearly 4 grammes (3·88). An easy way to convert grammes into English weight is to divide the sum by 4, which gives the equivalent in drachms very nearly thus:—

|          |          |     |         |         |
|----------|----------|-----|---------|---------|
| Grammes. | Drachms. | Oz. | Drachm. | Grains. |
| 100 ÷ 4  | = 25     | = 3 | . 1     | + 48    |

## DEVELOPING FORMULÆ, ETC., OF THE PRINCIPAL PLATE-MAKERS.

In the following pages we have collated the developing formulæ of the principal makers of gelatine dry plates, lantern plates, and bromide paper. Commercial formulæ are now extremely numerous and varied. Their collection in this ALMANAC will enable many who have hitherto experienced difficulty in comparing the ingredients of a particular maker's formula with those of another to do so in future very readily.

### MESSRS. CADETT & NEALL'S DEVELOPERS.

#### *Stock Solution.*

|                                                                 |               |                 |
|-----------------------------------------------------------------|---------------|-----------------|
| Pyrogallic acid .....                                           | (avoirdupois) | 1 ounce.        |
| Ammonium bromide .....                                          | "             | $\frac{1}{2}$ " |
| Potass. meta-bisulphite .....                                   | "             | 1 "             |
| Distilled water to make altogether, 7 ounces, 3 drachms, fluid. |               |                 |

Dissolve the meta-bisulphite and bromide in part of the distilled water before adding the pyrogallic acid.

- A. Stock Solution ..... 1 ounce.  
 Distilled water to make altogether ..... 20 ounces = 1 pint.
- B. Ammonia (.890) .....  $2\frac{1}{2}$  drachms.  
 Distilled water to make altogether ..... 20 ounces = 1 pint.  
 Mix equal parts of A and B to make developer.

#### *Fixing Solution.*

|             |  |          |
|-------------|--|----------|
| Hypo .....  |  | 1 pound. |
| Water ..... |  | 1 quart. |

#### FERROUS OXALATE DEVELOPER.

- A. Ferrous sulphate ..... (avoirdupois) 5 ounces.  
 Sulphuric acid..... 10 minims.  
 Distilled water to make altogether (avoirdupois) 20 ounces.
- B. Neutral potass. oxalate ..... (avoirdupois) 10 ounces.  
 Distilled water to make altogether ..... (fluid) 40 "

Dissolve the potass. oxalate in about three-quarters of the distilled water, made warm, and make up to bulk after the salt is dissolved.

The ferrous sulphate should be powdered just before solution in about three-quarters of the distilled water to which the sulphuric acid has been previously added. Make up to bulk after solution.

To make developer, add one part of A to four of B. For over-exposure, add a few drops to the mixed developer of a ten per cent. solution of potassium bromide.

#### *Fixing Solution.*

|             |  |          |
|-------------|--|----------|
| Hypo .....  |  | 1 pound. |
| Water ..... |  | 1 quart. |

We also give another formula for pyro-ammonia development without the meta-bisulphite of potass.

*Stock Solution.*

Pyrogallic acid ..... (avoirdupois) 1 ounce.  
 Ammonium bromide ..... " 1 "  
 Sulphurous or sulphuric acid ..... 1 drachm.  
 Distilled water to make altogether, 7 ounces, 3 drachms, fluid.

Mix the acid with part of the distilled water before adding the bromide and pyrogallic acid.

A. Stock solution ..... 1 ounce.  
 Distilled water to make altogether ..... 20 ounces = 1 pint.

B. Liq. ammonia ('890) ..... 2½ drachms.  
 Distilled water to make altogether ..... 20 ounces = 1 pint.

Mix equal parts of A and B to make developer.

Fixing solution..... hypo, 1 pound; water, 1 quart.  
 Clearing solution ..... hydrochloric acid, ½ ounce.  
 Saturated solution ..... alum, 20 ounces.

## DEVELOPER FOR THE 'CADETT' LANTERN PLATE.

1. Pyrogallic acid ..... 40 grains.  
 Potass. meta-bisulphite ..... 2 drachms.  
 Ammonium bromide ..... 40 grains.  
 Distilled water to make ..... 20 ounces.

Liquor ammonia '890 ..... 2½ drachms.  
 Distilled water to make ..... 20 ounces.

Equal parts of 1 and 2 just before development.

## THE EASTMAN COMPANY'S FORMULÆ.

## FOR BROMIDE PAPER.

No. 1. Oxalate of potash..... 1 pound.  
 Hot water ..... 48 ounces.  
 Acetic acid ..... 3 drachms.

No. 2. Proto-sulphate of iron..... 1 pound.  
 Hot water ..... 32 ounces.  
 Acetic acid (or citric acid, ¼ ounce) ..... ½ drachm.

No. 3. Bromide of potassium..... 1 ounce.  
 Water..... 1 quart.

These solutions keep separately, but must be mixed only for immediate use.

To develop, take in a suitable tray, No. 1, six ounces; No. 2, one ounce; No. 3, half drachm. Mix in the order given; use cold. After exposure, soak the paper in water until limp; then immerse in the developer. The image should appear slowly, and should develop up strong, clear, and brilliant. When the shadows are sufficiently black, pour off the developer and flood the plate with the

*Clearing Solution.*

|                  |            |
|------------------|------------|
| Acetic acid..... | 1 drachm.  |
| Water.....       | 32 ounces. |

Do not wash the print after pouring off the developer and before applying the clearing solution. Use a sufficient quantity to flow over the print, say two ounces for an 8 × 10. Allow it to act for one minute, and then pour it off and apply a fresh portion; repeat the operation a third time, then rinse in pure water, and immerse for ten minutes in the

*Fixing Bath.*

|                            |           |
|----------------------------|-----------|
| Hyposulphite of soda ..... | 3 ounces. |
| Water .....                | 16 "      |

After fixing, wash thoroughly two hours, and hang up to dry. Use fresh developer for each batch of prints. With a glass-bottomed tray, seven ounces of developer are sufficient for a 25 × 30 print.

## FOR KODAK FILMS.

|                               |            |
|-------------------------------|------------|
| No. 1. Sulphite of soda.....  | 6 ounces.  |
| Hot water .....               | 32 "       |
| When cold, add—               |            |
| Pyrogallic acid .....         | 1 ounce.   |
| No. 2. Carbonate of soda..... | 3 ounces.  |
| Carbonate of potash .....     | 1 ounce.   |
| Water .....                   | 32 ounces. |

To develop, take, for normal exposures, one part each of No. 1 and No. 2, together with two parts of water. Other developer formulæ may work with these films, but the above is recommended as reliable. A number of films can be developed in *one* dish at the same time, provided the developing fluid be sufficiently deep to submerge them.

*Restrainer.*

|                            |           |
|----------------------------|-----------|
| Bromide of potassium ..... | 1 ounce.  |
| Water .....                | 6 ounces. |

Restrainer is to be used only in case of over-exposure. As soon as developed, rinse slightly, and transfer to a saturated solution of common alum for two minutes; then rinse again, and fix.

*Fixing Solution.*

|                            |           |
|----------------------------|-----------|
| Hyposulphite of soda ..... | 4 ounces. |
| Water .....                | 16 "      |

If a number of films are fixed together in one tray, they should be put in *face down*, to avoid abrasion of the sensitive surface. It is well to move them about in the fixing bath, from time to time, in order to remove any air bubbles. After fixing, *wash thoroughly*; then immerse for one minute in the

*Soaking Solution.*

|                 |                      |
|-----------------|----------------------|
| Water.....      | 16 ounces.           |
| Glycerine ..... | $\frac{1}{2}$ ounce. |

Remove from the soaking solution, and pin up each film by *one* of its corners, to dry spontaneously. Any tear drops of the soaking solution should be removed with a bit of blotting-paper or absorbent cotton.

The object of the soaking solution is to prevent the film from curling when dry. The negative must not be rinsed after having been withdrawn from the soaking solution. In warm and moist climates the excessive use of glycerine is to be avoided, inasmuch as it tends to decompose the gelatine.

Always keep finished negatives flat—*do not roll them up.*

## EDWARDS' FORMULÆ.

### PYRO.

Make two stock solutions and label them No. 1 and No. 2.

|                              |                      |
|------------------------------|----------------------|
| No. 1. Pyrogallic acid ..... | 1 ounce.             |
| Methylated alcohol .....     | 7 ounces.            |
| Glycerine .....              | $\frac{1}{2}$ ounce. |

Mix the glycerine and spirit and add to the pyro.

|                      |                        |
|----------------------|------------------------|
| Or, Pyrogallic ..... | 1 ounce.               |
| Citric acid .....    | 40 grains.             |
| Water .....          | $7\frac{1}{2}$ ounces. |

|                                   |             |
|-----------------------------------|-------------|
| No. 2. Bromide of potassium ..... | 120 grains. |
| Distilled water .....             | 7 ounces.   |
| Strong ammonia '880 .....         | 1 ounce.    |

These solutions will keep good, if well corked, for many months.

To make the developer, add one part of No. 1 to fifteen parts of ordinary water, and label this bottle D (developer); in another bottle mix one part of No. 2 with fifteen parts of water, and label A (accelerator).

### AN ALTERNATIVE PYRO DEVELOPER

Is that introduced by Mr. B. J. Edwards, of using first a developer which brings up all details, say equal parts A and D, and which does not require any modification if the plate has been correctly exposed; but, if the detail rushes up too quickly, indicating over-exposure, then the developer is poured off, and, without waiting to wash the plate, a second highly concentrated and restrained solution is immediately applied. This re-developer gives any amount of density, without bringing out any more detail.

|                            |             |
|----------------------------|-------------|
| No. 1. Pyro .....          | 64 grains.  |
| Citrate of ammonium .....  | 20 "        |
| Or, Citric acid .....      | 15 "        |
| Distilled water .....      | 4 ounces.   |
| No. 2. Ammonia ('880)..... | 2 drachms.  |
| Bromide of ammonium.....   | 180 grains. |
| Distilled water .....      | 4 ounces.   |

For use, mix equal parts of Nos. 1 and 2. The mixed developer may be used for several plates in succession.

## PYRO AND SODA.

For those who prefer, as many do, to use soda in place of ammonia, the following simple formula can be strongly recommended. We do not find, however, that pyro and soda allow the same latitude in exposure as pyro and ammonia; but for hand-camera work, or when the plate has only received the minimum of exposure, it is sometimes very useful:—

|                           |            |
|---------------------------|------------|
| No. 1. Pyro .....         | 1 ounce.   |
| Sulphite of soda .....    | 6 ounces.  |
| Sulphurous acid .....     | 1½ ounce.  |
| Distilled water .....     | 18 ounces. |
| No. 2. Washing soda ..... | 6 ounces.  |
| Distilled water .....     | 18 „       |

Dissolve the sulphite in the water, add the acid, and lastly, the pyro.

The above solutions will keep good for months. For use, dilute with seven parts of water to one part of the solution, and mix in equal proportions.

## HYDROQUINONE.

This developing agent has found great favour with many amateurs, principally on account of its not staining the fingers. The following will be found a useful formula, and can be used several times over. It naturally becomes less energetic and slower in action after having been used, so that for short exposures fresh solutions should be used:—

|                                      |             |
|--------------------------------------|-------------|
| Carbonate of soda (granulated) ..... | 100 grains. |
| Sulphite of soda (crystals) .....    | 480 „       |
| Hydroquinone .....                   | 100 „       |
| Water .....                          | 14 ounces.  |

## EIKONOGEN DEVELOPER FOR ISOCHROMATIC PLATES.

|                              |            |
|------------------------------|------------|
| No. 1. Distilled water ..... | 35 ounces. |
| Sulphite of soda .....       | 2 „        |
| Eikonogen .....              | 1 ounce.   |
| No. 2. Distilled water ..... | 10 ounces. |
| Carbonate of potash .....    | 1 ounce.   |

For use, mix one part of No. 2 with three parts of No. 1, and, when new, add to each ounce of the mixture two to three drops of a ten per cent. solution of bromide of potass. The developer can be used repeatedly by adding more No. 1 and 2, omitting the bromide.

## ELLIOTT &amp; SONS' FORMULÆ.

## THE 'BARNET' PLATES, ORDINARY.

|                             |            |
|-----------------------------|------------|
| No. 1. Ammonia ('880) ..... | 1½ ounce.  |
| Water .....                 | 20 ounces. |

|                             |                      |
|-----------------------------|----------------------|
| No. 2. Pyrogallic acid..... | 160 grains.          |
| Bromide of ammonium .....   | $\frac{3}{4}$ ounce. |
| Water .....                 | 20 ounces.           |
| Pure nitric acid .....      | 10 drops.            |

For use, mix  $\frac{1}{2}$  an ounce of No. 1,  $\frac{1}{2}$  an ounce of No. 2 with 3 ounces of water.

*Pyro and Ammonia (10 per cent. Solutions).*

|                                  |            |
|----------------------------------|------------|
| 1 Ammonia (.880) .....           | 1 ounce.   |
| Water .....                      | 9 ounces.  |
| No. 2. Bromide of ammonium ..... | 1 ounce.   |
| Water, to make .....             | 10 ounces. |
| No. 3. ....                      | 1 ounce.   |
| Water, to make .....             | 10 ounces. |
| Nitric acid, pure .....          | 20 drops.  |

For studio use, take 80 minims No. 1, 40 minims No. 2, 20 minims No. 3, and make up to 2 ounces with water.

The above developer is the same strength as that recommended on the boxes.

For outdoor work, take 80 minims No. 1, 60 minims No. 2, 40 minims No. 3, and make up to 2 ounces with water.

*Pyro and Soda Developer.*

|                                        |            |
|----------------------------------------|------------|
| No. 1. Pyro .....                      | 1 ounce.   |
| Water .....                            | 86 ounces. |
| Nitric acid, pure .....                | 20 drops.  |
| No. 2. Pure sulphite of soda .....     | 10 ounces. |
| Pure carbonate of soda (crystals)..... | 9 "        |
| Water .....                            | 86 "       |

Use equal parts of Nos. 1 and 2.

*Eikonogen Developer.*

(One solution for very short exposures.)

Dissolve 5 parts sulphite soda, 2 parts carbonate potassium, and 1 part eikonogen, in 30 parts of hot water. Ready for use when cold.

*Hydroquinone Developer.*

|                            |             |
|----------------------------|-------------|
| No. 1. Hydroquinone .....  | 160 grains. |
| Sulphite of soda .....     | 2 ounces.   |
| Citric acid.....           | 60 grains.  |
| Bromide of potassium ..... | 30 "        |
| Distilled water.....       | 8 ounces.   |
| No. 2. Caustic soda .....  | 160 grains. |
| Distilled water.....       | 8 ounces.   |

Use equal parts of Nos. 1 and 2.

## THE ILFORD FORMULÆ.

*Stock Solution.*

- No. 1. Pyrogallic acid ..... 1 ounce.  
 Bromide of ammonium..... 600 grains.

Made up to six ounces with water. When dissolved, add exactly twenty drops of pure nitric acid. This will keep for a considerable time.

- No. 2. Strongest liquid ammonia .880 ..... 3 drachms.  
 Water ..... 1 pint.

This will keep some time if well stoppered.

- No. 3. No. 1 solution ..... 1 ounce.  
 Water..... 19 ounces.

This will keep for a few days.

For developing, mix the solutions Nos. 2 and 3 in equal proportions just before using.

If the plate is found to be over-exposed, at once remove it from the dish, and pour over it, once or twice, some of solution No. 3, allowing that which runs off the plate to mix with the solution in the dish. Upon returning the plate to the dish, it will be found in most cases to develop as if correctly exposed.

When the development is about three parts completed (or sooner, in the case of under-exposure), it may be hastened by adding more of solution No. 2.

Never omit the alum bath before fixing.

Acid added to the alum bath entirely destroys its property of hardening the film.

Do not be tempted to add alum or any other foreign matter to the fixing bath.

*For Hydroquinone.*

- No. 1. Hydroquinone ..... 160 grains.  
 Bromide of potassium..... 30 "  
 Sulphite of soda ..... (avoirdupois) 2 ounces.  
 Water to ..... 20 "

- No. 2. Soda hydrate..... 100 grains.  
 Water ..... 20 ounces.

For use, take equal portions of each. The manipulation will be the same as for pyro development.

## A UNIVERSAL DEVELOPER.

- No. 1. Hydroquinone ..... 160 grains.  
 Bromide of potassium ..... 30 "  
 Sulphite of soda ..... (avoirdupois) 2 ounces.  
 Water to..... 20 "

- No. 2. Soda hydrate..... 100 grains.  
 Water ..... 20 ounces.

Use as follows:—For negatives on Ilford plates: Equal parts Nos. 1 and 2.

For Ilford alpha lantern plates (for warm tone): One part No. 1; half part No. 2; two parts water.

For Ilford bromide papers : One part No. 1 ; one part No. 2 ; one part water.

For Ilford special lantern plates (for black tones) : Equal parts Nos. 1 and 2.

For Ilford alpha paper : One part No. 1 ; half part No. 2 ; two parts water.

Although it must be understood that, in our opinion, hydroquinone is somewhat inferior to ferrous oxalate for papers, yet we do not hesitate to put forward this universal developer as an alternative method of working for those who desire simplicity.

NOTE.—The clearing bath must not be used when developing with hydroquinone,

#### FOR ALPHA PAPER,

*For producing Warm Toned Prints by Development.*

Make the following solutions, and do not use until cold:—

|                                          |               |             |
|------------------------------------------|---------------|-------------|
| No. 1. Oxalate of potash (neutral) ..... | (avoirdupois) | 1 pound,    |
| Bromide of ammonium .....                |               | 320 grains. |
| Warm water .....                         |               | 64 ounces.  |

Filter.

|                               |               |            |
|-------------------------------|---------------|------------|
| No. 2. Sulphate of iron ..... | (avoirdupois) | 4½ ounces. |
| Citric acid .....             | „             | ½ ounce.   |
| Water .....                   | „             | 80 ounces. |

Filter.

For use, add one part of No. 2 to three parts of No. 1, not *vice versa*. It will be noted that the developer is weak and much restrained; a more vigorous formula is unsuitable. The prints can be soaked in water if desired, but it is not essential, the only object being to secure an even flow of developer over surface. Development is complete when image appears fully out. At this stage a correctly exposed print will be of a warm brown colour, with a peach bloom over the whole surface. Over-exposures are indicated by a yellowish red colour, and under-exposures by greenish black.

Old developer, freshened with a proportion of new just before use, gives the best results. This is best kept in a bottle filled up to the stopper, replenished from time to time as required, with the two solutions freshly mixed. After development, and without washing, immerse for about half a minute in clearing solution, pour off, and repeat.

#### *Clearing Solution.*

|                      |            |
|----------------------|------------|
| Water .....          | 80 ounces. |
| Sulphuric acid ..... | ½ ounce.   |

This has a reducing action on alpha prints; therefore do not allow them to stay in the bath longer than time given, unless it is desired to correct over-development. Wash thoroughly for eight to ten minutes in several changes of water; all the acid must be removed, or yellowness of whites will result. Prints are now ready for toning and fixing, which can be done by gas or subdued daylight.

*Combined Toning and Fixing Bath.*

|                                 |               |            |
|---------------------------------|---------------|------------|
| Water .....                     | (avoirdupois) | 10 ounces. |
| Hyposulphite of soda.....       | ”             | 2½ ”       |
| Acetate of soda .....           | ”             | ½ ounce.   |
| Sulphocyanide of ammonium ..... | ”             | ½ ”        |
| Chloride of gold .....          | ”             | 4 grains.  |

This bath should be made forty-eight hours before use and allowed to clear; it keeps good for months in the dark, and may be used over and over again if replenished from time to time with a few drachms of a stock solution, made up as above with five of water only, and double quantity of gold. The constituents of the bath must be added and dissolved in the order given.

When first put into the combined bath, the prints turn yellow and lose all their vigour, but gradually regain both colour and strength, and toning is complete in about a quarter of an hour. Prints dry darker in tone, more vigorous in image, and with more detail than they appear when wet. After toning wash for two hours in running water, or in frequent changes. Allow the prints to dry naturally, or they can be squeegeed down whilst wet, on talced glass, matt or polished, or clean ferrotype plates, to produce matt or enamelled surface, as may be desired.

---

**THE IMPERIAL COMPANY'S FORMULÆ.**
*Developer for Bromide Opals.*

|                           |            |
|---------------------------|------------|
| 1. Oxalate of potash..... | 4 ounces.  |
| Water .....               | 16 ”       |
| 2. Sulphate iron .....    | 4 ounces.  |
| Water .....               | 12 ”       |
| Citric acid .....         | 50 grains. |

For developing, add 1 ounce of No. 2 to 5 ounces of No. 1. And to every ounce of developer add about 10 drops of a ten per cent. solution of potassium bromide.

When development is complete, immerse the opal in the following clearing solution for a few minutes:—

|                   |           |
|-------------------|-----------|
| Alum .....        | 2 ounces. |
| Warm water .....  | 40 ”      |
| Citric acid ..... | ½ ounce.  |

Or instead of citric acid use  $\frac{1}{2}$  ounce of sulphuric acid.

After rinsing in a few changes of water, fix in:—

|             |           |
|-------------|-----------|
| Hypo .....  | 4 ounces. |
| Water ..... | 20 ”      |

And wash as usual.

Take care to have everything perfectly clean. The slightest trace of impurity conveyed to the solutions by dirty hands would spoil all results.

Please observe the following:—

Developing solution to be fresh and cold.

Clearing solution immediately after development.

All dishes to be perfectly clean, and one to be used exclusively for developing.

## DEVELOPER FOR IMPERIAL PLATES.

*Pyro and Soda.**No. 1.*

|                        |            |
|------------------------|------------|
| Pyrogallic acid.....   | 1 ounce.   |
| Potassium bromide..... | 60 grains. |
| Sulphite soda .....    | 6 ounces.  |
| Water to .....         | 50 ,,      |

*No. 2.*

|                                     |           |
|-------------------------------------|-----------|
| Carbonate soda (washing soda) ..... | 5 ounces. |
| Water to .....                      | 50 ,,     |

For use, take equal quantities of No. 1 and No. 2 before using.

For under-exposure, use more of No. 2.

For over-exposure, use more of No. 1.

*This developer gives the finest results with these plates.*

*Alum Bath.*

|            |            |
|------------|------------|
| Alum ..... | 1 ounce.   |
| Water..... | 10 ounces. |

Wash before and after immersing in alum bath.

*Fixing Solution.*

|            |            |
|------------|------------|
| Hypo ..... | 1 pound.   |
| Water..... | 50 ounces. |

The following formulæ may also be used:—

*Pyro and Ammonia.**Stock Solution.*

|                                    |            |
|------------------------------------|------------|
| Pyrogallic acid..... (avoirdupois) | 1 ounce.   |
| Ammonium bromide .....             | 1 ,,       |
| Water to make..... (fluid)         | 10 ounces. |
| Nitric acid (strong) .....         | 25 drops.  |

*No. 1.*

|                      |             |
|----------------------|-------------|
| Stock solution ..... | 1½ ounce.   |
| Water.....           | 18½ ounces. |

*No. 2.*

|                           |             |
|---------------------------|-------------|
| Liquor ammoniæ, '890..... | 2½ drachms. |
| Water.....                | 20 ounces.  |

For use, take equal quantities of No. 1 and No. 2.

For over-exposure, use more of No. 1.

For under-exposure, use more of No. 2.

*Hydroquinone Developer.**No. 1.*

|                         |                         |
|-------------------------|-------------------------|
| Hydroquinone .....      | 150 grains.             |
| Potassium bromide ..... | 25 ,,                   |
| Soda sulphite .....     | (avoirdupois) 2 ounces. |
| Water..... (fluid)      | 20 ,,                   |

*No. 2.*

|                    |             |
|--------------------|-------------|
| Caustic soda ..... | 100 grains. |
| Water.....         | 20 ounces.  |

For development, use equal portions of each.

## MARION'S FORMULÆ.

## PYRO AND AMMONIA DEVELOPER.

*Pyro Stock Solution. Ten per cent.*

|                        |             |
|------------------------|-------------|
| *Pyrogallic acid ..... | 480 grains. |
| Ammonium bromide ..... | 480 "       |
| Citric acid .....      | 60 "        |

Water to make up to 10 ounces.

*Ammonia Stock Solution. Twenty per cent.*

Strongest liquid ammonia, '880 ..... 2 ounces.

Water to make up to 10 ounces.

\* If the 437 grains to ounce of pyro is used, so the bromide and citric acid must be reduced in like proportion, and it must be made up to only nine ounces one drachm.

*Pyro Solution for Use.*

Take 1 ounce of stock solution and make up to 12 ounces with distilled water.

*Ammonia Solution for Use.*

Take 1 ounce of stock solution and make up to 12 ounces with distilled water.

For developing, mix these solutions in equal proportions just before using; each ounce of developer will then contain pyro two grains, ammonia four minims, and bromide two grains.

Twenty minims from pyro stock bottle, and twenty minims from ammonia stock bottle, made up to one ounce with water, will give the same result.

## PYRO AND AMMONIA DEVELOPER WITH SULPHITE.

*Pyro Stock Solution. Ten per cent.*

|                                |             |
|--------------------------------|-------------|
| *Pyrogallic acid .....         | 480 grains. |
| Meta-bisulphite of potash..... | "           |
| Ammonium bromide.....          | "           |

Water to make up to 10 ounces.

*Ammonia Stock Solution. Twenty per cent.*

Strongest liquid ammonia, '880 ..... 2 ounces.

Water to make up to 10 ounces.

\* If the 437 grains to ounce of pyro is used, so the bromide and potash must be reduced in like proportion, and it must be made up to only nine ounces one drachm.

*Pyro Solution for Use.*

Take 1 ounce of stock solution and make up to 12 ounces with distilled water.

*Ammonia Solution for Use.*

Take 1 ounce of stock solution and make up to 12 ounces with distilled water.

For developing, mix these solutions in equal proportions just before using; each ounce of developer will then contain pyro 2 grains, ammonia 4 minims, meta-bisulphite 2 grains, and bromide 2 grains.

Twenty minims from pyro stock bottle, and 20 minims from ammonia stock bottle, made up to 1 ounce with water, will give the same result.

## PYRO AND SODA DEVELOPER.

*Pyro Solution for Use.*

|                       |            |
|-----------------------|------------|
| Pyrogallic acid.....  | 40 grains. |
| Sodium sulphite ..... | 320 "      |

Water to make up to 10 ounces.

*Soda Solution for Use.*

|                            |             |
|----------------------------|-------------|
| Sodium carb. crystal ..... | 320 grains. |
|----------------------------|-------------|

Water to make up to 10 ounces.

Equal parts of each to be mixed (according to size of plate) at time of using. Each ounce of developer will then contain pyro, 2 grains; sodium sulphite, 16 grains; sodium carbonate, 16 grains.

With the soda developer the plate, after development, should be well rinsed, and placed for five minutes at least in a bath containing a saturated solution of common alum, then well rinsed before placing in the fixing bath.

## HYDROQUINONE DEVELOPER.

*Hydroquinone Solution.*

|                             |            |
|-----------------------------|------------|
| Hydroquinone .....          | 40 grains. |
| Sodium sulphite, pure ..... | 120 "      |
| Potassium brom. ....        | 5 "        |
| Citric acid.....            | 5 "        |

Water to make up to 10 ounces.

*Alkali Solution.*

|                             |            |
|-----------------------------|------------|
| Potass. hydrate, pure ..... | 80 grains. |
|-----------------------------|------------|

Water to make up to 10 ounces.

This developer, mixed in equal proportions, will contain per ounce—  
Hydroquinone, 2 grains; sulphite, 6 grains; brom.,  $\frac{1}{2}$  grain; citric,  $\frac{1}{2}$  grain; hydrate, 4 grains.

Another good formula is—

|                             |            |
|-----------------------------|------------|
| Hydroquinone .....          | 40 grains. |
| Sodium sulphite, pure ..... | 240 "      |

Water to make up to 10 ounces.

|                              |             |
|------------------------------|-------------|
| Sodium carbonate, pure ..... | 320 grains. |
|------------------------------|-------------|

Water to make up to 10 ounces.

This developer, mixed in equal proportions, will contain per ounce—

Hydroquinone, 2 grains; sodium sulphite, 12 grains; sodium carbonate, 16 grains.

Equal parts of the hydroquinone and either alkali solution to be mixed at time of using.

Potass. carbonate may be substituted for the soda in the first formula, or they may be mixed in varying proportion.

In the second formula sodium hydrate may be substituted for the potassium, and the proportions of bromide increased or decreased according to the kind of negative required, more for bright, and less for soft negatives.

#### EIKONOGEN FORMULÆ.

##### No. 1.—For Portraits and Landscapes.

No. 1. 4 parts sulphite of sodium are dissolved in 60 parts of water. To this solution add 1 part of eikonogen, and dissolve by shaking.

The solution can also be prepared in the following manner:—

To 4 parts of sulphite of sodium and 1 part eikonogen, which are placed either in an earthen or enamelled vessel, 10 parts water are added, and the dissolution brought about by boiling and stirring. The hot solution is then poured into a flask containing 50 parts cold water.

No. 2. 3 parts crystallised carbonate of soda are dissolved in 20 parts cold water.

Immediately before developing, mix 3 parts of solution No. 1 with part of solution No. 2.

##### No. 2.—For Instantaneous Photographs with Detective Cameras (about $\frac{1}{50}$ of a second exposure).

For this purpose Formula No. 1 is to be used, with the exception that the crystallised carbonate of soda is to be substituted by the same quantity of carbonate of potassium.

##### No. 3.—For very Short Instantaneous Exposures ( $\frac{1}{1000}$ of a second), and for Increasing the Power of the Developers Nos. 1 and 2 in Cases where the Plate has not been sufficiently Exposed.

5 parts sulphite of sodium, 2 parts carbonate of potassium, and 1 part of eikonogen are placed in an earthen or enamelled vessel, and to these are added 30 parts water, the dissolution being brought about by boiling and stirring.

After having been allowed to cool, the developer, which is now ready for use, is preserved in a tightly closed bottle.

The developer, if it has been prepared exactly according to the above method, keeps in good condition for a long time.

#### FOR GELATINO-CHLORIDE PLATES.

##### IRON.

##### For Cold Tones.

No. 1. Potass. citrate ..... 100 grains.  
Potass. oxalate ..... 30 "

Hot distilled water to make up to 1 ounce.

*For Warm Tones.*

|                                             |            |
|---------------------------------------------|------------|
| No. 2. Citric acid .....                    | 90 grains. |
| Ammonium carbonate.....                     | 60 „       |
| Cold distilled water to make up to 1 ounce. |            |

*For Extra Warm Tones.*

|                                             |             |
|---------------------------------------------|-------------|
| No. 3. Citric acid .....                    | 130 grains. |
| Ammonium carbonate.....                     | 40 „        |
| Cold distilled water to make up to 1 ounce. |             |

In mixing the solutions Nos. 2 and 3, it is better to place the crystals of the salts into a deep vessel, and, after adding the water, leave alone till all effervescence ceases. It is advisable to make it over night.

To three parts of either of the above add one part of the following at the time of using:—

|                       |             |
|-----------------------|-------------|
| Sulphate of iron..... | 120 grains. |
| Sulphuric acid .....  | 1 drop.     |

Make up with distilled water to 1 ounce.

Either of these developers should give clear glass in the unexposed parts of the picture; but, if at any time the slightest fog is found, it should at once be cured by the addition of a trace of either potassium bromide or sodium chloride. Bromide is better with No. 1, and chloride with either No. 2 or No. 3. A convenient form of using these will be to keep a ten per cent. solution of each of these salts, and one or two minims to each ounce of developer will be found a powerful restrainer.

## HYDROQUINONE.

|                           |            |
|---------------------------|------------|
| No. 1. Hydroquinone ..... | 48 grains. |
| Sodium sulphite .....     | 320 „      |
| Ammonium bromide .....    | 2 „        |

Water to make up to 1 ounce.

|                                 |             |
|---------------------------------|-------------|
| No. 2. Ammonium carbonate ..... | 100 grains. |
| Sodium carbonate.....           | 100 „       |

Water to make up to 1 ounce.

Equal proportions of each are mixed together, according to size of plate to be developed at the time of using.

Different alkalies may be substituted for those mentioned, such as potassium carbonate, sodium silicate, potassium hydrate, sodium hydrate, &c.; but, in all cases, a small proportion of bromide should be used.

A number of plates may be developed one after the other in the same solution.

## FOR BROMIDE PAPER.

|                                |            |
|--------------------------------|------------|
| 1. Distilled water .....       | 20 ounces. |
| Oxalate potash (neutral) ..... | 6 „        |
| 2. Distilled water .....       | 5 ounces.  |
| Protosulphate iron .....       | 1½ „       |
| Sulphuric acid.....            | 2 drops.   |
| 3. Distilled water.....        | 5 ounces.  |
| Citric acid .....              | 2½ „       |

Each of the above solutions should be filtered. At time of development take twenty parts of No. 1, and into it pour five parts of No. 2, and two parts of No. 3. Lay the exposed paper face upwards, in a flat tray, and pour the developer over it, rocking the tray backwards and forwards, until the print is sufficiently developed. Then wash quickly in several changes of water, and place in fixing baths composed as follows :—

*Fixing Baths.*

*Bath No. 1.*

- 1. Water ..... 10 ounces
- Hypo soda ..... 2 „
- 2. Water ..... 3 „
- Powdered alum ..... 250 grains.

*Bath No. 2.*

- Water ..... 10 ounces.
- Hypo soda ..... 2 „

The prints are first placed in fixing bath No. 1, until they lose the yellow colour, and then passed into fixing bath No. 2, where they should remain at least ten minutes.

**MAWSON & SWAN'S FORMULÆ.**

**PYRO AND AMMONIA.**

*Stock Solution.*

- Pyrogallic acid ..... (avoirdupois) 1 ounce.
- Ammon. bromide ..... „  $\frac{1}{2}$  „
- Meta-bisulphite potassium ..... „ 1 „
- Distilled water to make ..... (fluid) 11 ounces.

The meta-bisulphite and bromide must be thoroughly dissolved in a part of the water before the pyro is added.

- A. Stock solution .....  $1\frac{1}{2}$  ounce.
- Distilled water .....  $18\frac{1}{2}$  ounces.
- B. Ammonia ('890) .....  $2\frac{1}{2}$  drachms.
- Distilled water ..... 20 ounces.

Mix equal parts of A and B just before development.

*Fixing Solution.*

- Hypo .....  $\frac{1}{2}$  pound.
- Water ..... 1 quart.

**EIKONOGEN.**

- A. Eikonogen ..... 200 grains.
- Sulphite of soda (recrystd.) ..... 200 „
- Distilled water to make ..... 20 ounces.

- B. Carbonate of potassium (coml.) ..... 2400 grains.  
 Sulphite of soda (recrystd.) ..... 1000 "  
 Distilled water to make ..... 20 ounces.
- C. Caustic potassium ..... 800 grains.  
 Sulphite of soda (recrystd.) ..... 1800 "  
 Distilled water to make ..... 20 ounces.

Three parts of A to one part of B.

In cases of under-exposure or for instantaneous pictures, use C instead of B.

To correct over-exposure, add a few drops of ten per cent. solution of potassium bromide.

*Fixing Solution.*

- Hypo .....  $\frac{1}{2}$  pound.  
 Water ..... 1 quart.

Use hot water to mix A solution.

PYRO AND POTASH.

*Stock Solution.*

- Pyrogallic acid .....(avoirdupois) 1 ounce.  
 Meta-bisulphite potassium ..... 15 grains.  
 Distilled water to make .....(fluid) 11 ounces.

*Developer.*

- A. Stock solution ..... 3 ounces.  
 Distilled water ..... 17 "
- B. Carbonate of potassium (coml.) ..... 1000 grains.  
 Sulphite of soda (recrystd.) ..... 1200 "  
 Distilled water to make ..... 20 ounces.

Equal parts of A and B.

*Fixing Solution.*

- Hypo .....  $\frac{1}{2}$  pound.  
 Water ..... 1 quart.

Before fixing, immerse plate for one minute in alum, 240 grains; water, 20 ounces; wash before and after. This operation must not be omitted, or a bright yellow stain will ensue.

For under-exposed plates increase quantity of B, or, in extreme cases, add very gradually a few drops of ten per cent. solution caustic potash.

Over-exposure may be corrected by adding a few drops of ten per cent. solution potassium bromide. If greatly exposed, at once wash off and mix a fresh lot of developer containing a very small proportion of B and a few drops of bromide solution.

HYDROQUINONE.

- A. Hydroquinone ..... 80 grains.  
 Citric acid ..... 10 "  
 Sulphite soda (recrystd.) ..... 80 "  
 Distilled water to make ..... 20 ounces.
- B Potassium hydrate (sticks) ..... 160 grains.  
 Sulphite soda (recrystd.) ..... 160 "  
 Distilled water to make ..... 20 ounces

|                                     |             |
|-------------------------------------|-------------|
| C. Potassium bromide .....          | 24 grains,  |
| Distilled water to make .....       | 1 ounce.    |
| D. Potassium hydrate (sticks) ..... | 160 grains, |
| Distilled water to make .....       | 20 ounces,  |

Use equal parts of A and B, adding five minims of C for every ounce of solution.

For over-exposed plates, use D instead of B, with an extra quantity of C.

For under-exposed plates, omit C, and, in extreme cases, add about six grains more of sulphite soda per ounce.

#### *Fixing Solution.*

|             |                      |
|-------------|----------------------|
| Hypo .....  | $\frac{1}{2}$ pound. |
| Water ..... | 1 quart.             |

Plates showing a tendency to frill should be immersed for one minute in a five per cent. solution of common alum between development and fixing, washing before and after.

*Note.*—The object of decreasing or increasing sulphite soda is to give greater or less density.

#### DEVELOPER FOR CASTLE PLATES.

##### *Stock Solution.*

|                       |                        |
|-----------------------|------------------------|
| Pyrogallic acid ..... | (avoirdupois) 1 ounce. |
| Ammonio-bromide ..... | 1 "                    |
| Nitric acid .....     | 30 minims.             |

Distilled water to make up to 11 ounces fluid.

Mix acid with a part of the water before adding pyro and bromide.

|                             |                         |
|-----------------------------|-------------------------|
| No 1. Stock solution .....  | $1\frac{1}{2}$ ounces.  |
| Distilled water .....       | $18\frac{1}{2}$ "       |
| No. 2. Liquor ammoniæ ..... | $2\frac{1}{2}$ drachms. |
| Distilled water .....       | 20 ounces.              |

Use equal parts of 1 and 2 mixed just before development.

##### *Fixing Solution.*

|             |           |
|-------------|-----------|
| Hypo .....  | 8 ounces. |
| Water ..... | 1 quart.  |

##### *Clearing Solution.*

|                                  |            |
|----------------------------------|------------|
| Saturated solution of alum ..... | 20 ounces. |
| Hydrochloric acid .....          | 1 ounce.   |

#### FOR OPAL PLATES.

Negatives full of detail and rather delicate are most suitable.

*Exposure.*—For contact printing, expose from about twenty seconds, according to density of negative, at three feet from an ordinary gas burner. Avoid over-exposure; correctly exposed images develop very gradually.

|                                                       |    |         |
|-------------------------------------------------------|----|---------|
| No. 1. Neutral oxalate of potassium ... (avoirdupois) | 20 | ounces. |
| Bromide potassium.....                                | 40 | grains. |
| Distilled water..... (fluid)                          | 80 | ounces. |
| No. 2. Ferrous sulphate..... (avoirdupois)            | 6  | ounces. |
| Distilled water ..... (fluid)                         | 18 | „       |
| Sulphuric acid .....                                  | 12 | minims. |

Add 7 parts of No. 1 to one part of No. 2 just before using.

Should No. 2, after keeping, change to a brown colour, discard, and mix afresh.

#### Clearing Solution.

|                           |         |               |         |
|---------------------------|---------|---------------|---------|
| Acetic acid (1.044) ..... | (fluid) | $\frac{1}{2}$ | ounce.  |
| Water .....               | „       | 80            | ounces. |

#### Fixing Solution.

|                         |   |            |
|-------------------------|---|------------|
| Hypo..... (avoirdupois) | 2 | pounds     |
| Water .....             | „ | 80 ounces. |

When the plate is sufficiently developed, pour off developer, and, without washing, flood plate with clearing solution, and allow it to act for one minute; then wash, and fix for ten minutes; afterwards wash for several hours, frequently changing the water; dry slowly and carefully, and varnish.

Keep the hands and dishes scrupulously clean, and use developing and fixing dishes for their specified purposes only.

#### FOR PHOTO-MECHANICAL PLATES.

|                                 |                |          |
|---------------------------------|----------------|----------|
| A. Pyrogallic acid .....        | 60             | grains.  |
| Meta-bisulphite of potash ..... | 60             | „        |
| Bromide ammonium.....           | 60             | „        |
| Distilled water .....           | 20             | ounces.  |
| B. Liquor ammoniæ .....         | $2\frac{1}{2}$ | drachms. |
| Distilled water .....           | 20             | ounces.  |

Use equal parts of A and B.

#### Fixing Bath.

Half pound hypo to one quart water.

#### FOR LANTERN PLATES.

##### For Transparencies and Lantern Slides.

These plates can be exposed either in the enlarging camera or by contact printing under a negative. For contact printing the exposure should be made to gaslight for about one minute, at three feet from an ordinary fish-tail burner. Dense negatives may require two minutes, and very thin ones only thirty to forty seconds.

The following developer is recommended :—

|                                 |     |          |
|---------------------------------|-----|----------|
| A. Pyrogallic acid .....        | 40  | grains.  |
| Meta-bisulphite potassium ..... | 120 | „        |
| Bromide ammonium .....          | 40  | „        |
| Distilled water .....           | 20  | ounces.  |
| B. Liquor ammoniæ.....          | 2½  | drachms. |
| Distilled water .....           | 20  | ounces.  |

Mix equal parts of A and B just before using.

Development begins rather slowly, afterwards proceeding more rapidly. Time, four to six minutes.

Fix as usual in a solution of hypo, half pound to one quart of water; wash thoroughly; dry carefully.

#### FOR BROMIDE PAPER.

|                                           |               |    |         |
|-------------------------------------------|---------------|----|---------|
| No. 1. Neutral oxalate of potassium ..... | (avoirdupois) | 2  | ounces. |
| Bromide of potassium .....                | „             | 40 | grains. |
| Distilled water to make .....             | (fluid)       | 80 | ounces. |
| No. 2. Ferrous sulphate .....             | (avoirdupois) | 6  | ounces. |
| Distilled water to make .....             | (fluid)       | 18 | „       |
| Sulphuric acid .....                      |               | 12 | minims. |

Add seven parts of 1 to one part of 2 just before using.

Should 2, after keeping, change to a brown colour, discard and mix afresh.

#### Clearing Solution.

|                           |               |    |         |
|---------------------------|---------------|----|---------|
| Acetic acid (1·044) ..... | (fluid)       | ½  | ounce.  |
| Alum .....                | (avoirdupois) | 4  | ounces. |
| Water .....               | (fluid)       | 80 | „       |

#### Fixing Solution.

|            |               |    |         |
|------------|---------------|----|---------|
| Hypo.....  | (avoirdupois) | 3  | ounces. |
| Water..... | (fluid)       | 20 | „       |

#### Exposure.

Correct exposure is necessary to obtain the best results. Duration of exposure varies from about twenty seconds, at three feet from an ordinary gas burner. For contact printing, artificial is preferable to daylight, being less variable.

#### Development.

Soak print in clean water until soft, then transfer to developing solution, and keep rocking the tray. When sufficiently developed, pour off solution, and, without washing, flood print with clearing solution. Allow it to act for one minute, pour off, and repeat the operation; then, rinse in water, and fix ten minutes. Wash thoroughly in repeated changes of water, and hang up by the corner with American clips to dry spontaneously. Mount, when dry, in the ordinary way.

## THE PAGET PRIZE PLATE COMPANY'S FORMULÆ.

## PYRO AMMONIA.

|                                   |            |
|-----------------------------------|------------|
| No. 1. Pyrogallic acid.....       | 1 ounce.   |
| Citric acid .....                 | 60 grains. |
| Sodium sulphite (pure) .....      | 2½ ounces. |
| Distilled water to make .....     | 20 „       |
| No. 2. Liq. ammoniæ '880.....     | 1 ounce.   |
| Ammonium bromide .....            | 80 grains. |
| (For Phoenix plates, 120 grains.) |            |
| Distilled water to make .....     | 20 ounces. |

One part of each to 10 parts of water.

## PYRO SODA.

|                                              |            |
|----------------------------------------------|------------|
| No. 1. Pyrogallic acid.....                  | ¼ ounce.   |
| Sulphuric acid .....                         | 5 drops.   |
| Distilled water to make .....                | 20 ounces. |
| No. 2. Carbonate of soda (cryst. pure) ..... | 2 ounces.  |
| Sulphite of soda (pure) .....                | 2 „        |
| Distilled water to make .....                | 20 „       |

Equal parts of each.

## HYDROQUINONE.

|                           |            |
|---------------------------|------------|
| No. 1. Hydroquinone ..... | 1 ounce.   |
| Methylated spirit .....   | 10 ounces. |
| Sulphurous acid .....     | ½ ounce.   |
| Potassium bromide .....   | ¼ „        |

Dissolve the hydroquinone in the spirit, and add the acid. In another vessel dissolve the potassium bromide in 3 ounces of distilled water. Mix the two solutions, and make up to 20 ounces with distilled water.

|                                       |           |
|---------------------------------------|-----------|
| No. 2. Caustic soda (in sticks) ..... | 1 ounce.  |
| Sodium sulphite .....                 | 5 ounces. |
| Distilled water to make .....         | 20 „      |

One part of each to 4 parts of water.

If this be found to give too hard a negative, use more water.

## EIKONOGEN.

|                               |            |
|-------------------------------|------------|
| No. 1. Eikonogen .....        | ½ ounce.   |
| Sodium sulphite .....         | 1½ „       |
| Potassium bromide.....        | 8 grains.  |
| Distilled water to make ..... | 30 ounces. |

Sixty grains hydroquinone added to above is a decided improvement, increasing brilliancy and density.

|                                  |            |
|----------------------------------|------------|
| No. 2. Potassium carbonate ..... | 1 ounce.   |
| Distilled water to make .....    | 10 ounces. |

Three parts of No. 1 to one part of No. 2.

## PAGET PRIZE LANTERN PLATES.

The plates are made in two rapidities:—

*Slow*, for contact printing by artificial light, or for reduction in camera by daylight. They give a range of tone from black to red, according to exposure and development.

*Rapid*, which are about six times quicker than the slow, are for reduction in camera by artificial light, or may be used for contact printing with very dense negatives or very short exposures. These give only black tones.

## INSTRUCTIONS FOR USE.

*Rapid Series.*

*Exposure.*—These plates, which give only black tones, require about one-sixth of the exposure of the slow series as below.

*Development.*—Any of the formulæ given for the slow series for black tones are equally suitable for these.

*Slow Series.*

The great difference in density and character of negatives renders it impossible to make any definite statements with regard to exposure. The 'slow' plates exposed in contact with a certain clear and somewhat thin negative have been found to require for black tones an exposure of about thirty seconds at a distance of one foot from an ordinary fishtail gas-flame, or one inch of magnesium wire burnt at a distance of three feet. The exposures given under the heading of 'Warm Tones' also refer to the same negative. Denser negatives will, of course, require more.

## DEVELOPMENT.

For BLACK TONES any of the following formulæ are suitable:—

*Pyro Ammonia.**Solution No. 1.*

|                          |            |
|--------------------------|------------|
| Pyrogallie acid .....    | 1 ounce.   |
| Sodium sulphite .....    | 1½ "       |
| Citric acid .....        | ½ "        |
| Distilled water to ..... | 10 ounces. |

*Solution No. 2.*

|                           |            |
|---------------------------|------------|
| Liquor ammoniæ, 880 ..... | 1 ounce.   |
| Ammonium bromide .....    | 1 "        |
| Distilled water to .....  | 10 ounces. |

For use, take 45 minims of each solution and make up with water to 2 ounces.

*Ferrous Oxalate Developer.**Solution No. 1.*

|                                 |            |
|---------------------------------|------------|
| Neutral oxalate of potash ..... | 16 ounces. |
| Citric acid .....               | 60 grains. |
| Hot water .....                 | 50 ounces. |

*Solution No. 2.*

|                              |            |
|------------------------------|------------|
| Proto-sulphate of iron ..... | 4 ounces.  |
| Citric acid .....            | 15 grains. |
| Hot water .....              | 8 ounces.  |

*Solution No. 3.*

|                            |                      |
|----------------------------|----------------------|
| Bromide of potassium ..... | $\frac{1}{4}$ ounce. |
| Water .....                | 10 ounces.           |

For development, take 6 ounces of No. 1 and add 1 ounce of No. 2 and 24 drops of No. 3. Gives cold black tones.

*Eikonogen Developer.**Solution No. 1.*

|                          |                      |
|--------------------------|----------------------|
| Eikonogen .....          | $\frac{1}{2}$ ounce. |
| Sodium sulphite .....    | $1\frac{1}{2}$ "     |
| Potassium bromide .....  | 8 grains.            |
| Distilled water to ..... | 30 ounces.           |

*Solution No. 2.*

|                           |            |
|---------------------------|------------|
| Potassium carbonate ..... | 1 ounce.   |
| Distilled water to .....  | 10 ounces. |

Take three parts of No. 1 to one part of No. 2 solution.

*Rodinal Developer.*

|                                     |           |
|-------------------------------------|-----------|
| Rodinal concentrated solution ..... | 1 part.   |
| Water .....                         | 30 parts. |

This is a very clean developer, and gives a rich black colour.

*Hydroquinone.**Solution No. 1.*

|                         |                      |
|-------------------------|----------------------|
| Hydroquinone .....      | $\frac{1}{2}$ ounce. |
| Sulphurous acid .....   | $\frac{1}{4}$ "      |
| Potassium bromide ..... | 60 grains.           |
| Water to .....          | 20 ounces.           |

*Solution No. 2.*

|                       |                        |
|-----------------------|------------------------|
| Caustic soda .....    | $\frac{1}{2}$ ounce.   |
| Sodium sulphite ..... | $2\frac{1}{2}$ ounces. |
| Water to .....        | 20 "                   |

For use, take  $\frac{1}{2}$  ounce of each to 1 ounce of water.

## WARM TONES.—DEVELOPER.

*Solution No. 1.*

|                         |                      |
|-------------------------|----------------------|
| Hydroquinone .....      | $\frac{1}{2}$ ounce. |
| Sulphurous acid .....   | $\frac{1}{4}$ "      |
| Potassium bromide ..... | 60 grains.           |
| Water to .....          | 20 ounces.           |

*Solution No. 2.*

|                       |                        |
|-----------------------|------------------------|
| Caustic soda .....    | $\frac{1}{2}$ ounce.   |
| Sodium sulphite ..... | $2\frac{1}{2}$ ounces. |
| Water to .....        | 20 "                   |

*Solution No. 3.*

|                             |            |
|-----------------------------|------------|
| Bromide of ammonium .....   | 1 ounce.   |
| Carbonate of ammonium ..... | 1 "        |
| Water to .....              | 20 ounces. |

*Brown.*

Exposure: 60 seconds 1 foot from gas-flame, or 2 inches of magnesium wire burnt at a distance of 3 feet. Developer: solution 1,  $\frac{1}{2}$  ounce; solution 2,  $\frac{1}{2}$  ounce; solution 3, 100 minims; water to 2 ounces. Time required in development, about 5 minutes.

*Purple Brown.*

Exposure: 90 seconds 1 foot from gas-flame, or 3 inches of magnesium wire burnt at a distance of 3 feet. Developer: solution 1,  $\frac{1}{2}$  ounce; solution 2,  $\frac{1}{2}$  ounce; solution 3, 200 minims; water to 2 ounces. Time required in development, about 10 minutes.

*Purple.*

Exposure: 3 minutes 1 foot from gas-flame, or 3 inches of magnesium wire burnt at a distance of 2 feet. Developer: solution 1,  $\frac{1}{2}$  ounce; solution 2,  $\frac{1}{2}$  ounce; solution 3, 250 minims; water to 2 ounces. Time required in development, about 12 minutes.

*Red.*

Exposure: 5 minutes 1 foot from gas-flame, or 5 inches of magnesium wire burnt at a distance of 2 feet. Developer: solution 1,  $\frac{1}{2}$  ounce; solution 2,  $\frac{1}{2}$  ounce; solution 3, 300 minims; water to 2 ounces. Time required in development, about 15 minutes.

## FIXING BATH.

The simplest is the following:—

|                           |           |
|---------------------------|-----------|
| Hyposulphite of soda..... | 6 ounces. |
| Water .....               | 20 "      |

After fixing, the transparency is well washed for one hour in several complete changes of water.

## ROUCH'S FORMULÆ.

|                          |           |
|--------------------------|-----------|
| A. Pyrogallic acid ..... | 1 ounce.  |
| Sulphite of soda .....   | 4 ounces. |
| Water, to make .....     | 10 ,,     |

Dissolve the sulphite of soda in hot water, and, when cold, add the pyrogallic acid. Should any portion of the sulphite refuse to dissolve, the crystals may be allowed to remain in the bottle.

|                                   |            |
|-----------------------------------|------------|
| B. Bromide of ammonium.....       | 1 ounce.   |
| Water, to make .....              | 10 ounces. |
| C. Strongest liquor ammonia ..... | 3 ounces.  |
| Water, to make .....              | 10 ,,      |

In case sulphite of soda be not readily obtainable, the following may be substituted for solution A as above, and used in the same manner:—

|                       |            |
|-----------------------|------------|
| Pyrogallic acid ..... | 1 ounce.   |
| Citric acid ... ..    | 50 grains. |
| Water, to make .....  | 10 ounces. |

Dissolve the citric acid first, and then add the pyro.

## THOMAS'S FORMULÆ.

## HYDROQUINONE—SODA.

|                             |             |
|-----------------------------|-------------|
| No. 1. Hydroquinone .....   | 160 grains. |
| Sodium sulphite .....       | 2 ounces.   |
| Citric acid.....            | 60 grains.  |
| Potassium bromide.....      | 40 ,,       |
| Water, to .....             | 20 ounces.  |
| No. 2. Sodium hydrate ..... | 160 grains. |
| Water, to .....             | 20 ounces.  |

Mix equal parts of each, as below.

Except in cold weather, dilute this developer with an equal quantity of water; and, in hot weather, an extra three or four grains of bromide of potassium per ounce of developer may be added. In cases of over-exposure, the sky and high lights should be brought up with the diluted developer, plus the extra bromide and  $1\frac{1}{2}$  grain carbonate ammonia per ounce; when sufficient density is obtained, bring up shadow detail with the normal developer.

N.B.—With this development do not use the alum bath until after fixing; it is a frequent source of bad markings in the negative.

## PYROGALLIC ACID—AMMONIA.

|                                     |               |         |
|-------------------------------------|---------------|---------|
| No. 1. Pyrogallic acid.....         | 1             | ounce.  |
| Sodium sulphite .....               | 3             | ounces. |
| Citric acid.....                    | $\frac{1}{4}$ | ounce.  |
| Distilled or boiled water, to ..... | 10            | ounces. |

Label No. 1, 10 = .91 grain pyro.

|                                   |    |         |
|-----------------------------------|----|---------|
| No. 2. Liquor ammonia, .880 ..... | 1  | ounce.  |
| Water, to .....                   | 10 | ounces. |

Label No. 2, 10 minims = 1 minim liquid ammonia.

|                               |    |         |
|-------------------------------|----|---------|
| No. 3. Potassium bromide..... | 1  | ounce.  |
| Water, to .....               | 10 | ounces. |

Label No. 3, 10 minims = .91 grains potassium bromide.

To form one ounce of developer, take ten minims of each solution, Nos. 1, 2, 3, and dilute with water to one ounce (this quantity is sufficient for a quarter-plate). When image is well out, add ten minims more of No. 2 to increase density.

## FOR LANTERN SLIDES.

*Hydroquinone.*

|                                    |     |         |
|------------------------------------|-----|---------|
| No. 1. Hydroquinone .....          | 160 | grains. |
| Sodium sulphite .....              | 2   | ounces. |
| Citric acid .....                  | 60  | grains. |
| Potassium bromide .....            | 40  | „       |
| Water, to .....                    | 20  | ounces. |
| No. 2. Sodium hydrate.....         | 160 | grains. |
| Water, to .....                    | 20  | ounces. |
| No. 3. Bromide of ammonium .....   | 2   | „       |
| Water, to .....                    | 20  | „       |
| No. 4. Carbonate of ammonium ..... | 2   | „       |
| Water, to .....                    | 20  | „       |

*Pyrogallic Acid.*

|                                    |               |         |
|------------------------------------|---------------|---------|
| No. 1. Pyrogallic acid .....       | 1             | ounce.  |
| Sulphite of soda .....             | 3             | ounces. |
| Citric acid .....                  | $\frac{1}{4}$ | ounce.  |
| Water, to .....                    | 10            | ounces. |
| No. 2. Liquor ammonia, .880.....   | 1             | ounce.  |
| Water, to .....                    | 10            | ounces. |
| No. 3. Bromide of ammonium .....   | 1             | ounce.  |
| Water, to .....                    | 10            | ounces. |
| No. 4. Carbonate of ammonium ..... | 1             | ounce.  |
| Water, to .....                    | 10            | ounces. |

## INSTRUCTIONS FOR USE.

*Contact Printing.*

We have previously given the exposure by the gas flame, but prolonged experience convinces us that the results obtainable by it are decidedly inferior to those where the magnesium light is used, so we now adopt the latter; we may say, however, that the nearest equivalent to our old prescription of thirty seconds to the gas flame at one foot is one inch of magnesium ribbon burnt at a distance of three feet.

*Reductions in the Camera.*

In good diffused mid-day summer light, using stop *f*-8 for black tone, exposure from  $\frac{1}{4}$  plate, twenty-five seconds; from  $\frac{1}{2}$  plate, eighteen seconds; from  $\frac{3}{4}$  plate, twelve seconds. Brown tone, from five to seven minutes; development as below. For the varying power of the light, according to time of day or year, make the alterations given in our table of exposures attached to every packet of our camera plates and films.

The negative taken as a standard is a brilliant black-toned one of good printing density, taking about fifteen minutes in good diffused mid-day-light to furnish a satisfactory albumenised paper print.

Magnesium ribbon used is the ordinary commercial article, one foot of which weighed  $2\frac{1}{2}$  grains.

Exposures and development formulæ with approximate time required for development at temperature of 60°.

## BLACK TONE.

*Hydroquinone.*

Exposure, 1 in. Mg., distance 3 feet.

|                       |                      |
|-----------------------|----------------------|
| Developer No. 1 ..... | $\frac{1}{2}$ ounce. |
| "    No. 2 .....      | $\frac{1}{2}$ "      |
| Water, to .....       | 2 ounces.            |

Time, about two minutes.

*Pyro.*

Exposure, same as with hydroquinone.

|                       |            |
|-----------------------|------------|
| Developer No. 1 ..... | 30 minims. |
| "    No. 2 .....      | 30 "       |
| "    No. 3 .....      | 30 "       |
| Water, to .....       | 2 ounces.  |

Time, about two minutes.

## BROWN.

*Hydroquinone.*

Exposure, 2 in. Mg., distance 1 foot.

|           |       |       |               |         |
|-----------|-------|-------|---------------|---------|
| Developer | No. 1 | ..... | $\frac{1}{2}$ | ounce.  |
| „         | No. 2 | ..... | $\frac{1}{2}$ | „       |
| „         | No. 3 | ..... | 15            | minims. |
| „         | No. 4 | ..... | 15            | „       |
| Water, to |       | ..... | 2             | ounces. |

Time, about seven minutes.

*Pyro.*

Exposure, same as with hydroquinone.

|           |       |       |    |         |
|-----------|-------|-------|----|---------|
| Developer | No. 1 | ..... | 30 | minims. |
| „         | No. 2 | ..... | 30 | „       |
| „         | No. 3 | ..... | 45 | „       |
| „         | No. 4 | ..... | 45 | „       |
| Water, to |       | ..... | 2  | ounces. |

Time, about seven minutes.

## PURPLE.

*Hydroquinone.*

Exposure, 3 in. Mg., distance 1 foot.

|           |       |       |               |         |
|-----------|-------|-------|---------------|---------|
| Developer | No. 1 | ..... | $\frac{1}{2}$ | ounce.  |
| „         | No. 2 | ..... | $\frac{1}{2}$ | „       |
| „         | No. 3 | ..... | 30            | minims. |
| „         | No. 4 | ..... | 30            | „       |
| Water, to |       | ..... | 2             | ounces. |

Time, about ten minutes.

*Pyro.*

Exposure, same as with hydroquinone.

|           |       |       |     |         |
|-----------|-------|-------|-----|---------|
| Developer | No. 1 | ..... | 30  | minims. |
| „         | No. 2 | ..... | 30  | „       |
| „         | No. 3 | ..... | 120 | „       |
| „         | No. 4 | ..... | 120 | „       |
| Water, to |       | ..... | 2   | ounces. |

Time, about ten minutes.

## RED.

*Hydroquinone,*

Exposure, 6 in. Mg., distance 1 foot.

|                       |                      |
|-----------------------|----------------------|
| Developer No. 1 ..... | $\frac{1}{2}$ ounce. |
| "    No. 2 .....      | $\frac{1}{2}$ " "    |
| "    No. 3 .....      | 90 minims.           |
| "    No. 4 .....      | 90 " "               |
| Water, to .....       | 2 ounces.            |

Time, about fifteen minutes.

For the warm tones, development must be carried much beyond what is apparently sufficient, so much is lost at fixing. A yellow light is recommended to be used, as it greatly facilitates judging of tone. It should also be mentioned that richness of tone is entirely dependent on depth to which development is carried.

## WRATTEN &amp; WAINWRIGHT'S FORMULÆ.

## I.—PYROGALLIC ACID.

*Stock Solution A.*

|                                  |            |
|----------------------------------|------------|
| Liquor ammoniæ, s. g. .880 ..... | 1 ounce.   |
| Potassium bromide .....          | 60 grains. |
| Water .....                      | 2 ounces.  |

*Stock Solution B.\**

|                                      |                       |
|--------------------------------------|-----------------------|
| Pyrogallie acid .....                | 1 ounce.              |
| Citric acid or sulphurous acid ..... | $\frac{1}{2}$ drachm. |
| Water .....                          | 10 ounces.            |

\* For the 'Ordinary' plates, B should contain only half the quantity of pyrogallie acid.

*Stock Solution C.*

|                         |            |
|-------------------------|------------|
| Potassium bromide ..... | 20 grains. |
| Water .....             | 1 ounce.   |

*Stock Solution D.*

|                                  |           |
|----------------------------------|-----------|
| Liquor ammoniæ, s. g. .880 ..... | 1 drachm. |
| Water .....                      | 1 ounce.  |

## II.—FOR DROP SHUTTER SPECIAL PLATES.

*Stock Solution B.*

|                       |            |
|-----------------------|------------|
| Pyrogallie acid ..... | 1 ounce.   |
| Citric acid .....     | 60 grains. |
| Water .....           | 10 ounces. |

*Stock Solution A.*

|                            |                    |
|----------------------------|--------------------|
| Liquor ammoniæ, '880 ..... | 1 ounce.           |
| Bromide potassium .....    | 100 or 120 grains. |
| Water .....                | 2 ounces.          |

## SODA DEVELOPER.

|                                |           |
|--------------------------------|-----------|
| No. 1. Sulphite of soda.....   | 6 ounces. |
| Water .....                    | 80 „      |
| Sulphuric acid (pure) .....    | 1 drachm. |
| Pyro.....                      | 1 ounce.  |
| No. 2. Carbonate of soda ..... | 6 ounces. |
| Water .....                    | 80 „      |

Mix in equal parts for correct exposures.

## KALLITYPE NO. 2.

## INSTRUCTIONS FOR WORKING MATT SURFACE AND ALBUMEN KALLITYPE.

*Printing.*—Kallitype is not a printing-out process; the image before development is only a faint one. Care must be taken that the paper is quite dry when put out to print, or it will not be so easy to determine the proper exposure, and the resulting print will not be so good a colour.

*Exposure.*—Five to ten minutes in a good light, or from two to three minutes in sunlight, is an average exposure. When the detail in the densest parts of the negative is faintly indicated, the printing must be stopped.

*Development.*—The prints are immersed, one at a time, in a solution of—

## FOR BLACK TONES,

|                           |                 |
|---------------------------|-----------------|
| No. 1 Rochelle salt ..... | 1 ounce.        |
| Borax .....               | $\frac{1}{4}$ „ |
| Water .....               | 10 ounces.      |

12 to 15 minims of solution of bichromate of potash (twenty grains to the ounce).

## FOR PURPLE TONES.

|                            |                      |
|----------------------------|----------------------|
| No. 2. Rochelle salt ..... | 2 ounces.            |
| Borax .....                | $\frac{1}{4}$ ounce. |
| Water .....                | 10 ounces.           |

10 to 12 minims of solution of bichromate of potash (twenty grains to the ounce).

*Development.*—Be careful to remove any air-bubbles that may be formed on immersing the prints in developer; a touch with the finger will easily do this. A considerable number of prints may be developed at the same time, and development will be complete in about thirty minutes. If greater contrast is desired, the addition of one drop of a twenty-grain solution of bichromate of potash may be made to each ten ounces of developer, and more if necessary. Too much bichromate will destroy the half-tone. Development must be conducted in a subdued light, and, if the developing solution is kept carefully from the light, it will serve to develop a great number of prints. Five or six dozen half-plate prints may be developed with ten ounces of solution; then it will be well to throw developer away and make fresh. The developing solution serves the double purpose of developing the image, and also that of rendering the iron soluble in the ammonia fixing bath, so that, if used too long, the prints will be liable to show yellow stains when finished. The developer is very cheap, and it is recommended to use plenty of it, and to keep the prints moving about freely during the whole time they are in the solution.

If the prints are removed from the developer too soon, the yellow colour will not entirely disappear in the ammonia bath.

*Fixing.*—The prints are next fixed by immersing for ten minutes in fixing bath—

|                      |            |
|----------------------|------------|
| Strong ammonia ..... | 4 drachms. |
| Water .....          | 1 quart.   |

*Note.*—With albumen prints, use only eight to ten drops of bichromate of potash solution in ten ounces of developer, and fix in ammonia bath half the strength of that used for the matt paper.

To ensure perfect fixation, it will be best to pass them through a second ammonia fixing bath, made in the same way as above, allowing them to remain ten minutes, moving frequently. After washing in several changes of running water for about a quarter of an hour, the prints may be blotted off between clean cloths, or blotting-paper, and dried in the air.

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SEE PP. 1025-1032.

Morgan & Kidd  
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APPLICATIONS FOR PATENTS CONNECTED WITH THE  
 PHOTOGRAPHIC ART.

(Corrected up to date of going to Press.)

No. 20,620.—'The Rotary Hand Camera.' W. H. JACKSON.—Dated November 15, 1892.

No. 20,649.—'Improvements in Apparatus for Regulating the Speed of Photographic Shutters or the like.' A. S. NEWMAN and J. GUARDIA.—Dated November 15, 1892.

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# For Bromide Paper

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No. 21,947.—'Improvements in Photographic Cameras.' F. BEAUCHAMP.—*Dated December 1, 1892.*

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No. 23,378.—'Improvements in or connected with Doublet Lenses for Photographic Purposes.' C. P. GOERZ and E. von HOEGH.—*Dated December 19, 1892.*

No. 23,434.—'Improved Photographic Dark Slides.' S. H. BRITAIN and E. J. BRITAIN.—*Dated December 20, 1892.*

No. 23,487.—'Improvements in or relating to Photographic Cameras.' Communicated by A. C. Kemper. Complete specification. A. J. BOULT.—*Dated December 20, 1892.*

No. 23,530.—'An Improved Frame for Miniature Photographs, Views, or other Analogous Articles to be used as an Article of Jewellery.' J. STEVENSON.—*Dated December 21, 1892.*

No. 23,577.—'The Manufacture and Production of a New Material for use in Obtaining Oxygen from Atmospheric Air.' H. WEYMERSCH.—*Dated December 21, 1892.*

No. 23,592.—'An Improved Portable Photographic Developing Sink.' B. HUMPHREYS.—*Dated December 21, 1892.*

No. 23,681.—'An Improved Stand or Rack for Displaying Cards, Photographs, and other Articles.' H. C. HALL.—*Dated December 23, 1892.*

No. 23,716.—'Means or Apparatus whereby Photographers can Retouch their Negatives or Prints with the aid of Artificial Light.' E. T. POWELL.—*Dated December 23, 1892.*

❖ ELLIOTT & SON'S ❖

'STUDIO' PLATE.

The Quickest CHEAP Plate made.

WORKS:—BARNET, HERTS.

Morgan & Kidd  
 Richmond  
 S.W.

No. 23,756.—'Improvements in Optical Lanterns.' S. W. ALLEN.—*Dated December 23, 1892.*

No. 23,772.—'An Apparatus or Means of Illuminating Objects for Photographic Purposes.' H. SENIER.—*Dated December 24, 1892.*

No. 23,797.—'Improvements in or Relating to Mirrors, Screens, Reflectors, and the like, also Applicable to Photographic Cameras.' J. CHALLINOR and F. FIDLER.—*Dated December 24, 1882.*

No. 23,837.—'An Improved Connexion or Coupling for use in conjunction with Cylinders, Flasks, and Vessels containing Gases, and Fluids under High Pressure.' The MANCHESTER OXYGEN (BRIN'S PATENT) COMPANY, Ltd., and W. M. JACKSON.—*Dated December 26, 1892.*

No. 23,855.—'An Improved Method of Attaching the Legs of Camera Stands to the Tops.' W. G. TWEEDY.—*Dated December 27, 1892.*

No. 23,926.—'Improvements in Panoramic Cameras.' R. W. STEWART.—*Dated December 28, 1892.*

No. 23,942.—'Magnesium Arc Light for Photography.' G. W. MORGAN.—*Dated December 28, 1892.*

No. 23,944.—'Improvements in Photographic Cameras.' A. C. SMITH and A. A. SMITH.—*Dated December 28, 1892.*

No. 23,987.—'An Adjustable Clip or Grip for Holding Photographs. A Vignetting Chair and a Stand or Support for a Screen or Background Frame used in and for Photographic Purposes.' H. L. MOREL.—*Dated December 29, 1892.*

No. 24,106.—'Improvements in Photographic Apparatus.' S. D. WILLIAMS.—*Dated December 31, 1892.*

No. 6.—'Improvements in Lanterns and Other Means for Illuminating Photographic Dark Rooms.' G. V. FOSBERY.—*Dated January 2, 1893.*

No. 202.—'Improvements in Portable or Hand Photographic Apparatus or Cameras.' Communicated by J. B. Brunel and A. Reynier. W. P. THOMPSON.—*Dated January 4, 1893.*

⇒\* ELLIOTT & SON'S \*⇐

'BARNET' ORDINARY PLATE

The BEST PLATE for All-round Work.

WORKS:—BARNET, HERTS.

For  
**Carbon**  
**Enlargements**

No. 312.—'Improvements in or Relating to Photographic Cameras.' H. B. SHARP and H. C. HITCHMOUGH.—*Dated January 6, 1893.*

No. 468.—'Improvements in Lighting Apparatus for use in Photography.' S. O. TAYLOR.—*Dated January 10, 1893.*

No. 614.—'Improvements in Photographic Dark Slides.' S. J. LEVI, A. J. JONES, and E. HOLMES.—*Dated January 11, 1893.*

No. 686.—'Improvements in the Construction of Stereoscopes.' W. MIDDLEMISS.—*Dated January 12, 1893.*

No. 741.—'Improvements in and Apparatus for the Manufacture of Films especially intended for the Production of Transparent Films for Photographic purposes.' W. H. WALKER.—*Dated January 12, 1893.*

No. 963.—'Improved means for Colouring and Tinting Photographic Prints.' E. HOOKER.—*Dated January 16, 1893.*

No. 989.—'Improvements in regard to Washing and Draining Racks for Photographic and other purposes.' F. T. PARSONS.—*Dated January 17, 1893.*

No. 1000.—'A Photographic Hand Camera.' H. GAMWELL and C. GAMWELL.—*Dated January 17, 1893.*

No. 1065.—'Improvements in Coin-operated Photograph Machines.' P. VAN W. WELSH and W. F. FREEMAN.—*Dated January 17, 1893.*

No. 1151.—'An improved Photographic Camera.' G. I. SPALDING and R. L. HAWKINS.—*Dated January 18, 1893.*

No. 1192.—'Improvements in the production of Photographic Images.' H. K. TOMPKINS.—*Dated January 19, 1893.*

No. 1195.—'Improvements in Grooved Metallic Strips for Boxes for Carrying and Storing or Packing Photographic Plates and other Plates, and for other like purposes, and in the method of, and tools for, making the said Grooved Metallic Strips.' W. H. DUGARD and G. H. DUGARD.—*Dated January 19, 1893.*

❖ ELLIOTT & SON'S ❖

Artistic Finishing of Enlargements.

WORKS:—BARNET, HERTS.

Morgan & Kidd  
 Richmond  
 S.W.

No. 1581.—'Improvements in and relating to Photographic Cameras.' W. WATSON.—*Dated January 24, 1893.*

No. 1684.—'Improved Coin-free Apparatus for Exhibiting Photographs, Pictures, Advertisements, and the like.' F. J. COCKS.—*Dated January 25, 1893.*

No. 1696.—'Printing Photographic Plates.' E. A. BASEBE.—*Dated January 25, 1893.*

No. 1965.—'Improvements in and relating to Frames for Holding Plates or Films in Photographic Apparatus.' E. A. VELTER.—*Dated January 28, 1893.*

No. 1972.—'The "Biunio" Photographic Lens.' J. H. NEWMAN.—*Dated January 30, 1893.*

No. 1991.—'An Improvement in Photographic Lenses, also applicable to Microscope and Lantern Objectives.' H. D. TAYLOR.—*Dated January 30, 1893.*

No. 2035.—'Improvements in Photographic Cameras.' J. G. GOOSEY.—*Dated January 30, 1893.*

No. 2202.—'Improvements in Photographic Printing by Electric Light and in Apparatus therefor.' J. E. A. GWYNNE.—*Dated February 1, 1893.*

No. 2226.—'An Improvement in Photographic Cameras.' G. R. ALLELY, A. E. ALLELY, and T. E. ASTON.—*Dated February 1, 1893.*

No. 2288.—'Improvements in Photographic Cameras and in Apparatus connected therewith.' S. D. MCKELLEN.—*Dated February 2, 1893.*

No. 2328.—'Improvements in Photographic Studio Accessories.' H. L. MOREL.—*Dated February 2, 1893.*

No. 2566.—'Improvements in or relating to Apparatus for the Exposure, Separation, and Storing of a Pack or Series of Photographic Films.' Complete specification. J. T. CLARKE.—*Dated February 6, 1893.*

No. 2663.—'Improvements in Cabinets for the Reception of Photographs or other articles.' A. JEPSON.—*Dated February 7, 1893.*

❖ ELLIOTT & SON. ❖

SILVER & PLATINOTYPE PRINTING

WORKS:—BARNET, HERTS.

For  
**Platinotype  
 Enlargements**

No. 2707.—'Improvements in and relating to Photographic Retouching Devices.' Complete specification. A. S. HARRY.—*Dated February 7, 1893.*

No. 2747.—'A Chambered Roller with the Chambering carried parallel right through, and as a Through-draft Roller applied to Photographic Burnishing Machines.' L. MARION, H. GUIBOUT, G. BISHOP, F. BISHOP, and J. P. KIRK.—*Dated February 8, 1893.*

No. 2926.—'Improvements in Photographic Apparatus.' J. E. W. ERDESLEY.—*Dated February 10, 1893.*

No. 3312.—'An Improved Support for Photographic Apparatus.' Communicated by A. Roger-Dubroni. H. H. LAKE.—*Dated February, 14, 1893.*

No. 3529.—'An Improved Toy Magazine Photographic Camera.' J. W. RHODES.—*Dated February 17, 1893.*

No. 3604.—'Improvements in Nippers for Toning Photographs and Removing Prints from Baths or the like.' G. C. W. BARRON.—*Dated February 18, 1893.*

No. 3699.—'Improvements in Stand for Photographic Cameras.' H. W. TAUNT.—*Dated February 20, 1893.*

No. 3791.—'Improvements in Gratings or Screens for Photo-mechanical Printing.' Complete specification. M. LEVY.—*Dated February 21, 1893.*

No. 3804.—'Improvements in Electro-photography.' J. WARING.—*Dated February 21, 1893.*

No. 3847.—'Improvements in the Production of Lantern Slides and other Transparent Photographic Images, in which are also contained an Improved Means of Transferring Photographic Reproductions to Porcelain, Metal, and other surfaces.' R. MITCHELL.—*Dated February 21, 1893.*

No. 3919.—'An Improved Pneumatic Shutter for Photographic Purposes.' A. PHILBURN.—*Dated February 22, 1893.*

No. 3964.—'Improvements in or relating to Photo-mechanical Printing.' W. R. ANDRÉ, W. R. H. SLEIGH, and A. B. A. SLEIGH.—*Dated February 23, 1893.*

→\* ELLIOTT & SON'S \*←

**BARNET 'LANTERN' PLATE**

For Warm or Cold Tones.

WORKS:—BARNET, HERTS.

Morgan & Kidd  
 Richmond  
 S.W.

No. 3989.—'Irvine's Improved Twin Lens Hand Camera.' J. IRVINE.—  
*Dated February 23, 1893.*

No. 4030.—'Improvements in Shutters for Photographic Lenses.' F.  
 SHEW.—*Dated February 23, 1893.*

No. 4057.—'An Improved Photographic Camera for Portraiture and for  
 Studio Work.' J. V. ROBINSON.—*Dated February 24, 1893.*

No. 4065.—'Improvements in the Construction of Hand Cameras and Dark  
 Slides therefor.' W. MIDDLEMISS.—*Dated February 24, 1893.*

No. 4141.—'An Improved Photographic Printing Apparatus and Process.'  
 U. S. RUSH, H. L. JENKINS, and W. G. GOSSLIN.—*Dated February 24, 1893.*

No. 4167.—'Improvements in and connected with Extension Linkages for  
 Photographic Cameras and other Collapsible Apparatus.' G. WISHART.—  
*Dated February 25, 1893.*

No. 4188.—'Improvements in Photographic Cameras.' T. MILLER.—  
*Dated February 25, 1893.*

No. 4188.—'Improvements in Electric Retouching of Photographs, and in  
 Apparatus therefor.' R. KENNEDY.—*Dated February 25, 1893.*

No. 4214.—'New or Improved Apparatus for the Manufacture of Films,  
 more especially intended for the Manufacture of Films for Photographic  
 Purposes.' W. H. WALKER.—*Dated February 25, 1893.*

No. 4257.—'Improvements in the Condensers of Optical Lanterns.' W. I.  
 CHADWICK.—*Dated February 27, 1893.*

No. 4348.—'Improved Copying Camera for Photo-mechanical Work.'  
 A. WYBRANT and W. GAMBLE.—*Dated February 28, 1893.*

No. 4377.—'Improvements in Photographic Objectives.' Complete speci-  
 fication. A. B. PARVIN.—*Dated February 28, 1893.*

No. 4378.—'A Flexible Temporary Support for use in Carbon or Pigment  
 Printing.' H. J. BURTON.—*Dated February 28, 1893.*

→\* ELLIOTT & SON'S \*←

'ROCKET' FILMS.

Reliable, Rapid, Clean.

WORKS:—BARNET, HERTS.

# For Collotype Printing

No. 4520.—'Improvements in or relating to Photographic Processes.' Communicated by W. J. H. AUTON. A. J. BOULT.—*Dated March 1, 1893.*

No. 4578.—'The Pocket Portable Camera Bracket.' F. W. SMETHURST.—*Dated March 2, 1893.*

No. 4644.—'Improvements in and relating to Magic Lanterns, and to the Manipulation of the same.' H. SIMPSON.—*Dated March 3, 1893.*

No. 4672.—'Improvements in Apparatus for Exhibiting Photographs, Pictures, Advertisements, and the like.' C. F. VEIT.—*Dated March 3, 1893.*

No. 4692.—'Improvements in Photographic Objectives.' Complete specification. P. RUDOLPH.—*Dated March 3, 1893.*

No. 4814.—'Improvements in Photographic Cameras.' B. F. S. BADEN-POWELL.—*Dated March 6, 1893.*

No. 4884.—'A Cabinet or Case for the Holding and Carrying of Lantern and other Slides.' J. POTTS.—*Dated March 7, 1893.*

No. 4951.—'Improvements in Photography by the use of New Developers.' Communicated by the Chemische Fabrik auf actien vorm. E. Schering. S. PITT.—*Dated March 7, 1893.*

No. 5035.—'An Improved Case or Chamber for Enclosing and Protecting Photographic Printing Frames and Similar Apparatus with their Contents during the Process of Photographic Printing and the like.' G. C. J. JELPKE.—*Dated March 8, 1893.*

No. 5170.—'An Improvement in the Manufacture of Lenses for certain purposes.' H. VAN DER WEYDE.—*Dated March 9, 1893.*

No. 5219.—'An Improvement in Photographic Cameras.' J. THEOBALD.—*Dated March 10, 1893.*

No. 5232.—'Improvements in or relating to Photographic Cameras.' T. E. C. WILSON.—*Dated March 10, 1893.*

No. 5350.—'A Field-glass Camera.' A. F. SCHOERLE.—*Dated March 13, 1893.*

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## ⇒\* ELLIOTT & SON'S \*⇐

# ENLARGEMENTS.

Carbon, Bromide, and Platinotype.

CANNOT BE EXCELLED.

WORKS:—BARNET, HERTS.

Morgan & Kidd  
 Richmond  
 S.W.

No. 5396.—'Improvements in Hand or Detective Cameras and Shutter which can be used with other Cameras to advantage,' N. CROUCH.—*Dated March 13, 1893.*

No. 5504.—'Improvements in or relating to the Manufacture of Films for Photographic Purposes.' Communicated by T. H. Blair. A. J. BOULT.—*Dated March 14, 1893.*

No. 5517.—'Improved Silver Haloid Emulsions for Photographic Purposes.' W. H. PRESTWICH.—*Dated March 14, 1893.*

No. 5554.—'An Improved Form of Jet for Optical Lanterns.' J. H. BARTON.—*Dated March 15, 1893.*

No. 5624.—'Improvements in and connected with Clips for Holding Photographic Films, Glass, Paper, or any Sheets of Thin Material.' J. W. BARLOW.—*Dated March 15, 1893.*

No. 5828.—'Improvements in Photographic Cameras and their Accessories.' W. J. LANCASTER.—*Dated March 18, 1893.*

No. 5846.—'An Improved Photographic Apparatus.' J. DAMOIZEAU.—*Dated March 18, 1893.*

No. 5922.—'Improvements in Apparatus for Separating and Manipulating Plates, Cards, or Films, primarily applicable to Plates, Films, &c., in Photographic Cameras.' H. G. M. CONYBEARE.—*Dated March 20, 1893.*

No. 5932.—'An Improvement in the Manufacture of Photographic Plates.' O. MAGERSTEDT.—*Dated March 20, 1893.*

No. 5980.—'An Improved Hand Camera.' A. C. SMITH and A. A. SMITH.—*Dated March 21, 1893.*

No. 5993.—'Improvements in, or appertaining to, the Exposing Devices of Hand Cameras or the like.' C. COVENTRY.—*Dated March 21, 1893.*

No. 5994.—'Improvements in, or appertaining to, the Exposing Devices of Hand Cameras or the like.' C. COVENTRY.—*Dated March 21, 1893.*

⇒‡ ELLIOTT & SON'S ‡⇐

ALBUMENIZED PAPER

(AS USED AT THEIR WORKS).

WORKS:—BARNET, HERTS.

For  
**Richmond**  
**Dry Plates**

No. 6335.—'Improved Construction of Tripod Framing for Photographic Cameras, Music and Reading Desks.' J. H. ROSOMAN.—*Dated March 24, 1893.*

No. 6931.—'An Improved Mask with Border for Photographic Purposes.' A. C. JACKSON.—*Dated April 4, 1893.*

No. 7051.—'An Improvement in or connected with Hand Frames for holding Photographs, Pictures, and the like.' W. S. SIMPSON.—*Dated April 5, 1893.*

No. 7061.—'Improvements in Photographic Draining Racks, whereby several Sizes of Plates can be Accommodated together or separately.' W. TYLAR.—*Dated April 6, 1893.*

No. 7231.—'Cheney's Retouching Apparatus or Retouching Machine for Retouching and Stippling Photographic Negatives and other Pictures.' J. CHENEY.—*Dated April 8, 1893.*

No. 7281.—'Improvements Relating to the Production of Negatives.' E. ALBERT.—*Dated April 8, 1893.*

No. 7307.—'Turn-cards, an Apparatus for Displaying Photographs, Pictures, Advertisements, Samples, &c.' F. E. SUDDARD.—*Dated April 10, 1893.*

No. 7341.—'Improved Means for Preserving Paintings, Prints, and Photographs against Atmospherical Deterioration.' W. S. SIMPSON.—*Dated April 10, 1893.*

No. 7343.—'Improvements in and relating to the Colouring of Photographic Prints, Transparencies, and Negatives.' Complete specification. C. KLARY.—*Dated April 10, 1893.*

No. 7443.—'An Improved Method of Photographing Persons or Objects in Motion, and Improved Apparatus for Effecting the same, and Improved Apparatus for Exhibiting the same, and for Applying it to the Optical Lantern.' J. D. BURTON.—*Dated April 12, 1893.*

❖ ELLIOTT & SON'S ❖

'BARNET' DRY PLATES.

ORDINARY, STUDIO, and ROCKET.

WORKS:—BARNET, HERTS.

No. 7480.—'Improved Objective for Use in Photographic Cameras.' Communicated by A. Steinheil and R. Steinheil. W. P. THOMPSON.—*Dated April 12, 1893.*

No. 7481.—'Improvements in Photographic Cameras.' W. RICE.—*Dated April 12, 1893.*

No. 7656.—'Coin-freed Apparatus for the Automatic Production of Photographs.' Complete specification. Communicated by A. Hahn. A. STRAUSS-COLLIN.—*Dated April 14, 1893.*

No. 7680.—'An Automatic Safety Bar and Ejector for Use in Hand Cameras.' R. CROWE and H. NICHOLLS.—*Dated April 15, 1893.*

No. 7743.—'Improved Method of Photographing in Colours.' J. JOLY.—*Dated April 17, 1893.*

No. 7851.—'Improvements in Photographic Printing Frames or the like.' F. L. PERKEN, E. T. PERKEN, A. RAYMENT, and H. HUNTER.—*Dated April 18, 1893.*

No. 8122.—'Magazine Plate-carrier Slide and Changing Box.' J. G. REID.—*Dated April 22, 1893.*

No. 8340.—'Improvement in Lenses.' H. BATE.—*Dated April 25, 1893.*

No. 8420.—'Improvements in Photographic Cameras.' J. W. WILSON.—*Dated April 26, 1893.*

No. 8541.—'An Improved Apparatus for Changing in Daylight Photographic Plates from a Light-tight Box to the Dark Slide of the Camera, and vice versa.' E. BARNARD.—*Dated April 28, 1893.*

No. 8624.—'An Improved Washing Apparatus for Photographic Prints.' W. M. SIMPSON.—*Dated April 29, 1893.*

No. 8956.—'Improvements in the Manufacture of Sensitive Plates and Films for Photographic Purposes, and in the Treatment of such Plates and Films after Exposure in the Camera.' C. E. PETTITT.—*Dated May 4, 1893.*

No. 9072.—'“The Phrenoscopic Camera,” being an Instrument for the Production of Binocular Perspective in a Single Photograph.' S. N. GORDON and S. C. WICKS.—*Dated May 6, 1893.*

No. 9106.—'Improved Dark Slide for Exposing Celluloid Films in Photographic Camera.' E. H. FITCH.—*Dated May 6, 1893.*

No. 9107.—'Improvements in and in connexion with Photographic Cameras known as Hand or Detective Cameras.' H. G. M. CONYBEARE.—*Dated May 6, 1893.*

No. 9118.—'Improved Means for Operating Photographic Shutters.' C. J. WOLLASTON and J. STUART.—*Dated May 6, 1893.*

No. 9499.—'Improved Hand Camera, by the Use of Hexagonal Drum or Box in Interior.' A. T. DAVEY.—*Dated May 12, 1893.*

No. 9666.—'An Improved Means of Automatically Locking Shutters of Photographic Dark Slides.' W. F. FLETCHER and E. J. B. DANKS.—*Dated May 15, 1893.*

No. 9766.—'Improvements in Photographic Cameras.' C. BOND.—*Dated May 16, 1893.*

No. 9848.—'Holding Photographic Plates During the Process of Development, whereby any Contact of the Operator's Hand with the Bath is Prevented.' S. H. BRITTAIN.—*Dated May 17, 1893.*

No. 9896.—'Improvement in Caps for Photographic Lenses.' S. FOXON.—*Dated May 17, 1893.*

No. 9923.—'An Improved Method of Mounting the Jets of Optical Lanterns.' J. H. BARTON.—*Dated May 18, 1893.*

No. 10,001.—'A New Multiple Revolving Photographic Dark Slide.' W. WILSON.—*Dated May 19, 1893.*

No. 10,064.—'Improvements in and relating to Photographic Apparatus.' J. RICHARD.—*Dated May 19, 1893.*

No. 10,131.—'An Improvement in Photographic Apparatus.' W. J. DIBDIN.—*Dated May 20, 1893.*

No. 10,146.—'Improvements in Dark Slides for Photographic Purposes.' W. H. PRESTWICH.—*Dated May 23, 1893.*

No. 10,166.—'Improvements in Photographic Cameras, and a Fastener to be used therein.' C. SHAW.—*Dated May 23, 1893.*

No. 10,184.—'Improvements in Magazine Photographic Cameras.' M. COBÉ.—*Dated May 23, 1893.*

No. 10,194.—'Improved Means for the Development of Photographic Plates.' J. R. C. GALE.—*Dated May 23, 1893.*

No. 10,196.—'Improvements in Phototype Machines.' Communicated by A. P. Stanford. Complete specification. A. J. BOULT.—*Dated May 23, 1893.*

No. 10,238.—'Improvements in Optical Lanterns.' L. MATTHEWS.—*Dated May 23, 1893.*

No. 10,319.—'Improvement in Photographic Printing Frames.' G. R. HEAVISIDE and J. H. SCAMPTON.—*Dated May 25, 1893.*

No. 10,397.—'Improvements in Photographic Cameras.' T. F. S. TINNE.—*Dated May 26, 1893.*

No. 10,524.—'The Employment of Cobaltic Salts to Obtain Photographic Images.' Communicated by A. Lumière and L. Lumière. B. J. B. MILLS.—*Dated May 29, 1893.*

No. 10,617.—'Improvements in Apparatus for Calculating Photographic Exposures.' G. F. WYNNE.—*Dated May 30, 1893.*

No. 10,685.—'Improvements in or connected with the Production of Photographs on Slate.' W. JONES and H. JONES.—*Dated May 31, 1893.*

No. 10,694.—'A new Cross Motion for the Fronts of Field Cameras.' W. DAWKINS & SONS.—*Dated May 31, 1893.*

No. 10,971.—'An Improved Construction of Frame for Photographs and other Pictures and Designs.' L. WAKE.—*Dated June 5, 1893.*

No. 11,179.—'Improvements in Magazine Cameras.' S. D. WILLIAMS.—*Dated June 7, 1893.*

No. 11,210.—'Improvements in Photographic Cameras.' S. H. BRITAIN and G. D. HUGHES.—*Dated June 8, 1893.*

No. 11,212.—'Improvements in Photographic Cameras.' J. F. PARSONS.—*Dated June 8, 1893.*

No. 11,303.—'Improvements in the Construction of Photographic and other Folding Tripod Stands.' Complete specification. H. J. SPRATT, A. S. SPRATT, and G. A. SPRATT.—*Dated June 9, 1893.*

No. 11,353.—'Improvements in or relating to Photographic Cameras.' C. PECZENIK.—*Dated June 9, 1893.*

No. 11,365.—'Improvements in Photograph and other like Frames.' Communicated by S. Posen. A. COHN.—*Dated June 9, 1893.*

No. 11,789.—'Improvements in Photographic Cameras.' A. W. POCOCK.—*Dated June 15, 1893.*

No. 11,796.—'An Improvement in Photography.' F. STERNBERG.—*Dated June 15, 1893.*

No. 11,823.—'Improvement in Cameras.' Communicated by E. Decker. P. R. J. WILLIS.—*Dated June 15, 1893.*

No. 11,841.—'Improvements in Photographic Cameras.' G. D. HUGHES.—*Dated June 16, 1893.*

No. 11,869.—'Changing Arrangement for Hand Cameras.' G. S. WHITFIELD.—*Dated June 16, 1893.*

No. 11,872.—'Improvements in Photographic Developers.' Communicated by the Actien Gesellschaft für Anilin Fabrikation. C. D. ABEL.—*Dated June 16, 1893.*

No. 12,008.—'An Improved Plate Rest for Supporting Negative or Positive Photographic Plates in a Fixing or other Bath.' J. BARNES.—*Dated June 19, 1893.*

No. 12,287.—'Improvements in Photographic Apparatus.' Communicated by P. Meyer. A. J. BOULT.—*Dated June 22, 1893.*

No. 12,296.—'Improvements in the Manufacture of Half-tone Gelatine Reliefs for Process Blocks.' Complete specification. J. HUSNIK.—*Dated June 22, 1893.*

No. 12,304.—'An Improvement in the Manufacture of Sensitive Plates or Films for Photographic Purposes.' Complete specification. F. W. EDWARDS and H. RANSOM.—*Dated June 22, 1893.*

No. 12,443.—'Improvements in Photographic Apparatus.' W. J. GREATOREX.—*Dated June 24, 1893.*

No. 12,551.—'Improvements in the Fronts of Optical Lanterns.' J. H. BARTON.—*Dated June 27, 1893.*

No. 12,590.—'Improvements in Vitrifying Photographic Prints on Glass, Metal, Porcelain, China, and like Substances.' H. W. COX.—*Dated June 27, 1893.*

No. 12,621.—'Improvements in Photographic Cameras.' G. I. SPALDING.—*Dated June 27, 1893.*

No. 12,633.—'Improvements in Apparatus for Vignetting Photographic Prints.' E. M. ASHLEY.—*Dated June 27, 1893.*

No. 12,655.—'Improvements in Apparatus for Trimming Photographs.' Complete specification. A. C. RETTIE.—*Dated June 28, 1893.*

No. 12,656.—'Improvements in and in connexion with Saturators for use in Signalling, Optical Lanterns, and for similar Purposes.' J. G. PARVIN.—*Dated June 28, 1893.*

No. 12,734.—'An Appliance for Washing Photographic Plates and Prints.' W. THOMSON.—*Dated June 29, 1893.*

No. 12,839.—'Improvements in Tripod Stands for Photographic Cameras and other purposes.' L. A. MARION, H. GUIBOUT, G. BISHOP, F. BISHOP, and J. P. KIRK.—*Dated June 30, 1893.*

No. 12,840.—'Improvements in Apparatus for Storing and Exhibiting Transparent Pictures, Photographic Negatives or Positives, and the like.' L. A. MARION, H. GUIBOUT, G. BISHOP, F. BISHOP, and J. P. KIRK.—*Dated June 30, 1893.*

No. 12,860.—'Improvements in Photographic Cameras.' H. H. VON HOCHBERG, PRINCE OF PLESS.—*Dated June 30, 1893.*

No. 12,991.—'Improvements in or relating to the transfer of Photographic Pictures.' Communicated by C. F. JOZE. A. J. BOULT.—*Dated July 3, 1893.*

No. 13,063.—'Improvements in Magazine Cameras.' Complete specification. Communicated by E. R. ANDREWS. A. J. BOULT.—*Dated July 4, 1893.*

No. 13,288.—'An improved Shutter for Photographic Purposes.' A. PHILBURN.—*Dated July 8, 1893.*

No. 13,354.—'An Improved Frame or Holder for Photographic Films and plates.' S. D. WILLIAMS.—*Dated July 10, 1893.*

No. 13,373.—'Improved Means for regulating the Rays of Light passing through Photographic Lenses.' Complete specification. J. W. FAWCETT.—*Dated July 10, 1893.*

No. 13,808.—'An Improvement in Camera Cases.' F. E. BUSSELL.—*Dated July 17, 1893.*

No. 13,820.—'A New Apparatus for the Connexion of the Fronts and Backs of Cameras, Stereoscopes, Graphoscopes, and the like.' J. DAY.—*Dated July 17, 1893.*

No. 13,940.—'An Improved Gauge for Centering and Mounting Photographic Prints and the like.' C. F. GOOCH.—*Dated July 18, 1893.*

No. 14,024.—'Improvements in or Relating to Colours for and Colouring Photographs and other articles.' F. C. D. BEACHAM.—*Dated July 20, 1893.*

No. 14,036.—'Improvements in Magazine or Detective Hand Cameras.' A. J. BUNCHE.—*Dated July 20, 1893.*

No. 14,045.—'Improvements in Hand Cameras for Photographic Purposes. Communicated by A. Delug. W. P. THOMPSON.—*Dated July 20, 1893.*

No. 14,074.—'Improvements in Apparatus for Taking Photographs on Sensitive Films or Plates.' B. J. EDWARDS.—*Dated July 20, 1893.*

No. 14,112.—'Improvements in Optical Lanterns.' S. J. LEVI and A. J. JONES.—*Dated July 21, 1893.*

No. 14,163.—'An Automatic Changing Box for Photographic Films.' W. R. BAKER.—*Dated July 22, 1893.*

No. 14,364.—'Improvements in Instruments for calculating Photographic Exposures.' Complete specification. A. WATKINS.—*Dated July 25, 1893.*

No. 14,432.—'An Improved Focussing Appliance for Photographic Cameras.' F. T. Y. NIBLETT.—*Dated July 26, 1893.*

No. 14,604.—'Improvements in Frames for Photographs, Opalines, and other Pictures.' P. CAMPBELL.—*Dated July 29, 1893.*

No. 14,677.—'Improvements in or relating to Photographic Cameras.' J. R. GOTZ.—*Dated July 31, 1893.*

No. 14,839.—'Improvements in or in connexion with Photographic Shutters, known as Blind Shutters.' H. R. COOK.—*Dated August 2, 1893.*

No. 14,877.—'Improvements in and in connexion with Projecting Lanterns.' Complete specification. W. C. HUGHES and H. WOODRUFF.—*Dated August 3, 1893.*

No. 14,902.—'Actinometer and Method of Measuring the Chemical Effect of Light.' Complete specification. J. KREMER.—*Dated August 3, 1893.*

No. 14,925.—'Improvements in Photographic Cameras and other Optical Instruments.' J. W. GORDON.—*Dated August 4, 1893.*

No. 14,927.—'Improvements in Photographic Cameras.' E. H. P. HUMPHREYS.—*Dated August 4, 1893.*

No. 15,056.—'Improvements in the Construction of Photographic Cameras.' A. T. LIVIE.—*Dated August 5, 1893.*

No. 15,383.—'An Improved Process and Combination of Ingredients for the Formation and Transfer of Photographic Images.' O. HELLSTERN.—*Dated August 12, 1893.*

No. 15,400.—'Improvements in Coin-freed Photographic Apparatus.' P. E. MALLET.—*Dated August 12, 1893.*

No. 15,473.—'Improvements in Photographic Positives, and in Sensitive Emulsions therefor.' J. B. BROOKS and J. H. P. GILLARD.—*Dated August 15, 1893.*

No. 15,621.—'An Improvement in Photography.' C. F. CROSS and W. NELSON.—*Dated August 17, 1893.*

No. 15,666.—'Improvements in and in connexion with Photographic Shutters of the Character known as "Blind Shutters."' H. COOK.—*Dated August 18, 1893.*

No. 16,202.—'Improvements in the construction of Supports for Glazed Photographic Pictures and other Articles capable of being similarly supported.' E. FRITH.—*Dated August 28, 1893.*

No. 16,319.—'Baker's Rapid Photograph Moulder or Roller Squeegee.' T. BAKER.—*Dated August 30, 1893.*

No. 16,354.—'Improvements in the production of Photographic Negatives.' E. ALBERT.—*Dated August 30, 1893.*

No. 16,373.—'Improvements in or in connexion with Cameras.' F. W. BRANSON.—*Dated August 31, 1893.*

No. 16,579.—'Improvements in Magazine Cameras for Photographic Purposes.' B. J. YOUNG.—*Dated September 4, 1893.*

No. 16,826.—'Improvements in Cameras for Copying, Reducing, &c.' A. S. NEWMAN and J. GUARDIA.—*Dated September 7, 1893.*

No. 17,022.—'Improvements in the Construction of Portable Photographic Cameras and Stands.' W. J. SPURRIER.—*Dated September 11, 1893.*

No. 17,060.—'Improved Means and Apparatus for securing Accurate Focus Registration in Photographic Cameras.' T. R. DALLMEYER.—*Dated September 11, 1893.*

No. 17,685.—'Improvements in or relating to Photographic Shutters.' Complete specification. J. T. CLARKE.—*Dated September 20, 1893.*

No. 17,701.—'An Improved Adjustable Limelight Burner for Magic Lanterns and similar purposes.' A. C. JACKSON and H. L. TOMS.—*Dated September 20, 1893.*

No. 17,702.—'Improvements in Photographic Camera Stands.' E. BISHOP.—*Dated September 20, 1893.*

No. 17,816.—'An Improved Limelight Apparatus and Saturator for use in connexion with Biunial, Side-by-side, and other Optical Lanterns.' Complete specification. J. RILEY and W. LAWSON.—*Dated September 22, 1893.*

No. 17,875.—'Improvements in Photographic Shutter Mechanism.' C. HASELER and C. E. HASELER.—*Dated September 23, 1893.*

No. 17,913.—'Improvements in Screen Stands for Magic Lanterns and Dissolving View Apparatus.' J. PEPPER.—*Dated September 23, 1893.*

No. 17,957.—'A Stereoscopic Lens for Monocular Vision for the Examination of Photographs.' C. M. BLADES.—*Dated September 25, 1893.*

No. 18,115.—'A New or Improved Electric Arc Lamp specially applicable for Projecting Purposes instead of the Limelight.' F. J. BORLAND.—*Dated September 27, 1893.*

No. 18,224.—'Improvements in Saturators and Jets for Producing Oxygen-hydrogen or Limelight.' A. SUITER.—*Dated September 28, 1893.*

No. 18,233.—'An Apparatus for Exhibiting Photographs, Advertisements, and the like.' W. R. BAKER.—*Dated September 28, 1893.*

No. 18,237.—'Improvements in the Process of Making Photographic Films.' Communicated by R. Reissner and G. C. F. Hauser. E. EDWARDS.—*Dated September 28, 1893.*

No. 18,270.—'Improvements in Display Cabinets for Photographs.' Complete specification. Communicated by T. E. Wood. W. P. THOMPSON.—*Dated September 29, 1893.*

No. 18,294.—'An Improved Stand or Rack for Displaying Cards, Photographs, and other Articles.' H. C. HALL.—*Dated September 29, 1893.*

No. 18,412.—'Improvements in Detective Cameras.' J. MARSH.—*Dated October 2, 1893.*

No. 18,436.—'Improved Photographic Camera for Automatically Exposing, Changing, and Storing Celluloid Films.' E. H. FITCH.—*Dated October 2, 1893.*

No. 18,595.—'Improvements in Folding Photographic Cameras.' H. HILL and A. L. ADAMS.—*Dated October 4, 1893.*

No. 18,618.—'Lucidotype, an Improved Process of Photo-lithography.' G. H. WRIGHT.—*Dated October 5, 1893.*

No. 18,685.—'Improvements in or in connexion with Photographic Cameras for Use with Flexible Sensitive Surfaces.' H. HILL and A. L. ADAMS.—*Dated October 5, 1893.*

No. 18,742.—'Improvements in Apparatus for Exhibiting Stereoscopic, Panoramic, or Magic Lantern Views in Series.' Communicated by E. Scheitlin. J. WETTER.—*Dated October 6, 1893.*

No. 18,823.—'Improvements in Apparatus for taking Photographic Pictures.' A. A. FOIRET.—*Dated October 7, 1893.*

No. 18,975.—'Image Finder for Hand Cameras and other purposes, Showing the Image on a Plane situated at any Angle round the Axis of the Lens by Rotating a Mirror.' G. STOKES.—*Dated October 10, 1893.*

No. 19,129.—'A Post-card for Photographic Use.' C. HARBERS.—*Dated October 11, 1893.*

No. 19,199.—'Improvements in Photography.' Communicated by R. E. Liesegang. A. ZIMMERMANN.—*Dated October 12, 1893.*

No. 19,206.—'Improvements in Chrono-photographic Apparatus.' E. J. MAREY.—*Dated October 12, 1893.*

No. 19,239.—'Improvements in the Mode of and Means for Draining and Drying Photographic Plates.' J. PUMPHREY.—*Dated October 13, 1893.*

No. 19,282.—'Improvements in Instruments for Calculating Photographic Exposures.' A. WATKINS.—*Dated October 13, 1893.*

No. 19,304.—'Improvements in Photographic Cameras.' J. D. MCKELLEN and S. D. MCKELLEN.—*Dated October 13, 1893.*

No. 19,330.—'Improved Adjustable Support for Photographic Printing Frames.' E. H. HARDY.—*Dated October 14, 1893.*

No. 19,333.—'Improvements in, or connected with, Photographic Pictures.' A. A. BARRATT and A. J. E. HILL.—*Dated October 14, 1893.*

No. 19,518.—'Improved Means for Drying Photographic Films when on Celluloid, Paper, or Other Flexible Substance or Material.' J. W. T. CADETT and W. NEALL.—*Dated October 17, 1893.*

'UNIFORM SYSTEM' NUMBERS FOR STOPS FROM  $\frac{f}{1}$  TO  $\frac{f}{100}$ .

In the following table Mr. S. A. Warburton has calculated the exposure necessary with every stop from  $\frac{f}{1}$  to  $\frac{f}{100}$  compared with the unit stop of the 'uniform system' of the Photographic Society of Great Britain. The figures which are underlined show in the first column what  $\frac{f}{a}$  must be in order to increase the exposure in geometrical ratio from  $\frac{f}{4}$ , the intermediate numbers showing the uniform system number for any other aperture.

| $f$            | U. S. No.                        | $f$   | U. S. No. | $f$   | U. S. No. |
|----------------|----------------------------------|-------|-----------|-------|-----------|
| <u>1</u>       | <u><math>\frac{1}{16}</math></u> | 15    | 14.06     | 58    | 210.25    |
| $1\frac{1}{4}$ | .097                             | 16    | 16        | 59    | 217.56    |
| <u>1.414</u>   | <u><math>\frac{1}{8}</math></u>  | 17    | 18.06     | 60    | 225.00    |
| $1\frac{1}{2}$ | .140                             | 18    | 20.25     | 61    | 232.56    |
| $1\frac{3}{4}$ | .191                             | 19    | 22.56     | 62    | 240.25    |
| <u>2</u>       | <u><math>\frac{1}{4}</math></u>  | 20    | 25.00     | 63    | 248.06    |
| $2\frac{1}{4}$ | .316                             | 21    | 27.56     | 64    | 256       |
| $2\frac{1}{2}$ | .390                             | 22    | 30.25     | 65    | 264.06    |
| <u>2.828</u>   | <u><math>\frac{1}{2}</math></u>  | 22.62 | 32        | 66    | 272.25    |
| $2\frac{3}{4}$ | .472                             | 23    | 33.06     | 67    | 280.56    |
| <u>3</u>       | <u>.562</u>                      | 24    | 36.00     | 68    | 289.00    |
| $3\frac{1}{4}$ | .660                             | 25    | 39.06     | 69    | 297.56    |
| $3\frac{1}{2}$ | .765                             | 26    | 42.25     | 70    | 306.25    |
| $3\frac{3}{4}$ | .878                             | 27    | 45.56     | 71    | 315.06    |
| <u>4</u>       | <u>1.00</u>                      | 28    | 49.00     | 72    | 324.00    |
| $4\frac{1}{4}$ | 1.12                             | 29    | 52.56     | 73    | 333.06    |
| $4\frac{1}{2}$ | 1.26                             | 30    | 56.25     | 74    | 342.25    |
| $4\frac{3}{4}$ | 1.41                             | 31    | 60.06     | 75    | 351.56    |
| <u>5</u>       | <u>1.56</u>                      | 32    | 64        | 76    | 361.00    |
| $5\frac{1}{4}$ | 1.72                             | 33    | 68.06     | 77    | 370.56    |
| $5\frac{1}{2}$ | 1.89                             | 34    | 72.25     | 78    | 380.25    |
| <u>5.656</u>   | <u>2</u>                         | 35    | 76.56     | 79    | 390.06    |
| $5\frac{3}{4}$ | 2.06                             | 36    | 81.00     | 80    | 400.00    |
| <u>6</u>       | <u>2.25</u>                      | 37    | 85.56     | 81    | 410.06    |
| $6\frac{1}{4}$ | 2.44                             | 38    | 90.25     | 82    | 420.25    |
| $6\frac{1}{2}$ | 2.64                             | 39    | 95.06     | 83    | 430.56    |
| $6\frac{3}{4}$ | 2.84                             | 40    | 100.00    | 84    | 440.00    |
| <u>7</u>       | <u>3.06</u>                      | 41    | 105.06    | 85    | 451.56    |
| $7\frac{1}{4}$ | 3.28                             | 42    | 110.25    | 86    | 462.25    |
| $7\frac{1}{2}$ | 3.51                             | 43    | 115.56    | 87    | 473.06    |
| $7\frac{3}{4}$ | 3.75                             | 44    | 121.00    | 88    | 484.00    |
| <u>8</u>       | <u>4</u>                         | 45    | 126.56    | 89    | 495.06    |
| $8\frac{1}{4}$ | 4.25                             | 45.25 | 128       | 90.50 | 512       |
| $8\frac{1}{2}$ | 4.51                             | 46    | 132.25    | 91    | 517.56    |
| $8\frac{3}{4}$ | 4.78                             | 47    | 138.06    | 92    | 529.00    |
| <u>9</u>       | <u>5.06</u>                      | 48    | 144.00    | 93    | 540.56    |
| $9\frac{1}{4}$ | 5.34                             | 49    | 150.06    | 94    | 552.25    |
| $9\frac{1}{2}$ | 5.64                             | 50    | 156.25    | 95    | 564.06    |
| $9\frac{3}{4}$ | 5.94                             | 51    | 162.56    | 96    | 576.00    |
| <u>10</u>      | <u>6.25</u>                      | 52    | 169.00    | 97    | 588.06    |
| $11$           | 7.56                             | 53    | 175.56    | 98    | 600.25    |
| <u>11.31</u>   | <u>8</u>                         | 54    | 182.25    | 99    | 612.56    |
| $12$           | 9.00                             | 55    | 189.06    | 100   | 625.00    |
| $13$           | 10.56                            | 56    | 196.00    |       |           |
| $14$           | 12.25                            | 57    | 203.06    |       |           |

## ANGLES AND FOCI OF THE TELE-PHOTO LENS.

By THOMAS R. DALLMEYER.

| Distances of Focussing Screen from Compound Negatives or Back Foci, (P) | No. 1. <sup>3</sup><br>Angle included is practically constant; at Full Aperture = 11°<br>(2) |                             |                                          | No. 2. <sup>3½</sup><br>Angle included is practically constant; at Full Aperture = 12°<br>(2) |                             |                                          | No. 3. <sup>3¾</sup><br>Angle included is practically constant; at Full Aperture = 9°<br>(2) |                             |                                          |
|-------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|-----------------------------|------------------------------------------|-----------------------------------------------------------------------------------------------|-----------------------------|------------------------------------------|----------------------------------------------------------------------------------------------|-----------------------------|------------------------------------------|
|                                                                         | Corresponding Foci.                                                                          | Intensity at Full Aperture. | Circle of Illumination at Full Aperture. | Corresponding Foci.                                                                           | Intensity at Full Aperture. | Circle of Illumination at Full Aperture. | Corresponding Foci.                                                                          | Intensity at Full Aperture. | Circle of Illumination at Full Aperture. |
| Inches.                                                                 |                                                                                              |                             |                                          |                                                                                               |                             |                                          |                                                                                              |                             |                                          |
| 4                                                                       | 17½                                                                                          | 1/11                        | 3½                                       | 20                                                                                            | 1/10                        | 4½                                       |                                                                                              |                             |                                          |
| 5                                                                       | 21                                                                                           | 1/13                        | 4½                                       | 22½                                                                                           | 1/11                        | 4¾                                       |                                                                                              |                             |                                          |
| 6                                                                       | 24                                                                                           | 1/15                        | 5½                                       | 25                                                                                            | 1/12½                       | 5¾                                       | 34                                                                                           | 1/12¼                       | 5½                                       |
| 8                                                                       | 30                                                                                           | 1/19                        | 6¾                                       | 31½                                                                                           | 1/17                        | 7½                                       | 42½                                                                                          | 1/15                        | 7                                        |
| 10                                                                      | 36                                                                                           | 1/22                        | 8½                                       | 37                                                                                            | 1/18½                       | 9½                                       | 47½                                                                                          | 1/17                        | 8½                                       |
| 12                                                                      | 42                                                                                           | 1/26                        | 10                                       | 45                                                                                            | 1/22½                       | 11                                       | 56½                                                                                          | 1/20                        | 10                                       |
| 14                                                                      | 48                                                                                           | 1/30                        | 11¾                                      | 50                                                                                            | 1/25                        | 12¾                                      | 63                                                                                           | 1/23                        | 11¾                                      |
| 16                                                                      | 54                                                                                           | 1/33                        | 13¾                                      | 57                                                                                            | 1/28½                       | 14½                                      | 71                                                                                           | 1/26                        | 13½                                      |
| 18                                                                      | 60                                                                                           | 1/37½                       | 15                                       | 62½                                                                                           | 1/32                        | 16¼                                      | 78                                                                                           | 1/28                        | 15                                       |
| 20                                                                      |                                                                                              |                             |                                          | 69                                                                                            | 1/36                        | 18                                       | 85                                                                                           | 1/30                        | 16½                                      |
| 22                                                                      |                                                                                              |                             |                                          | 76                                                                                            | 1/38                        | 19¾                                      | 92                                                                                           | 1/33                        | 18                                       |
| 24                                                                      |                                                                                              |                             |                                          | 84                                                                                            | 1/42                        | 21½                                      | 100                                                                                          | 1/36                        | 20                                       |
| 26                                                                      |                                                                                              |                             |                                          |                                                                                               |                             |                                          | 106                                                                                          | 1/38                        | 22½                                      |
| 28                                                                      |                                                                                              |                             |                                          |                                                                                               |                             |                                          | 114                                                                                          | 1/40                        | 24¾                                      |
| 30                                                                      |                                                                                              |                             |                                          |                                                                                               |                             |                                          | 124                                                                                          | 1/45                        | 27                                       |
| 40                                                                      |                                                                                              |                             |                                          |                                                                                               |                             |                                          | 157½                                                                                         | 1/60                        | 42                                       |

(1) To obtain the distances from the flange to the focussing screen, add 3½, 4, and 6 inches for Nos. 1, 2, and 3 respectively.

(<sup>2</sup>) The angle included is a constant for *one* aperture for any distance of focussing screen, but it diminishes as smaller diaphragms are employed.

The diaphragms are so arranged that for any initial extension (and corresponding intensity) each succeeding smaller diaphragm requires double the exposure of the next larger.

There are seven diaphragms, ranging from full aperture to the *smallest*, which requires sixty-four times the exposure required for full aperture.

The smallest stop reduces the angles included at full aperture in Nos. 1, 2, and 3 to  $8\frac{1}{2}^{\circ}$ ,  $9^{\circ}$ , and  $6\frac{1}{2}^{\circ}$  respectively.

No. 1 tele-photographic lens consists of the patent stereographic (1.6 inches diameter) in conjunction with a compound negative  $\frac{8}{10}$  of an inch diameter.

No. 2 tele-photographic lens consists of the 1B patent portrait (2 inches diameter) in conjunction with a compound negative  $\frac{8}{10}$  of an inch diameter.

No. 3 tele-photographic lens consists of the 2B patent portrait ( $2\frac{3}{4}$  inches diameter) in conjunction with a compound negative 1 inch diameter.

#### RELATIVE EXPOSURES FOR VARYING PROPORTIONS OF IMAGE TO THE ORIGINAL.

[The following paper was read before the Photographic Society of Great Britain by Mr. W. E. Debenham. Its usefulness would be diminished by abbreviation, hence we reproduce it in full.—Ed.]

WHEN an enlarged photograph has to be made, either from a negative or print, it is commonly understood that the greater the degree of enlargement the longer will be the exposure required, but I have generally found only the vaguest ideas to exist as to the amount, by which such exposure has to be prolonged. Sometimes, indeed, it is assumed that the exposure will be in direct inverse proportion to the area covered, so that a copy of twice the linear dimensions of the original—covering, as it does, the area of four times the size—would require an exposure of four times that sufficing for a copy of the same size. This calculation, however, omits to recognise an important factor, and leads to serious error; the actual exposure required in the case mentioned (assuming the same lens and stop to be used) being not four times, but two and a quarter times, that of a copy of same size; whilst, when we come to high degrees of enlargement, the error would amount to an indication of nearly four times the exposure actually required.

To find the relative exposure, add one to the number of times that the

length of the original is contained in the length of the image, and square the sum. This will give the figure found in the third column of the annexed table.

| Proportion of image to original (linear). | Distance of image from lens* in terms of principal focus. | Proportionate exposures. | Exposures proportioned to that required for copying same size. |
|-------------------------------------------|-----------------------------------------------------------|--------------------------|----------------------------------------------------------------|
| $\frac{1}{80}$                            | $1\frac{1}{80}$                                           | 1.07                     | .27                                                            |
| $\frac{1}{70}$                            | $1\frac{1}{70}$                                           | 1.10                     | .28                                                            |
| $\frac{1}{60}$                            | $1\frac{1}{60}$                                           | 1.21                     | .3                                                             |
| $\frac{1}{50}$                            | $1\frac{1}{50}$                                           | 1.27                     | .31                                                            |
| $\frac{1}{40}$                            | $1\frac{1}{40}$                                           | 1.36                     | .34                                                            |
| $\frac{1}{30}$                            | $1\frac{1}{30}$                                           | 1.56                     | .39                                                            |
| $\frac{1}{20}$                            | $1\frac{1}{20}$                                           | 2.25                     | .56                                                            |
| $\frac{1}{15}$                            | $1\frac{1}{15}$                                           | 3.06                     | .76                                                            |
| (Same size) 1                             | 2                                                         | 4                        | 1                                                              |
| 2                                         | 3                                                         | 9                        | 2.25                                                           |
| 3                                         | 4                                                         | 16                       | 4                                                              |
| 4                                         | 5                                                         | 25                       | 6.25                                                           |
| 5                                         | 6                                                         | 36                       | 9                                                              |
| 6                                         | 7                                                         | 49                       | 12.25                                                          |
| 7                                         | 8                                                         | 64                       | 16                                                             |
| 8                                         | 9                                                         | 81                       | 20.25                                                          |
| 9                                         | 10                                                        | 100                      | 25                                                             |
| 10                                        | 11                                                        | 121                      | 30.25                                                          |
| 11                                        | 12                                                        | 144                      | 36                                                             |
| 12                                        | 13                                                        | 169                      | 42.25                                                          |
| 13                                        | 14                                                        | 196                      | 49                                                             |
| 14                                        | 15                                                        | 225                      | 56.25                                                          |
| 15                                        | 16                                                        | 256                      | 64                                                             |
| 16                                        | 17                                                        | 289                      | 72.25                                                          |
| 17                                        | 18                                                        | 324                      | 81                                                             |
| 18                                        | 19                                                        | 361                      | 90.25                                                          |
| 19                                        | 20                                                        | 400                      | 100                                                            |
| 20                                        | 21                                                        | 441                      | 110.25                                                         |
| 21                                        | 22                                                        | 484                      | 121                                                            |
| 22                                        | 23                                                        | 529                      | 132.25                                                         |
| 23                                        | 24                                                        | 576                      | 144                                                            |
| 24                                        | 25                                                        | 625                      | 156.25                                                         |
| 25                                        | 26                                                        | 676                      | 169                                                            |
| 26                                        | 27                                                        | 729                      | 182.25                                                         |
| 27                                        | 28                                                        | 784                      | 196                                                            |
| 28                                        | 29                                                        | 841                      | 210.25                                                         |
| 29                                        | 30                                                        | 900                      | 225                                                            |
| 30                                        | 31                                                        | 961                      | 240.25                                                         |

\* With a double lens it is usually sufficient to measure from the position of the diaphragm plate.

As examples: suppose a copy is wanted having twice the linear dimensions of the original. Take the number 2, add 1 to it, and square the sum,  $3^2=9$ . Again, if a copy is to be of eight times the linear dimensions of the original, take the number 8, add 1, and square the sum,  $9^2=81$ . Copies respectively twice and eight times the size (linear) of the original will thus require relative exposures of 9 and 81—*i.e.*, the latter will require nine times the exposure of the former.

It is convenient to have a practical standard for unity. An image of the same size as the original is a familiar case, and serves as such standard. By dividing the figures in the third column by four, we get at the figures in the last column, which represent the exposure required for varying degrees of enlargement or reduction, compared with the exposure for a copy of the same size.

The table is carried up to enlargements of thirty diameters; that is about the amount required for enlarging a small *carte-de-visite* to life size.

The exposures required in reductions do not vary at all to the same extent that they do in enlargements. It has, therefore, not been thought necessary to fill in the steps between images of  $\frac{1}{10}$  and  $\frac{1}{20}$ , and between  $\frac{1}{20}$  and  $\frac{1}{30}$  of the size of the original. Beyond  $\frac{1}{30}$  there is scarcely any perceptible difference in the exposure until disturbance comes in from another cause, a considerable distance of illuminated atmosphere (haze or fog) intervening.

The figures in the second column will also serve as a table for distances from the lens to the plate and to the original, all that is necessary being to multiply by the principal focus of the lens in use. In the case of enlargements the figures less than 2 must be multiplied to get the distance from the original to the lens, and the figures greater than 2 for the distance from lens to image. For reductions, the figures less than 2, multiplied by the principal focus of the lens, yield the distance from lens to plate; and the figures higher than 2, similarly multiplied, give the distance of original from lens.



### TABLES FOR THE SIMPLIFICATION OF EMULSION CALCULATIONS.

WITH a view of simplifying the calculations involved in emulsion-making, Mr. William Ackland a few years ago worked out some useful tables, which will enable even those most ignorant of chemical philosophy to calculate with ease and rapidity the proper quantities of silver or haloid salts in any formula. Even those who are able to perform the calculations in the recognised style will find their labours materially lightened by means of these tables, which should be kept in a convenient place for reference in every laboratory.

#### No. I.

|                                 | Equiva-<br>lent<br>weights. | Weight<br>of<br>AgNO <sub>3</sub><br>required<br>to con-<br>vert one<br>grain of<br>soluble<br>haloid. | Weight<br>of<br>soluble<br>haloid<br>required<br>to con-<br>vert one<br>grain<br>AgNO <sub>3</sub> . | Weight<br>of silver<br>haloid<br>pro-<br>duced<br>by one<br>grain of<br>soluble<br>haloid. | Weight<br>of<br>soluble<br>haloid<br>required<br>to pro-<br>duce one<br>grain of<br>silver<br>haloid. | Weight<br>of silver<br>haloid<br>pro-<br>duced<br>from one<br>grain<br>AgNO <sub>3</sub> . |
|---------------------------------|-----------------------------|--------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| Ammonium bromide .....          | 98                          | 1.734                                                                                                  | .576                                                                                                 | 1.918                                                                                      | .521                                                                                                  | } 1.106                                                                                    |
| Potassium        " .....        | 119.1                       | 1.427                                                                                                  | .700                                                                                                 | 1.578                                                                                      | .633                                                                                                  |                                                                                            |
| Sodium           " .....        | 103                         | 1.650                                                                                                  | .606                                                                                                 | 1.825                                                                                      | .548                                                                                                  |                                                                                            |
| Cadmium         " com. ....     | 172                         | .988                                                                                                   | 1.012                                                                                                | 1.093                                                                                      | .915                                                                                                  |                                                                                            |
| "    anh. ....                  | 136                         | 1.25                                                                                                   | .800                                                                                                 | 1.382                                                                                      | .723                                                                                                  | } 1.106                                                                                    |
| Zinc             "        ..... | 112.1                       | 1.509                                                                                                  | .663                                                                                                 | 1.670                                                                                      | .600                                                                                                  |                                                                                            |
| Ammonium chloride .....         | 53.5                        | 3.177                                                                                                  | .315                                                                                                 | 2.682                                                                                      | .373                                                                                                  | } .844                                                                                     |
| Sodium           "        ..... | 58.5                        | 2.906                                                                                                  | .344                                                                                                 | 2.453                                                                                      | .408                                                                                                  |                                                                                            |
| Ammonium iodide .....           | 145                         | 1.172                                                                                                  | .853                                                                                                 | 1.620                                                                                      | .617                                                                                                  |                                                                                            |
| Potassium       "        .....  | 166.1                       | 1.023                                                                                                  | .977                                                                                                 | 1.415                                                                                      | .707                                                                                                  | } 1.382                                                                                    |
| Sodium           "        ..... | 150                         | 1.133                                                                                                  | .882                                                                                                 | 1.566                                                                                      | .633                                                                                                  |                                                                                            |
| Cadmium         "        .....  | 183                         | .929                                                                                                   | 1.076                                                                                                | 1.284                                                                                      | .778                                                                                                  |                                                                                            |

The principal bromides, chlorides, and iodides which are likely to be used in emulsions of either gelatine or collodion have been included in these tables. Table No. I. presents to the reader, without any mystification which may be involved in equivalents, the actual weights of haloid or silver, as the case may be, required to convert or combine with one grain of the other.

In order to test the utility of this table, let us suppose that it is desired to make (say) ten ounces of emulsion by a new formula, which, for the sake of showing the working of the table, we will write down as follows:—

|                            |             |
|----------------------------|-------------|
| Bromide of potassium ..... | 150 grains. |
| Iodide of potassium .....  | 10 "        |
| Chloride of ammonium ..... | 10 "        |
| Gelatine .....             | 200 "       |

Now we want to know how much silver nitrate should be employed in sensitising this mixture. For this purpose we use the first column, in which we find against each haloid the exact quantity of silver nitrate required to fully decompose one grain. Taking, then, the figures we find in column No. 1 against the three salts in the above formula, and multiplying them by the number of grains of each used, we have the following sum:—

|                          |                           |                                         |
|--------------------------|---------------------------|-----------------------------------------|
| Potassium bromide .....  | $150 \times 1.427 = 214$  | } Weight<br>silver nitrate<br>required, |
| "    iodide .....        | $10 \times 1.023 = 10.23$ |                                         |
| Chloride of ammonium ... | $10 \times 3.177 = 31.77$ |                                         |

or the total quantity of silver nitrate required for full conversion, 256.00 grains.

No. II.

|                        | Ammonium Bromide. | Potassium Bromide. | Sodium Bromide. | Cadmium Bromide. (Coml.) | Cadmium Bromide. (Anhyd.) | Zinc Bromide. | Ammonium Chloride. | Sodium Chloride. | Ammonium Iodide. | Potassium Iodide. | Sodium Iodide. | Cadmium Iodide. |
|------------------------|-------------------|--------------------|-----------------|--------------------------|---------------------------|---------------|--------------------|------------------|------------------|-------------------|----------------|-----------------|
| Ammonium bromide.....  | 1                 | .823               | .951            | .57                      | .72                       | .87           | 1.832              | 1.675            | .676             | .59               | .653           | .585            |
| Potassium " .....      | 1.215             | 1                  | 1.156           | .682                     | .876                      | 1.058         | 2.226              | 2.086            | .831             | .717              | .794           | .651            |
| Sodium " .....         | 1.051             | .865               | 1               | .599                     | .757                      | .915          | 1.925              | 1.761            | .71              | .62               | .686           | .553            |
| Cadmium " com.         | 1.755             | 1.444              | 1.67            | 1                        | 1.265                     | 1.527         | 3.215              | 2.94             | 1.186            | 1.085             | 1.146          | .94             |
| " " anh.               | 1.387             | 1.141              | 1.32            | .79                      | 1                         | 1.207         | 2.542              | 2.324            | .938             | .819              | .906           | .743            |
| Zinc " .....           | 1.149             | .945               | 1.093           | .655                     | .828                      | 1             | 2.104              | 1.925            | .776             | .678              | .75            | .615            |
| Ammonium chloride..... | .545              | .449               | .519            | .311                     | .393                      | .475          | 1                  | .914             | .369             | .322              | .356           | .292            |
| Sodium " .....         | .597              | .491               | .568            | .34                      | .43                       | .519          | 1.093              | 1                | .403             | .352              | .39            | .319            |
| Ammonium iodide.....   | 1.479             | 1.217              | 1.408           | .843                     | 1.066                     | 1.287         | 2.712              | 2.478            | 1                | .873              | .966           | .792            |
| Potassium " .....      | 1.695             | 1.394              | 1.612           | .965                     | 1.221                     | 1.475         | 3.104              | 2.839            | 1.145            | 1                 | 1.107          | .907            |
| Sodium " .....         | 1.53              | 1.259              | 1.453           | .872                     | 1.103                     | 1.332         | 2.803              | 2.564            | 1.034            | .903              | 1              | .819            |
| Cadmium " .....        | 1.867             | 1.536              | 1.776           | 1.064                    | 1.345                     | 1.625         | 3.42               | 3.128            | 1.262            | 1.102             | 1.22           | 1               |

TABLE No. II. gives in separate columns the relative converting values of each of the soluble haloid salts in ordinary use, showing how much of any salt must be used to replace one grain of any other. In each column will be found a unit (printed in larger type) which represents one grain of the salt named at the head of the column; the other figures in the same column show the exact quantities of the other salts which must be used in lieu of a single grain of that particular haloid. Thus, taking the first column, which is headed 'Ammonium Bromide,' we find against ammonium bromide in the margin the figure 1, representing one grain of that salt. If we wish to know the relative converting power of potassium bromide we take the number in the same column which stands against the latter salt in the margin, viz., 1.215; that is to say, 1.215 grain of potassium bromide will be required to do the same work as one of NH<sub>4</sub> Br.

## THE PHOTOGRAPHIC SOCIETY'S STANDARDS.

[The following is reprinted from the Society's *Journal*.]

THE Standards adopted by the Society in 1881 have been carefully re-considered to see what additions or modifications were desirable.

The following statement is complete so far as the subjects it deals with are concerned:—

## LENS DIAPHRAGMS.

It is recommended:—

1st. That the aperture of the standard-unit diaphragm have a diameter equal to one-fourth the equivalent focal length of the lens.

2nd. That diaphragms with smaller openings have apertures diminishing in area to the extent of one-half from the unit standard downwards.

3rd. That every diaphragm be marked with its intensity ratio, and also with the relation that the diameter of its aperture bears to the equivalent focal length of the lens, thus:—

$$1 \frac{f}{4}; 2 \frac{f}{5.6}; 4 \frac{f}{8}; 8 \frac{f}{11.3}; 16 \frac{f}{16}; 32 \frac{f}{22.6}; 64 \frac{f}{32}; 128 \frac{f}{45.2}; 256 \frac{f}{64}; \&c.$$

Should a lens not admit of a diaphragm with an aperture as large in diameter as one-fourth its focal length, nor exactly any one of the above-mentioned sizes, it is still recommended that all the apertures be made in uniformity with the above scale, with the exception of the largest, which should be marked with the number its area requires in relation to the unit diaphragm. In the case of a lens having a working aperture exceeding in diameter one-fourth its focal length, the diaphragms should be marked according to the sizes of their relative apertures: for example:—

$$0.5 \frac{f}{2.8}; 0.25 \frac{f}{2}, \&c.$$

And diaphragms which require to be made with apertures intermediate to the standard sizes should be marked in a corresponding manner.

## LENS MOUNTS AND FITTINGS.

It is recommended:—

1st. That the equivalent focal length of each lens be engraved upon its mount.

2nd. That the following series of screws for photographic lens flange fittings be adopted:—

| Diameter in Inches.               | No. of Threads per Inch. | Core Diameter in Inches. |
|-----------------------------------|--------------------------|--------------------------|
| 1                                 | 24                       | ·9466                    |
| 1·25                              | 24                       | 1·1966                   |
| 1·5                               | 24                       | 1·4466                   |
| 1·75                              | 24                       | 1·6966                   |
| 2                                 | 24                       | 1·9466                   |
| 2·25                              | 24                       | 2·1966                   |
| 2·5                               | 24                       | 2·4466                   |
| 3                                 | 24                       | 2·9466                   |
| 3·5                               | 12                       | 3·3933                   |
| 4                                 | 12                       | 3·8933                   |
| 5                                 | 12                       | 4·8933                   |
| And upwards, advancing by inches. | 12                       |                          |

The form of thread is that known as Whitworth's Angular Thread, and is designed as follows:—Two parallel lines, at a distance apart equal to 0·96 of the screw pitch, are intersected by lines inclined to each other at 55°. One-sixth of the vertical height of the triangular spaces so obtained is rounded off both at the top and bottom. The depth of this thread is 0·64 of the screw pitch.

3rd. That every flange and adapter have a mark upon its front to indicate the position of the diaphragm slot or index of any lens when screwed home. The mark on any adapter should coincide with the mark upon any flange into which it is screwed. This mark should be placed at the point at which the thread becomes complete at the shoulder of the flange or adapter.

#### CAMERA SCREWS.

It is recommended:—

That all screws fitted to cameras, either for attachment to the stand, for fixing rising fronts, or for other movable parts, be either  $\frac{3}{16}$ ,  $\frac{1}{4}$ ,  $\frac{5}{16}$ , or  $\frac{3}{8}$  of an inch in external diameter, and in pitch of thread and other details in accordance with the generally recognised Whitworth standards for these sizes:

## DISCS AND THEIR RELATION TO THE LENS.

[The following article and the useful table annexed to it are extracted from our contemporary, *The Optical Magic Lantern Journal*.]

WHEN one is called upon to give a lantern entertainment in a hall or room the following questions will be uppermost in the mind of the operator:—1. What size of disc can be obtained with a lens of a certain focus? 2. How far distant from the screen must the lantern be placed in order to get a disc of a certain size with a given lens of ascertained focus? Doubtless many more questions will arise, but these mentioned will be of the most importance. It is a 'rule-of-thumb' practice for an operator to wheel his apparatus up and down a room in order to find the desired position from which to officiate, and the minds of any spectators will not be confirmed in the idea that the exhibitor thoroughly understands his business. How very much more simple and satisfactory is it to reason thus before starting for the place of entertainment:—'A screen of — feet diameter is required, so if I bring a lens of — focus the lantern must be — feet from the screen;' the length of the room being, of course, taken into consideration, in order to ascertain that it is possible to erect the lantern at the desired distance. This having been ascertained beforehand, all that is required is to take an objective of the desired focus, and measure off the necessary space between the screen and the place where the lantern should be set.

Supposing we are called upon to operate the lantern in a hall twenty-five feet in length, we first ascertain the size of disc desired, which we will suppose to be ten feet. With an objective having a focus of six inches, how far from the screen must the lantern be placed in order to produce a ten-foot disc?

Here is the rule by which it can be ascertained:—

Let A = focus of objective.

„ B = diameter of slide.

„ C = „ „ disc.

„ D = distance between the lantern and screen.

Multiply the diameter of the circle required (C) by the focus of the lens (A) and divide by the diameter of the slide (B).

$$\frac{C \times A}{B} = D = \frac{10 \times 6}{3} = 20 \text{ feet.}$$

It is thus seen that in order to produce a ten-foot disc with a six-inch objective the lantern must be placed twenty feet from the screen.

On the other hand, we may possess several lenses of different foci, and it is necessary that the screen and the lantern must occupy certain positions which we will suppose to be just twenty feet apart, and that the diameter of the disc must be ten feet. How are we to ascertain whether we must use a lens of four, five, six, seven, or other number of inches in focus?

Multiply the distance between the lantern and the screen (D) by the size of opening of slide (B), and divide by the size of disc (C).

$$\frac{D \times B}{C} = A, \text{ focus of lens} = \frac{20 \times 3}{3} = 6\text{-inch focus.}$$

Again:—We have a lens of six-inch focus, and intend that twenty feet shall intervene between the lantern and the screen, and wish to know what size of disc can be produced. In order to calculate this it is necessary that we multiply the distance between the lantern and the screen (D) by the size of slide opening (B), and divide by the focus of the lens used (A), which gives us

$$\frac{D \times B}{A} = C \text{ size of disc} = \frac{20 \times 3}{6} = 10 \text{ feet diameter of disc.}$$

The following Ready Reference Table has been computed by the foregoing rule, and by a glance it will show the relations between lantern and disc with object-glasses of every focus from 4 inches to 15 inches (see next page).

READY REFERENCE TABLE.

| Distance<br>between<br>Lantern<br>and Screen. | FOCUS OF LENS.    |       |       |       |       |       |        |        |        |        |        |        |
|-----------------------------------------------|-------------------|-------|-------|-------|-------|-------|--------|--------|--------|--------|--------|--------|
|                                               | 4 in.             | 5 in. | 6 in. | 7 in. | 8 in. | 9 in. | 10 in. | 11 in. | 12 in. | 13 in. | 14 in. | 15 in. |
|                                               | DIAMETER OF DISC. |       |       |       |       |       |        |        |        |        |        |        |
| 10 feet .....                                 | 7 6               | 6 0   | 5 0   | 4 3   | 3 9   | 3 4   | 3 0    | 2 9    | 2 6    | 2 4    | 2 2    | 2 0    |
| 11 " .....                                    | 8 3               | 6 7   | 5 6   | 4 9   | 4 2   | 3 8   | 3 4    | 3 0    | 2 9    | 2 6    | 2 4    | 2 2    |
| 12 " .....                                    | 9 0               | 7 2   | 6 0   | 5 2   | 4 6   | 4 0   | 3 7    | 3 3    | 3 0    | 2 9    | 2 7    | 2 5    |
| 13 " .....                                    | 9 9               | 7 10  | 6 6   | 5 7   | 4 11  | 4 4   | 3 11   | 3 7    | 3 3    | 3 0    | 2 9    | 2 7    |
| 14 " .....                                    | 10 6              | 8 5   | 7 0   | 6 0   | 5 3   | 4 8   | 4 2    | 3 10   | 3 7    | 3 3    | 3 0    | 2 9    |
| 15 " .....                                    | 11 3              | 9 0   | 7 6   | 6 5   | 5 8   | 5 0   | 4 6    | 4 1    | 3 9    | 3 6    | 3 3    | 3 0    |
| 20 " .....                                    | 15 0              | 12 0  | 10 0  | 8 7   | 7 6   | 6 8   | 6 0    | 5 6    | 5 0    | 4 7    | 4 3    | 4 0    |
| 25 " .....                                    | 18 9              | 15 0  | 12 6  | 10 9  | 9 4   | 8 4   | 7 6    | 6 10   | 6 3    | 5 9    | 5 4    | 5 0    |
| 30 " .....                                    | 22 6              | 18 0  | 15 0  | 12 10 | 11 3  | 10 0  | 9 0    | 8 2    | 7 6    | 6 11   | 6 5    | 6 0    |
| 35 " .....                                    | 26 3              | 21 0  | 17 6  | 15 0  | 13 1  | 11 8  | 10 6   | 9 6    | 8 9    | 8 1    | 7 6    | 7 0    |
| 40 " .....                                    | 30 0              | 24 0  | 20 0  | 17 2  | 15 0  | 13 4  | 12 0   | 10 10  | 10 0   | 9 2    | 8 6    | 8 0    |
| 45 " .....                                    | 33 9              | 27 0  | 22 6  | 19 3  | 16 10 | 15 0  | 13 6   | 12 3   | 11 3   | 10 4   | 9 8    | 9 0    |
| 50 " .....                                    | 37 6              | 30 0  | 25 0  | 21 5  | 18 9  | 16 8  | 15 0   | 13 8   | 12 6   | 11 6   | 10 9   | 10 0   |

EXAMPLES.—An 8-inch focus lens, at a distance of 35 feet, will give a disc of 13 feet 1 inch. To produce a disc of 12 feet, with a lens of 10 inches focus, the lantern and screen must be separated by 40 feet. To produce a disc of 15 feet at a distance of 45 feet, will require a lens of 9 inches focus.

TABLE OF THE SYMBOLS, ATOMICITY, ATOMIC, AND EQUIVALENT WEIGHTS OF THE ELEMENTS.

| NAME.                        | Symbol and Atomicity.                | Atomic Weight. | Equivalent Weight. |
|------------------------------|--------------------------------------|----------------|--------------------|
| Aluminium .....              | Al <sup>iii</sup>                    | 27·4           | 9·13               |
| Antimony (Stibium).....      | Sb <sup>iii</sup>                    | 122·0          | 40·66              |
| Arsenic .....                | As <sup>iii</sup>                    | 75·0           | 25·0               |
| Barium .....                 | Ba <sup>ii</sup>                     | 137·0          | 68·5               |
| Bismuth .....                | Bi <sup>iii</sup>                    | 208·0          | 69·33              |
| Boron .....                  | B <sup>iii</sup>                     | 11·0           | 3·66               |
| Bromine .....                | Br <sup>i</sup>                      | 80·0           | 80·0               |
| Cadmium .....                | Cd <sup>ii</sup>                     | 112·0          | 56·0               |
| Cæsium .....                 | Cs <sup>i</sup>                      | 133·0          | 133·0              |
| Calcium .....                | Ca <sup>ii</sup>                     | 40·0           | 20·0               |
| Carbon .....                 | C <sup>iv</sup>                      | 12·0           | 3·0                |
| Cerium .....                 | Ce <sup>ii</sup>                     | 92·0           | 46·0               |
| Chlorine.....                | Cl <sup>i</sup>                      | 35·5           | 35·5               |
| Chromium .....               | Cr <sup>ii</sup>                     | 52·2           | 26·1               |
| Cobalt.....                  | Co <sup>ii</sup>                     | 58·8           | 29·4               |
| Columbium (or Niobium) ..... | Cb <sup>v</sup>                      | 94·0           | 18·8               |
| Copper (Cuprum) .....        | { Cuprosum...<br>Cu <sup>i</sup>     | 63·4           | 63·4               |
|                              | { Cupricum ...<br>Cu <sup>ii</sup>   | 63·4           | 31·7               |
| Davyum .....                 | Da                                   | ...            | ...                |
| Didymium.....                | Di <sup>ii</sup>                     | 95·0           | 47·5               |
| Erbium .....                 | E <sup>ii</sup>                      | 112·6          | 56·3               |
| Fluorine.....                | Fl <sup>i</sup>                      | 19·0           | 19·0               |
| Gallium .....                | Ga                                   | 68·0           | ...                |
| Glucinum .....               | G <sup>ii</sup>                      | 9·4            | 4·7                |
| Gold (Aurum) .....           | Au <sup>iii</sup>                    | 196·0          | 65·33              |
| Hydrogen .....               | H <sup>i</sup>                       | 1·0            | 1·0                |
| Indium .....                 | In <sup>iii</sup>                    | 113·4          | 37·8               |
| Iodine .....                 | I <sup>i</sup>                       | 127·0          | 127·0              |
| Iridium .....                | Ir <sup>iv</sup>                     | 198·0          | 49·5               |
| Iron (Ferrum) .....          | { Ferrosum...<br>Fe <sup>ii</sup>    | 56·0           | 28·0               |
|                              | { Ferricum ...<br>Fe <sup>iii</sup>  | 56·0           | 18·66              |
| Lanthanum .....              | La <sup>ii</sup>                     | 92·8           | 46·4               |
| Lead (Plumbum) .....         | Pb <sup>ii</sup>                     | 207·0          | 103·5              |
| Lithium .....                | Li <sup>i</sup>                      | 7·0            | 7·0                |
| Magnesium .....              | Mg <sup>ii</sup>                     | 24·0           | 12·0               |
| Manganese.....               | Mn <sup>ii</sup>                     | 55·0           | 27·5               |
| Mercury (Hydrargyrum) .....  | { Mercuriosum...<br>Hg               | 200·0          | 200·0              |
|                              | { Mercuricum ...<br>Hg <sup>ii</sup> | 200·0          | 100·0              |
| Molybdenum .....             | Mo <sup>ii</sup>                     | 92·0           | 46·0               |
| Nickel.....                  | Ni <sup>ii</sup>                     | 58·8           | 29·4               |
| Nitrogen.....                | N <sup>iii</sup>                     | 14·0           | 4·66               |
| Osmium .....                 | Os <sup>iv</sup>                     | 199·0          | 49·75              |
| Oxygen .....                 | O <sup>ii</sup>                      | 16·0           | 8·0                |
| Palladium .....              | Pd <sup>ii</sup>                     | 106·5          | 53·25              |

## TABLE OF SYMBOLS, &amp;c.—CONTINUED.

| NAME.                      | Symbol and Atomicity.            | Atomic Weight. | Equivalent Weight. |
|----------------------------|----------------------------------|----------------|--------------------|
| Phosphorus .....           | P <sup>iii</sup>                 | 31.0           | 10.33              |
| Platinum .....             | { Platinosum... Pt <sup>ii</sup> | 197.4          | 98.7               |
|                            | { Platinicum... Pt <sup>iv</sup> | 197.4          | 49.35              |
| Potassium (Kalium).....    | K                                | 39.1           | 39.1               |
| Rhodium .....              | Rh <sup>ii</sup>                 | 104.4          | 52.2               |
| Rubidium .....             | Rb <sup>i</sup>                  | 85.4           | 85.4               |
| Ruthenium .....            | Ru <sup>iv</sup>                 | 104.0          | 26.0               |
| Selenium .....             | Se <sup>ii</sup>                 | 79.4           | 39.7               |
| Silicium (or Silicon)..... | Si <sup>iv</sup>                 | 28.0           | 7.0                |
| Silver (Argentum) .....    | Ag <sup>i</sup>                  | 108.0          | 108.0              |
| Sodium (Natrium) .....     | Na <sup>i</sup>                  | 23.0           | 23.0               |
| Strontium .....            | Sr <sup>ii</sup>                 | 87.5           | 43.75              |
| Sulphur .....              | S <sup>ii</sup>                  | 32.0           | 16.0               |
| Tantalum .....             | Ta <sup>v</sup>                  | 182.0          | 36.4               |
| Tellurium .....            | Te <sup>ii</sup>                 | 128.0          | 64.0               |
| Thallium .....             | Tl <sup>i</sup>                  | 204.0          | 204.0              |
| Thorium (or Thorinum)..... | Th <sup>iv</sup>                 | 231.5          | 57.87              |
| Tin (Stannum) .....        | { Stannosum... Sn <sup>ii</sup>  | 118.0          | 59.0               |
|                            | { Stannicum... Sn <sup>iv</sup>  | 118.0          | 29.5               |
| Titanium .....             | Ti <sup>iv</sup>                 | 50.0           | 12.5               |
| Tungsten (Wolfram) .....   | W <sup>iv</sup>                  | 184.0          | 46.0               |
| Uranium .....              | U <sup>ii</sup>                  | 120.0          | 60.0               |
| Vanadium .....             | V <sup>iii</sup>                 | 51.3           | 17.1               |
| Yttrium .....              | Y <sup>ii</sup>                  | 61.7           | 30.85              |
| Zinc .....                 | Zn <sup>ii</sup>                 | 65.2           | 32.6               |
| Zirconium .....            | Zr <sup>iv</sup>                 | 89.6           | 22.4               |

## FREEZING MIXTURES.

The following mixtures will be found useful where ice is not readily obtainable—

| Ingredients.                                | Parts by Weight. | The Temperature at starting being 50° Fahr. the thermometer sinks. | Diminution of Temperature. |
|---------------------------------------------|------------------|--------------------------------------------------------------------|----------------------------|
| 1 { Water .....                             | 1                | From + 50° to + 4°                                                 | 46° Fahr.                  |
| { Nitrate of ammonia .....                  | 1                |                                                                    |                            |
| 2 { Water .....                             | 16               | " + 50° " + 10°                                                    | 40° "                      |
| { Saltpetre .....                           | 5                |                                                                    |                            |
| { Chloride of ammonium (sal ammoniac) ..... | 5                | " + 50° " + 7°                                                     | 43° "                      |
| { Water .....                               | 1                |                                                                    |                            |
| 3 { Nitrate of ammonia .....                | 1                | " 32° " - 5°                                                       | 37° "                      |
| { Carbonate of soda .....                   | 1                |                                                                    |                            |
| 4 { Snow .....                              | 2                | " + 32° " - 50°                                                    | 82° "                      |
| { Chloride of sodium .....                  | 1                |                                                                    |                            |
| 5 { Snow .....                              | 2                | " + 50° " 0°                                                       | 50° "                      |
| { Crystallised chloride of calcium .....    | 3                |                                                                    |                            |
| 6 { Crystallised sulphate of soda .....     | 8                |                                                                    |                            |
| { Hydrochloric acid .....                   | 5                |                                                                    |                            |

TABLE OF SYMBOLS OF THE MORE IMPORTANT  
COMPOUNDS USED IN PHOTOGRAPHY.

| NAME.                     | SYMBOL.                            |       |
|---------------------------|------------------------------------|-------|
| Acid, Acetic (Cryst.)     | $H, C_2 H_3 O_3$                   | 60    |
| „ Citric                  | $H_3, C_6 H_5 O_7 + H_2 O$         | 210   |
| „ Formic                  | $H, CHO_2$                         | 46    |
| „ Gallic                  | $H, C_7 H_5 O_5$                   | 170   |
| „ Hydriodic               | HI                                 | 128   |
| „ Hydrobromic             | H Br                               | 81    |
| „ Hydrochloric            | H Cl                               | 36·5  |
| „ Hydrocyanic             | H CN                               | 27    |
| „ Hydrosulphuric          | $H_2 S$                            | 34    |
| „ Nitric                  | $H, NO_3$                          | 63    |
| „ Oxalic                  | $H_2 C_2 O_4 + 2 H_2 O$            | 126   |
| „ Pyrogallic              | $H_3 C_6 H_3 O_3$                  | 126   |
| „ Sulphuric               | $H_2 SO_4$                         | 98    |
| „ Sulphurous              | $H_2 SO_3$                         | 82    |
| „ Tannic                  | $H_4 C_{27} H_{18} O_{17}$         | 618   |
| „ Tartaric                | $H_4 C_4 H_3 O_6$                  | 150   |
| Alum, Chrome              | $Cr K (SO_4)_2 12 H_2 O$           | 499·3 |
| „ (Potash)                | $Al K (SO_4)_2 12 H_2 O$           | 474·5 |
| Ammonium, Bromide         | $NH_4 Br$                          | 98    |
| „ Carbonate               | $(NH_4)_2 CO_3$                    | 96    |
| „ Chloride                | $NH_4 Cl$                          | 53·5  |
| „ Iodide                  | $NH_4 I$                           | 145   |
| „ Nitrate                 | $NH_4 NO_3$                        | 80    |
| „ Sulphydrate of          | $NH_4 HS$                          | 51    |
| „ Sulphocyanide of        | $NH_4 CNS$                         | 76    |
| Barium, Bromide           | $Ba Br_2$                          | 297   |
| „ Chloride (Cryst.)       | $Ba, Cl_2 + 2 H_2 O$               | 244   |
| „ Iodide                  | $Ba I_2$                           | 391   |
| „ Nitrate                 | $Ba, (NO_3)_2$                     | 261   |
| Cadmium, Bromide (Cryst.) | $Cd, Br_2 + 4 H_2 O$               | 344   |
| „ Chloride                | $Cd Cl_2$                          | 183   |
| „ Iodide                  | $Cd I_2$                           | 366   |
| Calcium, Bromide (Cryst.) | $Ca Br_2 + 4 H_2 O$                | 272   |
| „ Chloride                | $Ca Cl_2$                          | 111   |
| „ Iodide                  | $Ca I_2$                           | 294   |
| Copper, Bromide (cupric)  | $Cu Br_2$                          | 223·4 |
| „ Chloride                | $Cu Cl_2 2 H_2 O$                  | 170·4 |
| „ Sulphate                | $Cu SO_4 5 H_2 O$                  | 249·4 |
| Gold, Trichloride         | $Au Cl_3$                          | 302·5 |
| Iron, Chloride (ferrous)  | $Fe Cl_2$                          | 127   |
| „ „ (ferric)              | $Fe_2 Cl_6$                        | 325   |
| „ Iodide                  | $Fe I_2$                           | 310   |
| „ Oxalate (ferrous)       | $Fe C_2 O_4$                       | 144   |
| „ „ (ferric)              | $Fe_2 (C_2 O_4)_3$                 | 376   |
| „ Sulphate (ferrous)      | $Fe SO_4 + 7 H_2 O$                | 278   |
| „ „ (ferric)              | $Fe_2 (SO_4)_3$                    | 400   |
| „ Ammonia-sulphate        | $Fe SO_4, (NH_4)_2 SO_4 + 6 H_2 O$ | 392   |
| Lead, Acetate (Cryst.)    | $Pb, (C_2 H_3 O_2)_2 + H_2 O$      | 343   |

## TABLES OF SYMBOLS, &amp;c.—CONTINUED.

| NAME.                              | SYMBOL.                                                                                     |       |
|------------------------------------|---------------------------------------------------------------------------------------------|-------|
| Lead, Nitrate .....                | Pb, (NO <sub>3</sub> ) <sub>2</sub> .....                                                   | 331   |
| Lithium, Bromide .....             | Li Br .....                                                                                 | 87    |
| „ Chloride .....                   | Li Cl .....                                                                                 | 42·5  |
| „ Iodide .....                     | Li I .....                                                                                  | 134   |
| Magnesium, Bromide.....            | Mg Br <sub>2</sub> .....                                                                    | 184   |
| „ Chloride.....                    | Mg Cl <sub>2</sub> .....                                                                    | 95    |
| „ Iodide .....                     | Mg I <sub>2</sub> .....                                                                     | 278   |
| Mercury, Chloride (Mercuric) ..... | Hg Cl <sub>2</sub> .....                                                                    | 271   |
| Platinum, Chloride.....            | Pt Cl <sub>4</sub> .....                                                                    | 339·4 |
| Potassium, Bichromate .....        | K <sub>2</sub> Cr <sub>2</sub> O <sub>7</sub> .....                                         | 294·6 |
| „ Acetate .....                    | K C <sub>2</sub> H <sub>3</sub> O <sub>2</sub> .....                                        | 98·1  |
| „ Bromide .....                    | K Br .....                                                                                  | 119·1 |
| „ Carbonate .....                  | K <sub>2</sub> CO <sub>3</sub> .....                                                        | 138·2 |
| „ Chloride .....                   | K Cl .....                                                                                  | 74·6  |
| „ Citrate .....                    | K <sub>3</sub> C <sub>6</sub> H <sub>5</sub> O <sub>7</sub> + H <sub>2</sub> O .....        | 324·3 |
| „ Cyanide .....                    | K C N .....                                                                                 | 65·1  |
| „ Ferridcyanide .....              | K <sub>6</sub> Fe <sub>2</sub> Cy <sub>12</sub> .....                                       | 658·6 |
| „ Ferrocyanide .....               | K <sub>4</sub> Fe Cy <sub>6</sub> .....                                                     | 368·4 |
| „ Hydrate .....                    | K OH .....                                                                                  | 56·1  |
| „ Iodide .....                     | K I .....                                                                                   | 166·1 |
| „ Nitrate .....                    | K NO <sub>3</sub> .....                                                                     | 101·1 |
| „ Permanganate.....                | K <sub>2</sub> Mn <sub>2</sub> O <sub>8</sub> .....                                         | 316·2 |
| Silver, Acetate.....               | Ag C <sub>2</sub> H <sub>3</sub> O <sub>2</sub> .....                                       | 167   |
| „ Bromide .....                    | Ag Br .....                                                                                 | 188   |
| „ Carbonate .....                  | Ag <sub>2</sub> CO <sub>3</sub> .....                                                       | 276   |
| „ Chloride .....                   | Ag Cl.....                                                                                  | 143·5 |
| „ Citrate .....                    | Ag <sub>3</sub> C <sub>6</sub> H <sub>5</sub> O <sub>7</sub> .....                          | 513   |
| „ Fluoride .....                   | Ag Fl.....                                                                                  | 127   |
| „ Iodide .....                     | Ag I .....                                                                                  | 235   |
| „ Nitrate .....                    | Ag NO <sub>3</sub> .....                                                                    | 170   |
| „ Oxalate .....                    | Ag <sub>2</sub> C <sub>2</sub> O <sub>4</sub> .....                                         | 304   |
| „ Oxide .....                      | Ag <sub>2</sub> O .....                                                                     | 232   |
| „ Sulphide .....                   | Ag <sub>2</sub> S .....                                                                     | 248   |
| Sodium, Acetate (Cryst.) .....     | Na C <sub>2</sub> H <sub>3</sub> O <sub>2</sub> 3 H <sub>2</sub> O .....                    | 136   |
| „ Biorate (Borax) .....            | Na <sub>2</sub> B <sub>4</sub> O <sub>7</sub> + 10 H <sub>2</sub> O .....                   | 382   |
| „ Bromide .....                    | Na Br .....                                                                                 | 103   |
| „ Carbonate (Cryst.) .....         | Na <sub>2</sub> CO <sub>3</sub> + 10 H <sub>2</sub> O .....                                 | 286   |
| „ Chloride .....                   | Na Cl.....                                                                                  | 58·5  |
| „ Citrate .....                    | 2 (Na <sub>3</sub> C <sub>6</sub> H <sub>5</sub> O <sub>7</sub> ) 11 H <sub>2</sub> O ..... | 714   |
| „ Hyposulphite (Cryst.).....       | Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> + 5 H <sub>2</sub> O .....                    | 248   |
| „ Iodide .....                     | Na I .....                                                                                  | 150   |
| „ Sulphite .....                   | Na <sub>2</sub> SO <sub>3</sub> 7 H <sub>2</sub> O .....                                    | 252   |
| Strontium, Bromide .....           | Sr Br <sub>2</sub> .....                                                                    | 247·5 |
| „ Chloride .....                   | Sr Cl <sub>2</sub> .....                                                                    | 158·5 |
| „ Iodide .....                     | Sr I <sub>2</sub> .....                                                                     | 341·5 |
| Uranium, Bromide.....              | U Br <sub>2</sub> 4 H <sub>2</sub> O .....                                                  | 352   |
| „ Nitrate .....                    | U <sub>2</sub> O <sub>2</sub> (NO <sub>3</sub> ) <sub>2</sub> 6 H <sub>2</sub> O .....      | 504   |
| Zinc, Bromide.....                 | Zn Br <sub>2</sub> .....                                                                    | 225·2 |
| „ Chloride.....                    | Zn Cl <sub>2</sub> .....                                                                    | 136·2 |
| „ Iodide.....                      | Zn I <sub>2</sub> .....                                                                     | 319·2 |

TABLE OF THE SOLUBILITIES OF THE PRINCIPAL  
SUBSTANCES USED IN PHOTOGRAPHY.

|                             | One part is soluble in — parts of water. |          | 100 parts of water dissolve at ordinary temperature. | Solubility in Alcohol.     |
|-----------------------------|------------------------------------------|----------|------------------------------------------------------|----------------------------|
|                             | Cold.                                    | Boiling. |                                                      |                            |
| Acid, Boracic (Anhydrous) . | 47.01                                    | ...      | 2.13                                                 | soluble                    |
| "  "  (Cryst.) .....        | 25.66                                    | 3.0      | 3.9                                                  | sol. in 6 parts @ 60°      |
| Citric .....                | 0.75                                     | 0.5      | 133.0                                                | sol. in 1.15 pt. s. g. 820 |
| Gallic .....                | 100.0                                    | 3.0      | 1.0                                                  | soluble in 4 parts         |
| Oxalic .....                | 15.5                                     | 1.0      | 6.47                                                 | insoluble                  |
| Pyrogallic .....            | 2.25                                     | ...      | ...                                                  | sol. in alc. and ether     |
| Salicylic .....             | 87.2                                     | vry sol  | 0.35                                                 | easily soluble             |
| Succinic.....               | 5.0                                      | 2.2      | 20.0                                                 | soluble in 3 parts         |
| Tannic .....                | very                                     | soluble  | e                                                    | sol. in alc. and ether     |
| Tartaric.....               | .66                                      | .5       | 150.0                                                | soluble                    |
| Alum (Potash) .....         | 10.5                                     | vry sol  | 9.52                                                 | insoluble                  |
| (Ammonia) .....             | 7.32                                     | "        | 13.66                                                | "                          |
| Ammonium, Bromide .....     | 1.4                                      | 0.78     | 41.1                                                 | sol. in 32.3 parts         |
| Carbonate ...               | 3.3                                      | .833     | 33.0                                                 | insoluble                  |
| Chloride .....              | 2.7                                      | 1.00     | 37.02                                                | sparingly soluble          |
| Citrate .....               | deliqu                                   | escent   | vy. sol.                                             | less sol. in alcohol       |
| Iodide .....                | very                                     | soluble  | e                                                    | soluble                    |
| Nitrate .....               | 2.0                                      | 1.0      | 50.0                                                 | freely soluble             |
| Salicylate.....             | very                                     | soluble  | e                                                    |                            |
| Succinate.....              | "                                        | "        |                                                      |                            |
| Sulphocyanide               | deliqu                                   | escent   | easily                                               | sol. in water and alc.     |
| Barium, Bromide .....       | .96                                      | ...      | 104.2                                                | easily soluble             |
| Chloride { Crystallised     | 2.18                                     | ...      | 46.0                                                 | very slightly soluble      |
| { Anhydrous.                | 2.862                                    | ...      | 34.1                                                 |                            |
| Iodide.....                 | 0.48                                     | 0.35     | 208.3                                                | easily soluble             |
| Nitrate .....               | 12.2                                     | 2.84     | 8.18                                                 |                            |
| Cadmium, Bromide .....      | easily                                   | soluble  | e                                                    | easily soluble             |
| Chloride .....              | 0.71                                     | 0.67     | ...                                                  | "                          |
| Iodide .....                | 1.08                                     | 0.75     | 92.6                                                 | very soluble               |
| Calcium, Bromide (Cryst.) . | 0.97                                     | ...      | 102.56                                               | easily soluble             |
| Chloride .....              | 0.25                                     | any qy   | 400.0                                                |                            |
| Iodide .....                | deliqu                                   | escent   |                                                      |                            |
| Cobalt, Chloride.....       | very                                     | soluble  | e                                                    | sol. in alc. and ether     |
| Copper, Bromide (Cuprie)... | deliqu                                   | escent   | vy. sol.                                             | "                          |
| Chloride .....              | soluble                                  | "        | "                                                    | "                          |
| Nitrate .....               | soluble                                  | "        | "                                                    | very soluble               |
| Sulphate .....              | 2.5                                      | ...      | 40.0                                                 | insoluble                  |
| Gold, Perchloride .....     | deliqu                                   | escent   | vy. sol.                                             | soluble in ether           |
| Iron, Chloride f Anhyd. ... | 2.0                                      | ...      | 50.0                                                 | sol. in 1 part alcohol     |
| (Ferrous) { Hydrated .      | 0.68                                     | ...      | 147.0                                                | easily soluble             |

TABLE OF THE SOLUBILITIES, &amp;c.—CONTINUED.

|                               | One part is soluble in — parts of water. |          | 100 parts of water dissolve at ordinary temperature. | Solubility in Alcohol.      |
|-------------------------------|------------------------------------------|----------|------------------------------------------------------|-----------------------------|
|                               | Cold.                                    | Boiling. |                                                      |                             |
| Iron, Chloride (Ferric) ..... | very                                     | del. &   | sol.                                                 | very soluble                |
| „ Oxalate „ .....             | insolu                                   | ble, ex  | cept in                                              | excess of oxalic acid       |
| „ Sulphate „ .....            | soluble                                  | e        | ...                                                  | soluble                     |
| „ „ (Ferrous) ...             | 1·3                                      | ·30      | 77·0                                                 | insoluble                   |
| Lead, Acetate .....           | 3·7                                      | 3·45     | 27·0                                                 | soluble in 12·5 parts       |
| „ Nitrate .....               | 7·7                                      | ...      | 13·0                                                 |                             |
| Lithium, Bromide .....        | 0·66                                     | ...      | 149·8                                                | soluble                     |
| „ Chloride .....              | 1·315                                    | ...      | 76·0                                                 |                             |
| „ Iodide .....                | 0·61                                     | ...      | 164·0                                                |                             |
| Magnesium, Bromide .....      | deliqu                                   | escent   | vy. sol.                                             | very soluble                |
| „ Chloride .....              | 1·857                                    | ...      | 53·8                                                 |                             |
| „ Iodide .....                | deliqu                                   | escent   | vy. sol.                                             | soluble                     |
| „ Sulphate .....              | 1·47                                     | 0·66     | 68·04                                                | slightly soluble            |
| Mercury, Chloride .....       | 16·0                                     | 3·0      | 6·25                                                 | soluble in 2·35 parts       |
| (Mercuric) .....              |                                          |          |                                                      |                             |
| Platinum, Bichloride .....    | soluble                                  | e        | ...                                                  | easily sol. in alc. & ether |
| Potassium, Bichromate ..      | 10·0                                     | ...      | 10·0                                                 |                             |
| „ Bromide .....               | 1·55                                     | ...      | 64·5                                                 |                             |
| „ Carbonate .....             | 0·9                                      | ...      | 111·0                                                |                             |
| „ Chloride .....              | 3·03                                     | 2·0      | 33·0                                                 | slightly soluble            |
| „ Citrate .....               | very                                     | soluble  | e                                                    |                             |
| „ Cyanide .....               | deliqu                                   | escent   | vy. sol.                                             | insol. in pure alcohol      |
| „ Ferrocyanide ...            | 3·0                                      | 1·0      | 33·3                                                 | insoluble                   |
| „ Ferridcyanide ...           | 2·54                                     | 1·22     | 39·37                                                | very sparingly soluble      |
| „ Hydrate .....               | 0·5                                      | ...      | 200·0                                                | very soluble                |
| „ Iodide .....                | 0·7                                      | 0·27     | 143·0                                                | sol. in 40 pts. abs. alc.   |
| „ Nitrate .....               | 3·5                                      | 0·4      | 28·57                                                | insoluble                   |
| „ Nitrite .....               | deliqu                                   | & solu   | ble                                                  |                             |
| „ Oxalate(neutral)            | 3·0                                      | ...      | 33·3                                                 | slightly soluble            |
| „ „ (bin.) ...                | 40·0                                     | ...      | 2·5                                                  | insoluble                   |
| „ „ (quad.)..                 | 20·17                                    | ...      | 4·95                                                 | insoluble                   |
| „ Permanganate..              | 16·0                                     | ...      | 6·25                                                 | insoluble                   |
| „ Sulphocyanide..             |                                          |          |                                                      |                             |
| Silver, Acetate .....         | very                                     | slightly | sol.                                                 |                             |
| „ Citrate .....               | soluble                                  | in wa    | rm water                                             |                             |
| „ Fluoride .....              | deliqu                                   | escent   |                                                      |                             |
| „ Nitrate .....               | 1·0                                      | 0·5      | 100·0                                                | sol. in 4 pts. boiling alc. |
| „ Nitrite .....               | 300·0                                    | dissol.  | easily                                               | 0·33                        |
| „ Oxalate .....               |                                          |          |                                                      |                             |

## TABLE OF THE SOLUBILITIES, &amp;c.—CONTINUED.

|                                              | One part is soluble in — parts of water. |          | 100 parts of water dissolve at ordinary temperature. | Solubility in Alcohol. |
|----------------------------------------------|------------------------------------------|----------|------------------------------------------------------|------------------------|
|                                              | Cold.                                    | Boiling. |                                                      |                        |
| Silver, Sulphate .....                       | 200·0                                    | 88·0     | 0·5                                                  | insoluble              |
| Sodium, Acetate (Cryst.) ...                 | 2·86                                     | ·66      | 35·0                                                 |                        |
| „ Biorate (Borax)...                         | 12·44                                    | 2·0      | 8·033                                                | insoluble              |
| „ Bromide .....                              | 1·13                                     | ...      | 88·5                                                 |                        |
| „ Carbonate (Cryst.)                         | 2·0                                      | 1·0      | 50·0                                                 | insoluble              |
| „ „ (Anhyd.)                                 | 3·85                                     | 2·07     | 25·93                                                | insoluble              |
| „ Chloride .....                             | 2·77                                     | 2·77     | 36·0                                                 | sparingly soluble      |
| „ Citrate .....                              | 1·0                                      | ...      | 100·0                                                | sparingly soluble      |
| „ Hydrate .....                              | 1·65                                     | ...      | 60·63                                                | easily soluble         |
| „ Hyposulphite ... }<br>(Thiosulphate) }     | deliquescent                             |          | vy. sol.                                             | insoluble              |
| „ Iodide .....                               | 0·55                                     | 0·3      | 180·0                                                | sparingly soluble      |
| „ Nitrate .....                              | 1·136                                    | ...      | 88·03                                                | sol. in 37 parts alc.  |
| „ Nitrite .....                              | deliquescent                             |          | vy. sol.                                             | very soluble           |
| „ Phosphate .....                            | 4·0                                      | 2·0      | 25·0                                                 |                        |
| „ Succinate .....                            | very soluble                             |          |                                                      |                        |
| „ Sulphate .....                             | 2·08                                     | 0·41     | 48·0                                                 | soluble                |
| „ Sulphite .....                             | 4·0                                      | ...      | 25·0                                                 | slightly soluble       |
| „ Bisulphite .....                           | very soluble                             |          | ...                                                  | insoluble              |
| „ Sulphocyanide ...                          |                                          |          |                                                      |                        |
| „ Tartrate .....                             | 1·75                                     | ...      | 56·37                                                | insoluble              |
| „ Tungstate .....                            | 4·0                                      | 2·0      | 25·0                                                 |                        |
| Strontium, Bromide .....                     | 1·01                                     | ...      | 99·0                                                 | sparingly soluble      |
| „ Chloride .....                             | 1·88                                     | ...      | 53·0                                                 | feebly soluble         |
| „ Iodide .....                               | 0·56                                     | 0·27     | 178·5                                                |                        |
| Uranium, Bromide ..... }<br>(Hydrated) ... } | deliquescent                             |          | & soluble                                            | soluble                |
| „ Nitrate .....                              | 0·5                                      | ...      | 200·0                                                | sol. in alc. and ether |
| „ Oxalate ..... {                            | nearly insol.                            | 30·0     | ...                                                  | insoluble              |
| Zinc, Bromide .....                          | deliquescent                             |          | vy. sol.                                             | very soluble           |
| „ Chloride .....                             | 0·333                                    | ...      | 300·0                                                | very soluble           |
| „ Iodide .....                               | vy. deliques.                            |          | & sol.                                               | very soluble           |

## Percentage of Real Ammonia in Solutions of different Densities at 14° Centigrade.—CARIUS.

| Specific Gravity. | Percentage Ammonia. | | | | | | |
|---|---|---|---|---|---|---|---|
| 0·8844            | 36·0                | 0·9052            | 27·0                | 0·9314            | 18·0                | 0·9631            | 9·0                 |
| 0·8864            | 35·0                | 0·9078            | 26·0                | 0·9347            | 17·0                | 0·9670            | 8·0                 |
| 0·8885            | 34·0                | 0·9106            | 25·0                | 0·9380            | 16·0                | 0·9709            | 7·0                 |
| 0·8907            | 33·0                | 0·9133            | 24·0                | 0·9414            | 15·0                | 0·9749            | 6·0                 |
| 0·8929            | 32·0                | 0·9162            | 23·0                | 0·9449            | 14·0                | 0·9790            | 5·0                 |
| 0·8953            | 31·0                | 0·9191            | 22·0                | 0·9484            | 13·0                | 0·9831            | 4·0                 |
| 0·8976            | 30·0                | 0·9221            | 21·0                | 0·9520            | 12·0                | 0·9873            | 3·0                 |
| 0·9001            | 29·0                | 0·9251            | 20·0                | 0·9556            | 11·0                | 0·9915            | 2·0                 |
| 0·9026            | 28·0                | 0·9283            | 19·0                | 0·9593            | 10·0                | 0·9959            | 1·0                 |

THERMOMETRIC TABLES,  
SHOWING THE ASSIMILATION OF THE THERMOMETERS IN USE THROUGHOUT  
THE WORLD.

| Celsius. | Réaumur. | Fahrenheit. | Celsius. | Réaumur. | Fahrenheit. |
|----------|----------|-------------|----------|----------|-------------|
| 100      | 80·0     | 212·0       | 49       | 39·2     | 120·2       |
| 99       | 79·2     | 210·0       | 48       | 38·4     | 118·4       |
| 98       | 78·4     | 208·4       | 47       | 37·6     | 116·6       |
| 97       | 77·6     | 206·6       | 46       | 36·8     | 114·8       |
| 96       | 76·8     | 204·8       | 45       | 36·0     | 113·0       |
| 95       | 76·0     | 203·0       | 44       | 35·2     | 111·2       |
| 94       | 75·2     | 201·2       | 43       | 34·8     | 109·4       |
| 93       | 74·4     | 199·4       | 42       | 33·6     | 107·6       |
| 92       | 73·6     | 197·6       | 41       | 32·8     | 105·8       |
| 91       | 72·8     | 195·8       | 40       | 32·0     | 104·0       |
| 90       | 72·0     | 194·0       | 39       | 31·2     | 102·2       |
| 89       | 71·2     | 192·2       | 38       | 30·4     | 100·4       |
| 88       | 70·4     | 190·4       | 37       | 29·6     | 98·6        |
| 87       | 69·6     | 188·6       | 36       | 28·8     | 96·8        |
| 86       | 68·8     | 186·8       | 35       | 28·0     | 95·0        |
| 85       | 68·0     | 185·0       | 34       | 27·2     | 93·2        |
| 84       | 67·2     | 183·2       | 33       | 26·4     | 91·4        |
| 83       | 66·4     | 181·4       | 32       | 25·6     | 89·6        |
| 82       | 65·6     | 179·6       | 31       | 24·8     | 87·8        |
| 81       | 64·8     | 177·8       | 30       | 24·0     | 86·0        |
| 80       | 64·0     | 176·0       | 29       | 23·2     | 84·2        |
| 79       | 63·2     | 174·2       | 28       | 22·4     | 82·4        |
| 78       | 62·4     | 172·4       | 27       | 21·6     | 80·6        |
| 77       | 61·6     | 170·6       | 26       | 20·8     | 78·8        |
| 76       | 60·8     | 168·8       | 25       | 20·0     | 77·0        |
| 75       | 60·0     | 167·0       | 24       | 19·2     | 75·2        |
| 74       | 59·2     | 165·2       | 23       | 18·4     | 73·4        |
| 73       | 58·4     | 163·4       | 22       | 17·6     | 71·6        |
| 72       | 57·6     | 161·6       | 21       | 16·8     | 69·8        |
| 71       | 56·8     | 159·8       | 20       | 16·0     | 68·0        |
| 70       | 56·0     | 158·0       | 19       | 15·2     | 66·2        |
| 69       | 55·2     | 156·2       | 18       | 14·4     | 64·4        |
| 68       | 54·4     | 154·4       | 17       | 13·6     | 62·6        |
| 67       | 53·6     | 152·6       | 16       | 12·8     | 60·8        |
| 66       | 52·8     | 150·8       | 15       | 12·0     | 59·0        |
| 65       | 52·0     | 149·0       | 14       | 11·2     | 57·2        |
| 64       | 51·2     | 147·2       | 13       | 10·4     | 55·4        |
| 63       | 50·4     | 145·4       | 12       | 9·6      | 53·6        |
| 62       | 49·6     | 143·6       | 11       | 8·8      | 51·8        |
| 61       | 48·8     | 141·8       | 10       | 8·0      | 50·0        |
| 60       | 48·0     | 140·0       | 9        | 7·2      | 48·2        |
| 59       | 47·2     | 138·2       | 8        | 6·4      | 46·4        |
| 58       | 46·4     | 136·4       | 7        | 5·6      | 44·6        |
| 57       | 45·6     | 134·6       | 6        | 4·8      | 42·8        |
| 56       | 44·8     | 132·8       | 5        | 4·0      | 41·0        |
| 55       | 44·0     | 131·0       | 4        | 3·2      | 39·2        |
| 54       | 43·2     | 129·2       | 3        | 2·4      | 37·4        |
| 53       | 42·4     | 127·4       | 2        | 1·6      | 36·6        |
| 52       | 41·6     | 125·6       | 1        | 0·8      | 33·8        |
| 51       | 40·8     | 123·8       | 0        | 0·0      | 32·0        |
| 50       | 40·0     | 122·0       |          |          |             |

CONVERSION OF GRAINS AND OUNCES INTO  
GRAMMES.

|   | Grains to Grammes. | Ounces to Grammes. | Grains to the Ounce = Grammes to 100 c.c. |
|---|--------------------|--------------------|-------------------------------------------|
| 1 | 0·06479            | 28·3495            | 0·22817                                   |
| 2 | 0·12958            | 56·9660            | 0·45635                                   |
| 3 | 0·19437            | 85·0485            | 0·68452                                   |
| 4 | 0·25916            | 113·3980           | 0·91269                                   |
| 5 | 0·32395            | 141·7475           | 1·14086                                   |
| 6 | 0·38874            | 170·0970           | 1·36904                                   |
| 7 | 0·45353            | 198·4465           | 1·59721                                   |
| 8 | 0·51832            | 226·7960           | 1·82538                                   |
| 9 | 0·58311            | 255·1455           | 2·05356                                   |

CONVERSION OF MINIMS, DRACHMS, OUNCES, AND  
PINTS TO CUBIC CENTIMETRES AND LITRES.

|   | Minims to c.c. | Drachms to c.c. | Ounces to c.c. | Pints to Litres. |
|---|----------------|-----------------|----------------|------------------|
| 1 | 0·05916        | 3·5495          | 28·396         | 0·56792          |
| 2 | 0·11832        | 7·0990          | 56·792         | 1·13584          |
| 3 | 0·17748        | 10·6485         | 85·188         | 1·70376          |
| 4 | 0·23664        | 14·1980         | 113·584        | 2·27168          |
| 5 | 0·29580        | 17·7475         | 141·980        | 2·83960          |
| 6 | 0·35496        | 21·2970         | 170·376        | 3·40752          |
| 7 | 0·41412        | 24·8465         | 198·772        | 3·97544          |
| 8 | 0·47328        | 28·3960         | 227·168        | 4·54336          |
| 9 | 0·53244        | 31·9455         | 255·564        | 5·11128          |

### FRENCH FLUID MEASURES.

THE cubic centimetre, usually represented by 'c. c.,' is the unit of the French measurement for liquids. It contains nearly seventeen minims of water; in reality, it contains 16.896 minims. The weight of this quantity of water is one gramme. Hence it will be seen that the cubic centimetre and the gramme bear to each other the same relation as our drachm for solids and the drachm for fluids, or as the minim and the grain. The following table will prove to be sufficiently accurate for photographic purposes:—

|                     |   |           |                        |                             |
|---------------------|---|-----------|------------------------|-----------------------------|
| 1 cubic centimetre  | = | 17 minims | (as near as possible). |                             |
| 2 cubic centimetres | = | 34        | "                      |                             |
| 3                   | = | 51        | "                      |                             |
| 4                   | = | 68        | "                      | or 1 drachm 8 minims.       |
| 5                   | = | 85        | "                      | 1 " 25 "                    |
| 6                   | = | 102       | "                      | 1 " 42 "                    |
| 7                   | = | 119       | "                      | 1 " 59 "                    |
| 8                   | = | 136       | "                      | 2 drachms 16 "              |
| 9                   | = | 153       | "                      | 2 " 33 "                    |
| 10                  | = | 170       | "                      | 2 " 50 "                    |
| 20                  | = | 340       | "                      | 5 " 40 "                    |
| 30                  | = | 510       | "                      | 1 ounce 0 drachm 30 minims. |
| 40                  | = | 680       | "                      | 1 " 3 drachms 20 "          |
| 50                  | = | 850       | "                      | 1 " 6 " 10 "                |
| 60                  | = | 1020      | "                      | 2 ounces 1 " 0 "            |
| 70                  | = | 1190      | "                      | 2 " 3 " 50 "                |
| 80                  | = | 1360      | "                      | 2 " 6 " 40 "                |
| 90                  | = | 1530      | "                      | 3 " 1 " 30 "                |
| 100                 | = | 1700      | "                      | 3 " 4 " 20 "                |

### THE CONVERSION OF FRENCH INTO ENGLISH WEIGHTS.

ALTHOUGH a gramme is equal to 15.4346 grains, the decimal is one which can never be used by photographers; hence in the following table it is assumed to be 15½ grains, which is the nearest approach that can be made to *practical* accuracy:

|           |   |             |   |                             |
|-----------|---|-------------|---|-----------------------------|
| 1 gramme  | = | 15½ grains. |   |                             |
| 2 grammes | = | 30½         | " |                             |
| 3         | = | 46½         | " |                             |
| 4         | = | 61½         | " | ..... or 1 drachm 1½ grain. |
| 5         | = | 77½         | " | 1 " 17½ grains.             |
| 6         | = | 92½         | " | 1 " 32½ "                   |
| 7         | = | 107½        | " | 1 " 47½ "                   |
| 8         | = | 123½        | " | drachms 3½ "                |
| 9         | = | 138½        | " | 2 " 18½ "                   |
| 10        | = | 154         | " | 2 " 34 "                    |
| 11        | = | 169         | " | 2 " 49 "                    |
| 12        | = | 184½        | " | 3 " 4½ "                    |
| 13        | = | 200½        | " | 3 " 20½ "                   |
| 14        | = | 215½        | " | 3 " 35½ "                   |
| 15        | = | 231         | " | 3 " 51 "                    |
| 16        | = | 246½        | " | 4 " 6½ "                    |
| 17        | = | 261½        | " | 4 " 21½ "                   |
| 18        | = | 277½        | " | 4 " 37½ "                   |
| 19        | = | 292½        | " | 4 " 52½ "                   |
| 20        | = | 308         | " | 5 " 8 "                     |
| 30        | = | 462         | " | 7 " 42 "                    |
| 40        | = | 616         | " | 10 " 16 "                   |
| 50        | = | 770         | " | 12 " 50 "                   |
| 60        | = | 924         | " | 15 " 24 "                   |
| 70        | = | 1078        | " | 17 " 58 "                   |
| 80        | = | 1232        | " | 20 " 32 "                   |
| 90        | = | 1386        | " | 23 " 6 "                    |
| 100       | = | 1540        | " | 25 " 40 "                   |

| Focus<br>of<br>Lens,<br>inches. | TIMES OF ENLARGEMENT AND REDUCTION. |                 |                 |                 |                 |                 |                 |                 |
|---------------------------------|-------------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|                                 | 1                                   | 2               | 3               | 4               | 5               | 6               | 7               | 8               |
|                                 | inches.                             | inches.         | inches.         | inches.         | inches.         | inches.         | inches.         | inches.         |
| 2                               | 4                                   | 6               | 8               | 10              | 12              | 14              | 16              | 18              |
|                                 | 4                                   | 3               | $2\frac{2}{3}$  | $2\frac{1}{2}$  | $2\frac{2}{5}$  | $2\frac{1}{3}$  | $2\frac{2}{7}$  | $2\frac{1}{4}$  |
| $2\frac{1}{2}$                  | 5                                   | $7\frac{1}{2}$  | 10              | $12\frac{1}{2}$ | 15              | $17\frac{1}{2}$ | 20              | $22\frac{1}{2}$ |
|                                 | 5                                   | $3\frac{3}{4}$  | $3\frac{1}{3}$  | $3\frac{1}{8}$  | 3               | $2\frac{1}{2}$  | $2\frac{6}{7}$  | $2\frac{1}{10}$ |
| 3                               | 6                                   | 9               | 12              | 15              | 18              | 21              | 24              | 27              |
|                                 | 6                                   | $4\frac{1}{2}$  | 4               | $3\frac{3}{4}$  | $3\frac{2}{5}$  | $3\frac{1}{2}$  | $3\frac{2}{7}$  | $3\frac{3}{8}$  |
| $3\frac{1}{2}$                  | 7                                   | $10\frac{1}{2}$ | 14              | $17\frac{1}{2}$ | 21              | $24\frac{1}{2}$ | 28              | $31\frac{1}{2}$ |
|                                 | 7                                   | $5\frac{1}{4}$  | $4\frac{2}{3}$  | $4\frac{3}{8}$  | $4\frac{1}{5}$  | $4\frac{1}{12}$ | 4               | $3\frac{1}{10}$ |
| 4                               | 8                                   | 12              | 16              | 20              | 24              | 28              | 32              | 36              |
|                                 | 8                                   | 6               | $5\frac{1}{3}$  | 5               | $4\frac{4}{5}$  | $4\frac{2}{3}$  | $4\frac{4}{7}$  | $4\frac{1}{2}$  |
| $4\frac{1}{2}$                  | 9                                   | $13\frac{1}{2}$ | 18              | $22\frac{1}{2}$ | 27              | $31\frac{1}{2}$ | 36              | $40\frac{1}{2}$ |
|                                 | 9                                   | $6\frac{3}{4}$  | 6               | $5\frac{5}{8}$  | $5\frac{2}{5}$  | $5\frac{1}{4}$  | $5\frac{1}{7}$  | $5\frac{1}{10}$ |
| 5                               | 10                                  | 15              | 20              | 25              | 30              | 35              | 40              | 45              |
|                                 | 10                                  | $7\frac{1}{2}$  | $6\frac{2}{3}$  | $6\frac{1}{4}$  | 6               | $5\frac{5}{8}$  | $5\frac{5}{7}$  | $5\frac{5}{8}$  |
| $5\frac{1}{2}$                  | 11                                  | $16\frac{1}{2}$ | 22              | $27\frac{1}{2}$ | 33              | $38\frac{1}{2}$ | 44              | $49\frac{1}{2}$ |
|                                 | 11                                  | $8\frac{1}{4}$  | $7\frac{1}{3}$  | $6\frac{1}{4}$  | $6\frac{3}{5}$  | $6\frac{5}{12}$ | $6\frac{2}{7}$  | $6\frac{3}{10}$ |
| 6                               | 12                                  | 18              | 24              | 30              | 36              | 42              | 48              | 54              |
|                                 | 12                                  | 9               | 8               | $7\frac{1}{2}$  | $7\frac{1}{5}$  | 7               | $6\frac{6}{7}$  | $6\frac{3}{4}$  |
| 7                               | 14                                  | 21              | 28              | 35              | 42              | 49              | 56              | 63              |
|                                 | 14                                  | $10\frac{1}{2}$ | $9\frac{1}{3}$  | $8\frac{3}{4}$  | $8\frac{2}{5}$  | $8\frac{1}{8}$  | 8               | $7\frac{7}{8}$  |
| 8                               | 16                                  | 24              | 32              | 40              | 48              | 56              | 64              | 72              |
|                                 | 16                                  | 12              | $10\frac{2}{3}$ | 10              | $9\frac{2}{5}$  | $9\frac{1}{3}$  | $9\frac{1}{7}$  | 9               |
| 9                               | 18                                  | 27              | 36              | 45              | 54              | 63              | 72              | 81              |
|                                 | 18                                  | $13\frac{1}{2}$ | 12              | $11\frac{1}{4}$ | $10\frac{4}{5}$ | $10\frac{1}{2}$ | $10\frac{2}{7}$ | $10\frac{1}{8}$ |

The object of this table is to enable any manipulator who is about to enlarge (or reduce) a copy any given number of times, to do so without troublesome calculation. It is assumed that the photographer knows exactly what the focus of his lens is, and that he is able to measure accurately from its optical centre. The use of the table will be seen from the following illustration:—A photographer has a *carte* to enlarge to four times its size, and the lens he intends employing is one of six inches equivalent focus. He must, therefore, look for 4 on the upper horizontal line, and for 6 in the first vertical column, and carry his eye to where these two join, which will be at  $30-7\frac{1}{2}$ . The greater of these is the distance the sensitive plate must be from the centre of the lens; and the lesser, the distance of the picture to be copied. To *reduce* a picture any given number of times the same method must be followed, but in this case the greater number will represent the distance between the lens and the picture to be copied; the latter, that between the lens and the sensitive plate. This explanation will be sufficient for every case of enlargement or reduction.

If the focus of the lens be twelve inches, as this number is not in the column of focal lengths, look out for six in this column and multiply by 2, and so on with any other numbers.

## TABLE OF VIEW-ANGLES.

By CLARENCE E. WOODMAN, Ph.D.

*(Photographic Times.)*

DIVIDE THE BASE OF THE PLATE BY THE EQUIVALENT FOCUS OF THE LENS;

| If the quo-<br>tient is | The<br>angle is | If the quo-<br>tient is | The<br>angle is | If the quo-<br>tient is | The<br>angle is |
|-------------------------|-----------------|-------------------------|-----------------|-------------------------|-----------------|
|                         | Degrees.        |                         | Degrees.        |                         | Degrees.        |
| .282                    | 16              | .748                    | 41              | 1.3                     | 66              |
| .3                      | 17              | .768                    | 42              | 1.32                    | 67              |
| .317                    | 18              | .788                    | 43              | 1.36                    | 68              |
| .335                    | 19              | .808                    | 44              | 1.375                   | 69              |
| .353                    | 20              | .828                    | 45              | 1.4                     | 70              |
| .37                     | 21              | .849                    | 46              | 1.427                   | 71              |
| .389                    | 22              | .87                     | 47              | 1.45                    | 72              |
| .407                    | 23              | .89                     | 48              | 1.48                    | 73              |
| .425                    | 24              | .911                    | 49              | 1.5                     | 74              |
| .443                    | 25              | .933                    | 50              | 1.53                    | 75              |
| .462                    | 26              | .954                    | 51              | 1.56                    | 76              |
| .48                     | 27              | .975                    | 52              | 1.59                    | 77              |
| .5                      | 28              | 1.                      | 53              | 1.62                    | 78              |
| .517                    | 29              | 1.02                    | 54              | 1.649                   | 79              |
| .536                    | 30              | 1.041                   | 55              | 1.678                   | 80              |
| .555                    | 31              | 1.063                   | 56              | 1.7                     | 81              |
| .573                    | 32              | 1.086                   | 57              | 1.739                   | 82              |
| .592                    | 33              | 1.108                   | 58              | 1.769                   | 83              |
| .611                    | 34              | 1.132                   | 59              | 1.8                     | 84              |
| .631                    | 35              | 1.155                   | 60              | 1.833                   | 85              |
| .65                     | 36              | 1.178                   | 61              | 1.865                   | 86              |
| .67                     | 37              | 1.2                     | 62              | 1.898                   | 87              |
| .689                    | 38              | 1.225                   | 63              | 1.931                   | 88              |
| .708                    | 39              | 1.25                    | 64              | 1.965                   | 89              |
| .728                    | 40              | 1.274                   | 65              | 2.                      | 90              |

*Example.*—Given a lens of 13 inches equivalent focus; required the angle included by it on plates respectively  $3\frac{1}{4} \times 4\frac{1}{4}$ ,  $4\frac{1}{4} \times 6\frac{1}{2}$ ,  $6\frac{1}{2} \times 8\frac{1}{2}$ ,  $8 \times 10$ ,  $10 \times 12$ , and  $11 \times 14$ .

1. Dividing 4.25 by 13, we have as quotient .327—midway between the decimals .317 and .335 of our table; therefore the required angle is  $18^\circ 30'$ . Similarly—

|    |     |   |    |   |       |                  |      |
|----|-----|---|----|---|-------|------------------|------|
| 2. | 6.5 | ÷ | 13 | = | .5;   | corresponding to | 28.  |
| 3. | 8.5 | ÷ | 13 | = | .654; | "                | 36.  |
| 4. | 10  | ÷ | 13 | = | .77;  | "                | 42½. |
| 5. | 12  | ÷ | 13 | = | .923  | "                | 49½. |
| 6. | 14  | ÷ | 13 | = | 1.08  | "                | 57.  |

## EQUATIONS RELATING TO FOCI, &c.

THE following simple optical formulæ and calculations, worked out by Mr. J. A. C. Branfill, will prove useful in many branches of photography, especially where several lenses of varying foci are in constant use for a variety of purposes:—

- Let  $p$  = Principal focus.  
 $F$  = Greater conjugate do.  
 $f$  = Lesser do. do.  
 $D$  =  $F + f$  = distance of image from object.  
 $r$  = Ratio of any dimension in original to the same dimension in copy (in case of reduction), or *vice versa* (in case of enlargement).  
 $a$  = Effective diameter of diaphragm.  
 U. S. No. = 'Uniform System' No. of do.  
 $x$  = Comparative exposure required.

Then

$$p = D \times \frac{r}{(r+1)^2} = \frac{Ff}{D} = \frac{F}{r+1} = \frac{rf}{r+1}$$

$$F = p(r+1) = \frac{pf}{f-p} = rf = \frac{rD}{r+1}$$

$$f = p \times \frac{(r+1)}{r} = \frac{pF}{F-p} = \frac{D}{r+1} = \frac{F}{r}$$

$$D = p \times \frac{(r+1)^2}{r} = f(r+1) = p \left( 2 + r + \frac{1}{r} \right)$$

$$r = \frac{F-p}{p} = \frac{p}{f-p} = \frac{F}{f}$$

$$\text{U. S. No.} = \frac{p^2}{16 a^2}$$

$$x = \frac{f^2}{16 a^2} = \frac{p^2}{16 a^2} \times \frac{(r+1)^2}{r^2}$$

N.B.—For ordinary landscape work, where  $r$  is greater than 20,  $x$  may be taken as  $\frac{p^2}{16 a^2}$

NOTE.—In case the above may not be clear to some photographers, the following rules may be better understood:—

To find the principal focus of a lens ( $p$ ), focus a near object in the camera, and measure the distance between it and the ground-glass ( $D$ ); next find the proportion which any dimension in the object bears to the same dimension on the ground-glass ( $r$ ). Thus, if the original dimension be four times as large as its reproduction, we say that  $r$  equals (=) 4. Multiply  $D$  by  $r$ , and divide the product by the square of a number greater by one than  $r$  ( $r+1$ )<sup>2</sup>. This rule was lately published by Mr. Debenham.

To find the lesser conjugate focus ( $f$ ) (if  $p$  and  $r$  are known) multiply  $p$  by the sum of  $r+1$  and divide the product by  $r$ . Or divide  $D$  by  $r+1$ .

To find the greater conjugate focus ( $F$ ) multiply  $p$  by  $r+1$ . Or multiply  $f$  by  $r$ .

To find  $D$  (the distance which the ground-glass should be from the object to be copied in order to get a given value for  $r$ ) multiply  $p$  by the sum of  $r + \frac{1}{r} + 2$ .

To find  $r$  divide  $F-p$  (the difference between  $F$  and  $p$ ) by  $p$ . Or divide  $p$  by  $f-p$ . Or divide  $F$  by  $f$ .

To find  $x$  divide the square of  $f$  by 16 times the square of  $a$  (the diameter of aperture to lens).

For example: focus an object which is five inches high, so that it is one inch high on the ground glass; thus we know that  $r=5$ . Next measure the distance between the object and the ground glass ( $D$ ), which is found to be 45 inches.

Then  $p = 45 \times (\text{multiplied by}) 5 \div (\text{divided by}) 6 \times 6 = 6\frac{1}{4}$  inches.

$f = 6\frac{1}{4} \times 6 \div 5 = 7\frac{1}{2}$  inches. Or  $f = 45 \div 6 = 7\frac{1}{2}$  inches.

$F = 6\frac{1}{4} \times 6 = 37\frac{1}{4}$  inches. Or  $F = 7\frac{1}{2} \times 5 = 37\frac{1}{2}$  inches.

$D = 6\frac{1}{4} \times (5 + \frac{1}{5} + 2) = 6\frac{1}{4} \times 7\frac{1}{5} = 45$  inches.

$r = (37\frac{1}{2} - 6\frac{1}{4}) \div 6\frac{1}{4} = 5$ . Or  $r = 6\frac{1}{4} \div (7\frac{1}{2} - 6\frac{1}{4}) = 5$ .

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|                                                                            | per doz.                                                   | per 1/2 doz. | 1/7     | 1/8           | 2/2           | 2/3           | 2/10    | 3/6           | 3/9     | 4/3     | 5/-     | 7/3     | 10/- | 10/- | 5/6  | 13/- | 6/9  | 20/- | 10/- | 5/6  | 4/-  | 5/6  | 14/6 | 7/9  |  |
| 'Pall Mall', Extra Rapid, 25 w. ...                                        | 1/6                                                        | 2/4          | 2/4     | ...           | ...           | 3/6           | ...     | 4/6           | ...     | 6/6     | ...     | 10/-    | 5/6  | 13/- | 6/9  | 20/- | 10/- | 5/6  | 4/-  | 5/6  | 14/6 | 7/9  | 10/- | 5/6  |  |
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| 'Pall Mall', Thickly Coated Ldscope, 18 w. ...                             | 2/3                                                        | 3/4          | 3/4     | 4/6           | 4/6           | 4/6           | 5/6     | 6/9           | 7/3     | 8/9     | 9/6     | 13/-    | 9/6  | 13/- | 6/9  | 20/- | 10/- | 5/6  | 4/-  | 5/6  | 14/6 | 7/9  | 10/- | 5/6  |  |
| 'Pall Mall', Thickly Coated Cyclist or Ultra Rapid, 28 w. ...              | 1/3                                                        | 1/8          | 1/8     | 2/5           | 2/5           | 2/5           | 2/11    | 3/6           | 3/9     | 4/6     | 5/-     | 10/-    | 13/- | 15/- | 20/- | 10/- | 5/6  | 4/-  | 5/6  | 14/6 | 7/9  | 10/- | 5/6  |      |  |
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| 'Pall Mall', Matt Opal Plates ...                                          | 1/8                                                        | 2/6          | 2/6     | 3/-           | 3/-           | 3/-           | 4/-     | 4/6           | 5/-     | 6/6     | 7/9     | 10/-    | 11/- | 14/6 | 7/9  | 10/- | 5/6  | 4/-  | 5/6  | 14/6 | 7/9  | 10/- | 5/6  |      |  |
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| 'Sandell', Especial Plate, 28 w. ...                                       | 2/6                                                        | 3/9          | 3/9     | 5/-           | 5/-           | 5/-           | 6/3     | 7/3           | 8/3     | 10/-    | 11/-    | 14/6    | 7/9  | 10/- | 5/6  | 4/-  | 5/6  | 14/6 | 7/9  | 10/- | 5/6  | 14/6 | 7/9  | 10/- |  |
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|                                                                            | 11 x 9                                                     | 13 x 8       | 12 x 10 | 15 x 12       | 9 x 12        | 10 x 12       | 12 x 16 | 12 x 16       | 13 x 18 | 15 x 21 | 18 x 24 | 21 x 27 |      |      |      |      |      |      |      |      |      |      |      |      |  |
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|                                                                            | 11 x 9                                                     | 13 x 8       | 12 x 10 | 15 x 12       | 9 x 12        | 10 x 12       | 12 x 16 | 12 x 16       | 13 x 18 | 15 x 21 | 18 x 24 | 21 x 27 |      |      |      |      |      |      |      |      |      |      |      |      |  |
|                                                                            | 11 x 9                                                     | 13 x 8       | 12 x 10 | 15 x 12       | 9 x 12        | 10 x 12       | 12 x 16 | 12 x 16       |         |         |         |         |      |      |      |      |      |      |      |      |      |      |      |      |  |

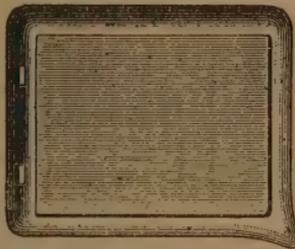




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| 10 x 8                            | 1 6                             | 3 0                  | 1 10                                            | 2 3                                   |
| 12 x 10                           | 1 6                             | 3 3                  | 1 10                                            | 2 3                                   |
| 15 x 12                           | 2 0                             | 4 6                  | 2 6                                             | 3 0                                   |
| 18 x 15                           | 2 3                             | —                    | 3 0                                             | 4 2                                   |
| 23 x 17                           | 3 3                             | —                    | 4 0                                             | 5 1                                   |
| 24 x 18                           | 5 0                             | —                    | 6 0                                             | 7 3                                   |
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|                          | s. d.      | s. d.      | s. d.      |                            | s. d.      | s. d.      | s. d.      |
| 10 x 8                   | 3 6        | 6 0        | 10 0       | 10 x 8                     | 5 0        | 10 0       | 20 0       |
| 12 x 10                  | 3 6        | 6 0        | 10 0       | 12 x 10                    | 5 0        | 10 0       | 20 0       |
| 15 x 12                  | 5 0        | 7 6        | 14 0       | 15 x 12                    | 8 0        | 15 0       | 25 0       |
| 18 x 15                  | 7 0        | 10 0       | 16 6       | 18 x 15                    | 10 0       | 20 0       | 35 0       |
| 23 x 17                  | 7 6        | 12 0       | 20 0       | 23 x 17                    | 17 6       | 30 0       | 45 0       |
| 24 x 18 }<br>24 x 20 }   | 10 0       | 20 0       | 30 0       | 24 x 18 }<br>24 x 20 }     | 25 0       | 42 0       | 60 0       |

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| 6½ × 4½                              | 3 3               | 2 0        | 3 11                                   | 2 4        | 0 6 0                                | 0 5 5         |
| 8 × 5                                | 3 3               | 2 0        | 3 11                                   | 2 4        | 0 6 9                                | 0 5 9         |
| 8½ × 6½                              | 4 9               | 2 9        | 5 6                                    | 3 2        | 0 9 6                                | 0 7 10        |
| 10 × 8                               | 6 0               | 3 6        | 6 10                                   | 3 11       | 0 11 10                              | 0 9 9         |
| 12 × 10                              | 7 6               | 4 3        | 8 6                                    | 4 9        | 0 15 0                               | 0 12 6        |
| 12 × 10                              | 11 0              | 6 0        | 12 6                                   | 6 9        | 1 2 6                                | 0 17 3        |
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| 4½ × 3½        | 0 5          | 1 3        | 2 0      | 1 3                                  | 2 3                                                | 0 6                                           |
| 6½ × 4½        | 0 7          | 2 2        | 4 0      | 1 9                                  | 3 0                                                | 0 8                                           |
| 8 × 5          | 0 8          | 3 0        | 5 6      | 3 0                                  | 4 8                                                | 0 9                                           |
| 8½ × 6½        | 1 0          | 3 6        | 6 0      | 3 8                                  | 5 0                                                | 1 3                                           |
| 10 × 8         | 1 6          | 4 9        | 8 9      | 5 0                                  | 8 0                                                | 1 6                                           |
| 12 × 10        | 2 2          | 7 3        | 12 6     | 9 0                                  | 9 0                                                | 2 0                                           |
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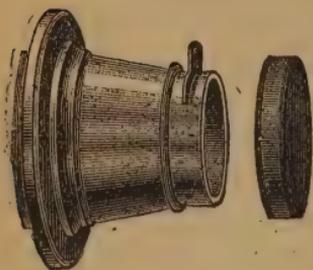
| No. | View.   | Portrait or Group. | Diamtr. | Focus.  | Price with Waterhouse Stops. | Price with Iris Stops. |
|-----|---------|--------------------|---------|---------|------------------------------|------------------------|
| 0.  | 4½ × 3½ | 4 × 3              | ... ..  | 4½-inch | £1 10 0                      | ... ..                 |
| 1   | 5 × 4   | 4½ × 3½            | 1-inch  | 5-inch  | 2 2 0                        | £2 12 6                |
| 2   | 7½ × 5  | 6½ × 4½            | 1½-inch | 7½-inch | 3 3 0                        | 3 15 0                 |
| 3   | 8 × 5   | 7½ × 5             | 1¾-inch | 8½-inch | 3 10 0                       | 4 4 0                  |
| 4   | 8½ × 6½ | 8 × 5              | 1¾-inch | 11-inch | 4 4 0                        | 4 18 0                 |
| 5   | 10 × 8  | 8½ × 6½            | 2-inch  | 14-inch | 5 10 0                       | 6 6 0                  |
| 6   | 12 × 10 | 10 × 8             | 2½-inch | 17-inch | 7 0 0                        | 8 0 0                  |
| 7   | 15 × 12 | 12 × 10            | 2½-inch | 20-inch | 8 10 0                       | 10 10 0                |
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| 5 × 4             | 5½-inch      | 1½-inch | £0 18 0 | £1 8 0                |
| 7½ × 5            | 8½-inch      | 1½-inch | 1 3 0   | 1 15 0                |
| 8½ × 6½           | 10 or 11-in. | 2½-inch | 1 8 0   | 2 2 0                 |
| 10 × 8            | 14-inch      | 2½-inch | 1 12 0  | 2 12 0                |
| 12 × 10           | 16-inch      | 2½-inch | 1 15 0  | 2 15 0                |
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[See following page.]

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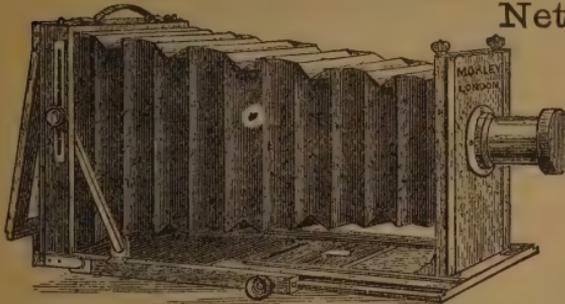
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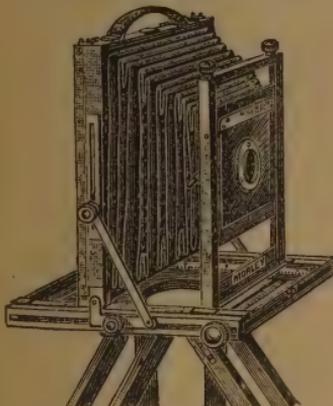
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AND THREE DOUBLE SLIDES.

|               |     |     |     |     |         |
|---------------|-----|-----|-----|-----|---------|
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| Half          | "   | ... | ... | ... | 5 12 6  |
| Whole         | "   | ... | ... | ... | 6 17 0  |

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AND THREE DOUBLE SLIDES.

|               |     |     |     |     |        |
|---------------|-----|-----|-----|-----|--------|
| Quarter Plate | ... | ... | ... | ... | £6 1 6 |
| Half          | "   | ... | ... | ... | 7 15 0 |
| Whole         | "   | ... | ... | ... | 9 0 0  |

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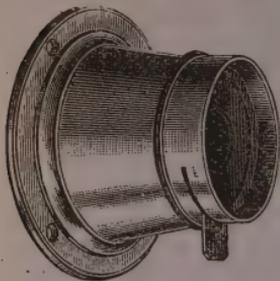


Fig. 1.

**SINGLE VIEW LENSES.—**  
 $\frac{3}{4}$ , 5/-;  $\frac{1}{2}$ , 10.-;  $\frac{1}{4}$ , 15'-; 10x8, 20/-; 12x10, 25/-

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 10x8 14-in. focus. 37/6

**SINGLE VIEW LENS (Fig. 2).**  
 Achromatic, with Iris Diaphragms.



Fig. 2.

|               |                             |
|---------------|-----------------------------|
| 5x4           | 7x5                         |
| 6-in. focus.  | 8 $\frac{1}{2}$ -in. focus. |
| 22/-          | 27/6                        |
| 9x7           | 10x8                        |
| 11-in. focus. | 13-in. focus.               |
| 40/-          | 45/-                        |

**WIDE-ANGLE PERE-  
SCOPIC (Fig. 3).**

Full aperture  $f/16$ . Angle view about 80°

|       |     |     |     |       |
|-------|-----|-----|-----|-------|
| 5x4   | ... | ... | ... | 20/-  |
| 7x5   | ... | ... | ... | 35/-  |
| 9x7   | ... | ... | ... | 40/-  |
| 10x8  | ... | ... | ... | 55/-  |
| 12x10 | ... | ... | ... | 80/-  |
| 15x12 | ... | ... | ... | 125/- |



Fig. 3.



Fig. 4.



Fig. 5.



Fig. 6.



Fig. 7.

**PANORAMIC LENS (Fig. 4).** Extreme wide angle, full aperture  $f/11$ .

|               |               |               |                |                |
|---------------|---------------|---------------|----------------|----------------|
| 5x4           | 7x5           | 9x7           | 10x8           | 12x10          |
| 4-inch focus. | 6-inch focus. | 8-inch focus. | 10-inch focus. | 12-inch focus. |
| 50/-          | 55/-          | 75/-          | 100/-          | 120/-          |

**RAPID RECTILINEAR (Fig. 5).** Full aperture  $f/8$ . Waterhouse Stops. French manufacture, warranted quality.

5x4, 30/-; 7x5, 40/-; 9x7, 6 1/-; 10x8, 75; 12x10, 110/-; 15x12, 150/-  
 Fitted with Iris Diaphragms, 10/- each extra.

**HAND CAMERA LENSES (Fig. 6).** Detective, single, full aperture  $f/11$ . Covers  $\frac{1}{2}$ -plate sharp to the edge, 5-in. focus, rotary stop. Price 20/-

**HAND CAMERA (Fig. 7).**—Extra rapid Euroscopic, works at  $f/6$ , with rack and pinion for focussing; covers  $\frac{1}{2}$ -plate sharp to the edges, Iris Diaphragms, 5-in focus, 45/-

**PORTRAIT LENSES (FRENCH)** of fine quality, made with English glass, English patterns. Carte, 80/-; Cabinet, 100/-; Whole-plate, 160/-

**PORTRAIT LENSES (FRENCH)**, cheap quality, warranted. Carte, 25/-; Cabinet, 50/-; Whole-plate, 105/-

*We are Agents for and Stock Lenses by all the best makers—ROSS, DALLMEYER, TAYLOR, WRAY, SWIFT, ZEISS, SUTER, CLEMENT & GILMER, &c., &c.*

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**GEORGE MASON & CO., GLASGOW.**


---

## SPECIAL LINES IN CAMERAS.



OUR 'STANDARD' SET.

**THE 'STANDARD' SET.**—The Camera is of fine mahogany and well polished. It is fitted with leather bellows, slightly conical. It has a swing back, reversible back, a rising front; the bellows is double extension, closing to 2 inches, and drawing out to 16 inches. The back goes forward to allow of wide-angled lenses being used. The Lens is a Rapid Rectilinear of guaranteed quality, working at  $f/8$ , fitted with Iris diaphragms. The shutter is fitted with pneumatic release. The stand is three-fold, rigid compact. This is the most perfectly complete outfit in the market at the prices, comprising as it does, Camera Slides, Lens, Shutter, Stand, and Waterproof Case, all for

**£4 12s. 6d.**

**THE 'UNIQUE'** is a  $\frac{1}{4}$ -plate Camera, handy for lantern slide work and  $\frac{1}{2}$ -plate pictures; it is fitted with three double slides; the lens is a rapid rectilinear, with shutter, all fitted in case, with folding tripod, for **£3 15s.**

**THE 'I. X. L.'** SET.—Half-plate, of best workmanship, and fitted with three double slides, light and strong, with rectilinear lens and shutter, fitted in case with folding Stand. Price **£7 5s.**

**THE 'PERFECT' SET.**—Whole-plate; pictures  $8\frac{1}{2} \times 6\frac{1}{2}$  inches; light, compact, and strong; reversible back, extension bellows, movable body for wide-angle lens, with three double backs, rapid rectilinear lens with pneumatic shutter. All fitted in case; folding tripod; all complete for **£10.**

**OUR NEW PORTABLE CAMERA.**—Compact and light, possessing all the latest improvements, with three double slides. This is the Camera that obtained the Medal awarded at the Edinburgh Exhibition.

|                                      |                                    |                                    |                |                |                 |
|--------------------------------------|------------------------------------|------------------------------------|----------------|----------------|-----------------|
| Size— $\frac{1}{4}$ or $\frac{1}{2}$ | $6\frac{1}{2} \times 4\frac{1}{2}$ | $8\frac{1}{2} \times 6\frac{1}{2}$ | $10 \times 8$  | $12 \times 10$ | $15 \times 12$  |
| <b>£5 0 0</b>                        | <b>£6 10 0</b>                     | <b>£8 0 0</b>                      | <b>£10 0 0</b> | <b>£12 0 0</b> | <b>£14 10 0</b> |

**OUR 'LADIES' CAMERA.**—The lightest Field Camera made. Specially useful for lady photographers.  $\frac{1}{4}$ -plate, three double slides, **£5 10s.**;  $\frac{1}{2}$ -plate, three double slides, **£6 15s.** All the latest improvements are fitted to these instruments—swing, wide-angle arrangement, reversible back, rising front, and can be fitted with turntable and stand, for  $\frac{1}{4}$ -plate, 25s., and  $\frac{1}{2}$ -plate, 30s. extra.

**We supply LANCASTER'S CAMERAS and LENSES of all the various qualities and patterns.**

**HAND CAMERAS OF EVERY DESCRIPTION STOCKED.**

*Send for our Illustrated List of Hand Cameras and Apparatus for 1893.*

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**GEORGE MASON & CO., GLASGOW.**

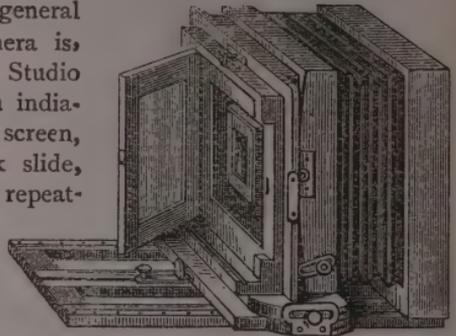

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# STUDIO CAMERAS.

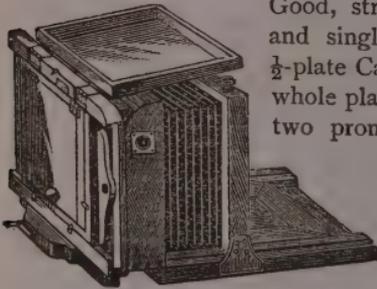
## NEW AMERICAN CAMERA.

For strength, utility, and general mechanical appliances this Camera is, without doubt, the best appointed Studio Camera made. It is fitted with india-rubber bellows, patent focussing screen, double swing back, patent dark slide, and hinged focussing screen, with repeating backs, and can be had the following sizes—

|                      |         |          |
|----------------------|---------|----------|
| $\frac{1}{4}$ -plate | 10X8    | 12X10    |
| £8 15 0              | £10 0 0 | £13 10 0 |



## OUR UNIVERSAL STUDIO CAMERA.



Good, strong, and serviceable, with single slides, and single swing, with repeating backs. The  $\frac{1}{2}$ -plate Camera takes two cartes on half plate; the whole plate takes two cartes, or two cabinets, or two promenades, and so on through the other sizes. The prices for above are—

|                      |               |       |       |        |
|----------------------|---------------|-------|-------|--------|
| $\frac{1}{4}$ -plate | $\frac{1}{2}$ | 10X10 | 12X12 | 15X15  |
| £4 15                | £5 15         | £7 10 | £9    | £11 10 |

When fitted with double slides and double swing,

|                      |               |       |       |        |
|----------------------|---------------|-------|-------|--------|
| $\frac{1}{4}$ -plate | $\frac{1}{2}$ | 10X8  | 12X12 | 15X15  |
| £5 5                 | £7 5          | £8 15 | £10   | £12 10 |

In Cameras and Lenses, for guaranteed quality our goods are well known. The foregoing are but a few special lines. For a full detail of the various classes and prices see our 'PHOTOGRAPHIC GUIDE.' Being about the oldest manufacturers in the trade, our productions have stood both the test of time and experience, and have not been found wanting.

We have just issued a Special Catalogue of **HAND CAMERAS** of every description. Sent free on application.

See it before you invest.

**GEORGE MASON & CO., GLASGOW.****PAPERS.**

Papers of all kinds and makers stocked.

**ALBUMENIZED PAPERS.**—The demand is still increasing for our own two brands—STANDARD and IXL. We also stock Three Star, SS., Cross Swords, Anchor, and all popular brands.

**SENSITIZED PAPERS**, in sheet or cut, supplied by return.

**PRINTING-OUT PAPERS.**—SOLIO and P.O.P always in stock, in pink, mauve, and white.

**NIKKO PAPER.**—'Eastman's' gives the effect of Platinum, with enamelled surface. Can be had in sheets or cut sizes. Send for List.

**PLATINUM SENSITIZED PAPERS.**—The most popular and in universal use is the AA, for cold development. This we have in stock always. The hot bath (rough surface or sepia) we get forward in a short time after order. We also supply all the Apparatus necessary for the successful working of this beautiful process, also the special Chemicals. We will send you a special List on application, showing articles and prices in detail.

**BROMIDE PAPERS** by Morgan & Kidd, Ilford, Eastman, &c. (rough and smooth, rapid and slow, all grades, all sizes) on hand always.

**LANTERN PLATES.**

Ilford (Special and Alpha), Paget (Rapid, Slow, and Printing-out), Mawson, Thomas England. All for contact printing or reduction.  
HILL-NORRIS COLLODION PLATES.

**PAGET'S PRIZE PRINTING-OUT OPALS.**

New and successful. Matt,  $\frac{1}{2}$ -plate, 4/- per dozen; Glazed, 5/- per dozen.

**DEVELOPERS AND TONING CHEMICALS (NEW).**

Hydrokinone. Rodinal. Glycinn. Metol. Amidol. Eikonogen. Thiotone.  
Uda Powder. Noxinol.

**OUR PATENT TRIPOD SECURER**

keeps the Stand rigid and steady under any circumstances. For use in Interiors, on smooth floors and awkward places. Price 5/-; post free, 5/3.

**OUR AUTOMATIC STUDIO STAND.**

Well known. Ever popular. Small, £4 10s.; large, £6.

**BACKGROUNDS.**

Our Italian Grounds, 8x8, from 65/-. Our Moselle Grounds, 8x8, from 50/-.

American Backgrounds (exterior and interior) from 50/-.

Set of cheap Backgrounds (exterior and interior), 8x8, from 25/- each.

Cloud and Shaded Grounds in stock.

*All sizes and designs painted to order, either in Oil or Distemper. Quotations given.*

Plain Cloth Grounds, in pale blue, green, and grey, at the following sizes and prices:—

|       |       |       |       |       |       |        |        |        |        |        |
|-------|-------|-------|-------|-------|-------|--------|--------|--------|--------|--------|
| 50x40 | 60x40 | 70x40 | 70x60 | 72x72 | 90x72 | 108x92 | 108x96 | 120x96 | 132x96 | 144x96 |
| 2/8   | 3/-   | 3/4   | 4/6   | 5/6   | 6/8   | 7/10   | 12/-   | 13/6   | 15/-   | 16/6   |

*Photographs and Patterns sent when desired.*

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**GEORGE MASON & CO., GLASGOW.**


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**FURNITURE & ACCESSORIES.**

- THE OAK DOLPHIN TABLE, 33 in. long, 21 in. wide, 30 in. high, **£3 15s.**  
 THE WOLSEY CHAIR, in carved oak, 29 in. high, 21 in. wide, **£4 15s.**  
 OAK WRITING CABINET, carved, 27 in. high, 27 in. wide, 45 in. long, **£9 10s.**  
 OAK TABLE ('HERKOMER'), 22 in. high, length 17 in., top width 17 in., **£2.**  
 OAK WHATNOT, carved, 36 in. high, 17 in. long, 17 in. wide, **£3.**  
 OAK HALL SEAT AND TABLE COMBINED, 3 ft. 6 in. long, **£5.**  
 OAK HALL SEAT, richly carved, 3 ft. long, **£4 10s.**  
 OAK SMALL TABLES, from **10s. 6d.** upwards. FOOTSTOOLS from **2s. 6d.**  
 THE BIRDCAGE AND STAND. Attractive and useful Stand, 5 ft. high, width 2 ft., **£1 15s.**  
 THE COTTAGE, with opening door and windows, 7 ft. 9 in. high, 6 ft. wide, **£2 5s.**  
 THE GATEWAY, with Pillars (6 pieces), 4 ft. high, 5 ft. wide, **£1 10s.**  
 THE RUSTIC STILE, 3 ft. high, 3½ ft. wide, **17s. 6d.**  
 OUR CIRCULAR BALUSTRADE, 23 in. (highest pillar 32 in., length 5 ft.), in 5 pieces), **£1 15s.**  
 STRAIGHT PILLAR BALUSTRADE, in variety of designs, from **£1 5s.** to **£6.**  
 OUR TREE STUMP (papier mache), 3 ft. long, 2 ft. wide, 2 ft. high, **£1 1s.**  
 POSING CHAIR, 2 extra backs, making 3 changes, in plush, **£3 15s.**  
 POSING CHAIR, 4 backs, suitable in change for all sitters, **£7 10s.**  
 GARDEN SEAT, Old Sandstone pattern. Prices **£2 10s.** and **£3.**  
 RUSTIC FLOWER STANDS, in bamboo, artistic designs, from **2s. 6d.** to **£1 10s.**  
 RUSTIC TABLES, in Japanese and bamboo, from **5s.** to **£2.**

*We have photographs, lithographs, or designs in most cases, of Furniture and Accessories, which we will be glad to send on for inspection to any one so desiring.*

**We stock every new thing that we find suitable for the trade.**

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**ENAMEL COLLODION (Mason's own).**

There is no better. 9/6 a Winchester, 2/9 a pint.

**THINNING SOLUTION.** 8/- a Winchester, 2/3 a pint.

**ENAMELLING GELATINE 'COIGNETS,'** 1/8 per lb.

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**PLATES.**

Every make of Plates stocked. Any quantity, any quality, any maker, sent by return. Supplied on the best market terms.

We are Agents for ILFORD, MAWSON, CADETT, WRATTEN, EDWARDS, THOMAS, ELLIOTT, and all the leading makers. Best terms.

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**OPALINE GOODS.**

**Plush Blocks. Bevelled Glasses. Backs and Boxes.**

IN EVERY STYLE.

*If interested in this class of goods it would pay you to send for our detailed Price List before buying.*

GEORGE MASON & CO., GLASGOW.

MOUNTS.

BEST QUALITY. LOWEST PRICES.

'PEARL' MOUNTING BOARD.—The 'Pearl Board' is on one side a rich Cream Tint, the other side White. Both sides have an *extra superfine* finish, and serve at once for a toned or a white board.

THICK AND STRONG—ONCE USED ALWAYS USED.

8×6, 8/- 10×8, 12/- 12×10, 18/- 15×12, 24/- 19×14, 33/-  
26×19, 54/- 29×23, 72/- per gross.

THE 'SILVER GREY' BOARD has a delicate grey tint on both sides. It is extra thick—best superfine quality—hard, smooth surface. Specially suited for PLATINOTYPE and BROMIDE work.

A BETTER BOARD CANNOT BE HAD FOR ANY MONEY.

10×8, 12/- 12×10, 18/- 15×12, 24/- 19×14, 36/- 26×19, 60/- per gross.

MASON'S 'ARTIST' MOUNT.—Grey board, India-tinted centre. Superfine quality. Suitable for every class of photograph.

Size of Tint 6¼×5 7½×5½ 10×8 12×9½ 14×9 14×11 17½×14  
Price per 100 8/6 14/- 20/- 30/- 45/- 54/- 66/-

LINED MOUNTS.—Special, for Views or Groups. Superfine quality, with double chocolate line.

|               |        |       |       |         |        |
|---------------|--------|-------|-------|---------|--------|
| Board... ..   | 8½×6½  | 8½×6½ | 10×8  | 12×10   | 14×11½ |
| Line ... ..   | 5×4    | 6×4½  | 7×5   | 9×7     | 10×8   |
| Price per 100 | 4/-    | 4/-   | 5/6   | 9/-     | 12/-   |
| Board... ..   | 15×12  | 18×14 | 20×16 | 21½×17½ | 25×19  |
| Line ... ..   | 10½×8¼ | 12×10 | 14×11 | 15×12   | 18×14  |
| Price per 100 | 14/-   | 18/-  | 28/-  | 38/-    | 46/-   |

OXFORD LINED MOUNTS, for Views and Groups. Cream board, chocolate lines, fancy corners.

|               |      |       |       |        |       |       |       |
|---------------|------|-------|-------|--------|-------|-------|-------|
| Board... ..   | 10×8 | 12×10 | 14×11 | 15×12  | 18×14 | 21×17 | 26×19 |
| Line ... ..   | 7×5  | 9×7   | 10×8  | 10½×8¼ | 12×10 | 15×12 | 18×14 |
| Price per 100 | 4/6  | 7/-   | 9/9   | 11/6   | 16/6  | 24/-  | 31/-  |

INDIA TINTED MOUNTS.—White, with neutral grey tint.

|               |      |       |        |       |       |       |       |
|---------------|------|-------|--------|-------|-------|-------|-------|
| Board... ..   | 10×8 | 12×10 | 15×12  | 18×14 | 20×16 | 21×17 | 26×19 |
| Tint ... ..   | 7×5  | 9×7   | 10½×8¼ | 12×10 | 14×11 | 15×12 | 18×14 |
| Price per 100 | 4/6  | 7/-   | 11/6   | 16/6  | —     | 24/-  | 31/-  |

The same Mount, with plate-sunk mark:—

|               |     |     |      |      |      |      |      |
|---------------|-----|-----|------|------|------|------|------|
| Price per 100 | 6/- | 8/6 | 14/6 | 22/- | 29/- | 31/- | 40/- |
|---------------|-----|-----|------|------|------|------|------|

# GEORGE MASON & CO., GLASGOW.

## MOUNTS (Continued).

**PLATE MARKED MOUNTS**, with India Tint pasted on. Best quality, extra thick. White board, Cream tint. Grey board, Cream tint.

|               |         |         |         |           |           |
|---------------|---------|---------|---------|-----------|-----------|
| Board... ..   | 8½ × 6½ | 9½ × 8  | 10 × 8  | 12 × 10   | 14 × 11½  |
| Tint ... ..   | 5 × 4   | 6½ × 5½ | 7 × 5   | 9 × 7     | 10 × 8    |
| Price per 100 | 8/-     | 10/-    | 11/6    | 18/-      | 23/-      |
| Board... ..   | 18 × 14 | 20 × 16 | 25 × 19 | 29 × 23   | 33 × 26   |
| Tint ... ..   | 12 × 10 | 14 × 11 | 18 × 14 | 21 × 17   | 25 × 19   |
| Price per 100 | 35/-    | 50/-    | 65/-    | 18/- doz. | 24/- doz. |

**PLATE MARKED MOUNTS**, same as foregoing. Good, stout quality, at a lower rate, which will be found perfectly suitable for many classes of work.

|               |         |         |           |         |          |
|---------------|---------|---------|-----------|---------|----------|
| Board... ..   | 8½ × 6½ | 9½ × 8  | 10 × 8    | 12 × 10 | 15 × 12  |
| Tint ... ..   | 5 × 4   | 6½ × 5½ | 7 × 5     | 9 × 7   | 10½ × 8½ |
| Price per 100 | 5/6     | 5/9     | 7/-       | 9/3     | 14/-     |
| Board... ..   | 18 × 14 | 20 × 16 | 21½ × 17½ | 25 × 19 |          |
| Tint ... ..   | 12 × 10 | 14 × 11 | 15 × 12   | 18 × 14 |          |
| Price per 100 | 21/-    | 26/-    | 30/-      | 85/-    |          |

For **GOLD BEVELLED-EDGE MOUNTS**, Plain or Stamped, we are the best house in the trade. *Send for samples and prices.*

For **PRINTED** or **ENGRAVED MARKS** we are the best house in the trade. *Send for samples and prices.*

These goods in all sizes, from Midget-Cartes and Cabinets up to Large Panel, and odd sizes for Views. *Lists on application.*

### STEREOSCOPIC MOUNTS 2/8 100 upwards.

Our Mounts are unsurpassed for purity of Cardboard and excellence of Engraving and Finish.

**NEW AMERICAN BACKGROUND-HOLDER**, fitted for Ten grounds. 8 × 8, with one Roller, £6 5s., extra Rollers 11/- each. Size 10 × 8, £6 10s., with one Roller, extra Rollers 12/- each.

**GLOBE ENAMELLERS.**—Sizes, 10-in., 15-in., 20-in., 25-in.

**NEW DARK ROOM LAMPS**, for Candle, Oil, or Gas. From 2/- each upwards.

Of the following Appliances, Apparatus, and Sundries we always hold a full stock:—Retouching Desks, Shutters, Stands, Plate Boxes, Printing Frames, Trays, Racks, Squeegees, Brushes, Focussing Glasses, View Finders, Head Rests, Measures, Funnels, Cutting Shapes, Exposure Meters, Vignettors, Rubber Stamps, Chemicals, Chemical Apparatus.

FERROTYPE PLATES, Envelopes, and all necessaries for Positive work.

**PICTURES IN BLACK AND WHITE**, or Photographers Photographed. By G. Mason ('Mark Out'). Paper, 9d., cloth, 1s.; cloth, gilt lettered, 2s.

**GEORGE MASON & CO., Sauchiehall St., Glasgow.**

TELEGRAPHIC ADDRESS: 'SODA, GLASGOW.'

[See preceding pages.]

# E. & T. UNDERWOOD,

*Patentees and Manufacturers of*

## PHOTOGRAPHIC APPARATUS

(Telegraphic Address: 'Instanto, Birmingham')

**BRUNSWICK WORKS,**

130 to 132 Granville Street, Birmingham, ENGLAND.



A reliable Camera and a good Lens are absolutely necessary for the production of first-class Photographs.

As good results are obtained, in competent hands, with our Cameras and Lenses, as with any Instruments in the market, no matter what the price.

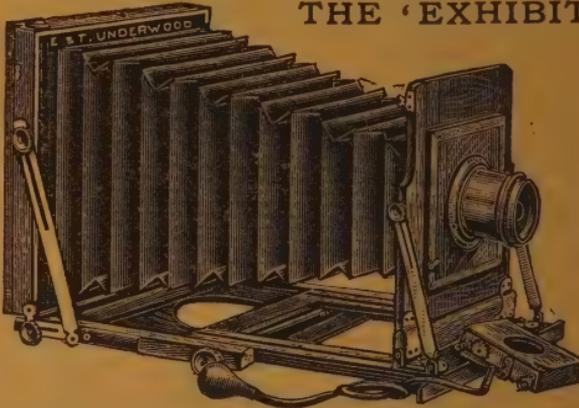
FULL ILLUSTRATED CATALOGUE, FOUR STAMPS.

[See following pages

## E. & T. UNDERWOOD,

### THE 'EXHIBITION.'

Camera, Double Back, Lens, Shutter,  
and Stand.

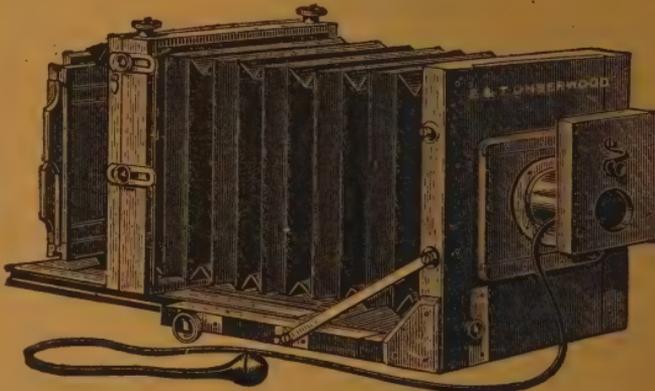


Camera, and One Double Back.  
 $\frac{1}{2}$ -plate, £4 1s.     $\frac{1}{4}$ -plate, £5 8s.  
 With contained Tripod Head.

PRICE, Complete Apparatus:  $\frac{1}{2}$ -plate, £5 5s.;  $\frac{1}{4}$ -plate, £7 5s.

### THE 'INSTANTO.'

Camera, Double Back, Lens, Shutter  
and Stand.



$\frac{1}{4}$ -plate, £2 4s. 6d., complete sets.     $\frac{1}{2}$ -plate, £4 4s., complete sets.

Whole-plate, £6 6s., complete sets.

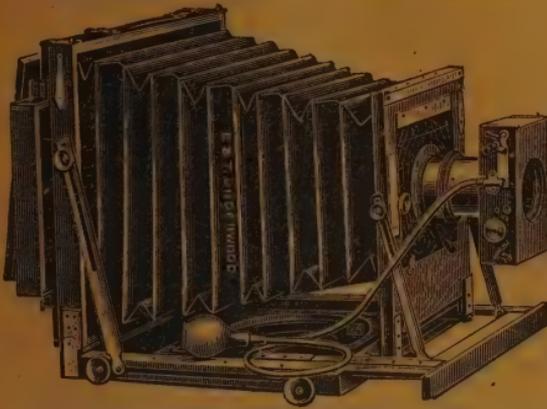
Extra Double Back, Double Folding Shutters, and Brass Side Clips.

$\frac{1}{4}$ -plate, 7/-;  $\frac{1}{2}$ -plate, 11/6; Whole-plate, 18/-.

**BEST WORKMANSHIP AND MATERIAL.**  
**ALL LENSES GUARANTEED.**

130 to 132 GRANVILLE STREET,

Patentees and Manufacturers.



The 'CLUB.'

PRICE,

Complete Apparatus,  
Camera, Double  
Back, Lens, Inst.  
and Time Shutter,  
and Stand.

$\frac{3}{4}$ -plate ... £5 10s.  
 $\frac{1}{2}$ -plate ... 7 10

With Rectilinear  
Lens.

$\frac{1}{2}$ -plate ... £7 2s.  
 $\frac{1}{4}$ -plate ... 10 2



THE 'FIELD.' Price complete :  $\frac{1}{2}$  pl., £4 12s. ;  $\frac{1}{4}$ -pl., £6 16s.  
THE LIGHTEST CAMERA MADE.

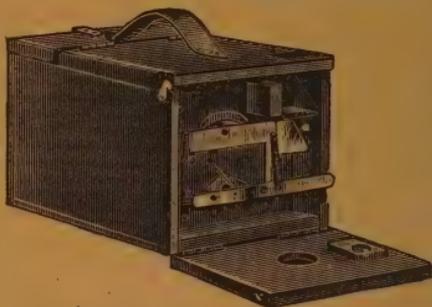
- N  
 The 'Compactum.'  
 The 'Tourgraph.'  
 The 'Instanto.'  
 The 'Albion.'  
 The 'Convention.'  
 The 'Medal.'  
 The 'President.'  
 The 'Exhibition.'  
 The 'Field.'  
 The 'Club.'  
 The 'Stereograph.'  
 The 'Stereoscopic.'  
 Shutters.  
 Carrying Cases.

\* BIRMINGHAM. \*

## E. & T. UNDERWOOD.

### HAND CAMERAS.

#### THE 'CITY' (Patent).



Carries 1 doz.  $\frac{1}{4}$ -plates. Changing system—simplest and most reliable possible. Accurately centered finder. No focussing required. Achromatic Lens and always-set Shutter.

Covered in Morocco Leather :  
Price 28/-.

With adjustable speed shutter  
and diaphragm plate, 32/-.

#### THE 'ARGOSY.'

MARVELLOUSLY SIMPLE AND EASY TO USE.

This is a Magazine Camera taking 1 doz.  $\frac{1}{4}$ -plates in sheaths. The changing arrangement is a mechanical one of great simplicity operated from the outside, and the shutter being always set the whole relay of plates are used without once opening the camera or any part of it.

The Lens, Shutter and Finder, and the style and finish are as in the 'City' Pattern. Size  $7\frac{1}{2} \times 5 \times 6$  in., price 36/-.

With Adjustable Speed Shutter and Quadrant Diaphragm Plate, 40/-.



#### THE 'SPHYNX.'

Magazine Hand Camera for  
twelve  $\frac{1}{4}$ -plates.

Highest quality Euryscope Lens, with Iris Diaphragms. Time and Instantaneous roller blind shutter working between lenses. Horizontal and Vertical Finders, focussing from 5 ft. to infinity. Covered in best morocco leather, handsomely finished.

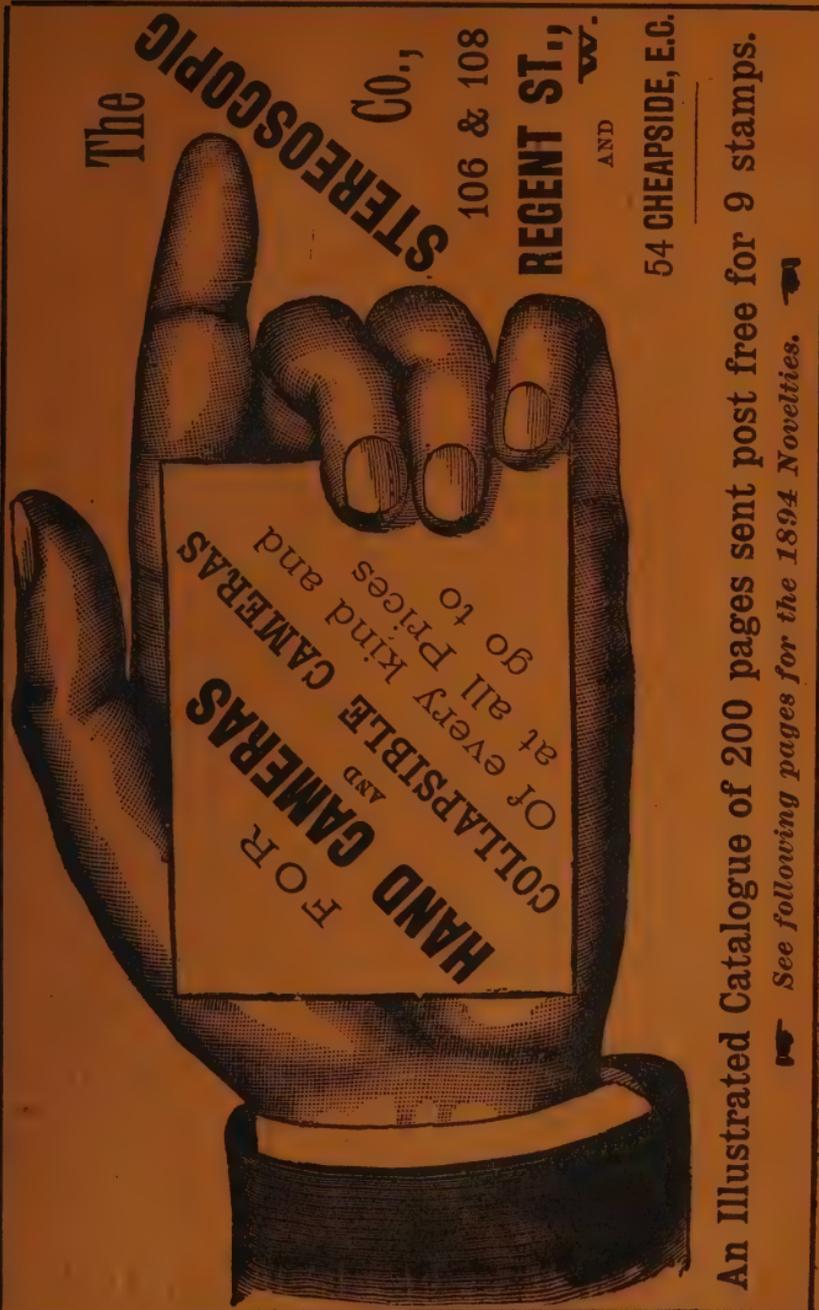
Size  $9\frac{1}{2} \times 5\frac{1}{2} \times 4\frac{1}{2}$ , £3 15s.

SPECIAL CATALOGUE  
MANUAL, 2 Stamps.



→\* BIRMINGHAM. \*←

[See preceding pages.]



The  
STEREOSCOPIC  
Co.,

106 & 108

REGENT ST.,

AND  
W.

54 CHEAPSIDE, E.C.

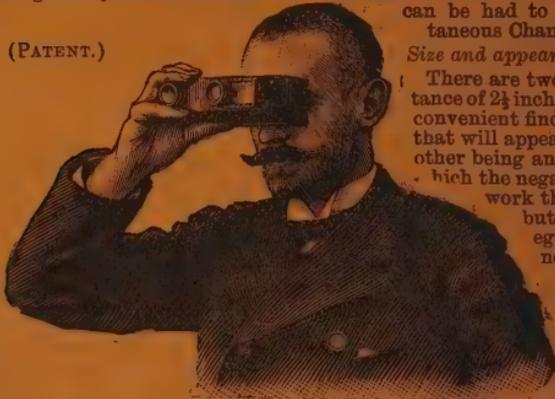
An Illustrated Catalogue of 200 pages sent post free for 9 stamps.

See following pages for the 1894 Novelties.

## A PHOTOGRAPHIC NOVELTY. THE STEREOSCOPIC COMPANY'S 'BINOCULAR' CAMERA.

Weight only 19 oz. Finder shows full size of Picture. Carries 12 Plates,  $2\frac{1}{2} \times 1\frac{1}{2}$  in., or can be had to hold 30 cut films. Instantaneous Changing. Extra Rapid Lens.

(PATENT.)



Size and appearance of a small Field Glass.

There are two lenses side by side at a distance of  $2\frac{1}{2}$  inches, one forming a perfect and convenient finder, showing the exact image that will appear on the exposed plate; the other being an extra rapid rectilinear, with which the negative is secured. For outdoor work the exposure is instantaneous, but, in other cases, may be easily regulated at will. By a simple and ingenious arrangement it is possible at any moment to ascertain how many plates have been exposed.

In consequence of the superior quality of the lens the pictures will bear enlarging to almost any extent.

## A SPECIAL ENLARGING APPARATUS

for the Binocular Negatives.

WITH the all-important object of diminishing weight and increasing portability, the plates measure only  $2\frac{1}{4} \times 1\frac{1}{2}$  inches, but the Company have designed a most perfect, but simple, enlarging apparatus, by means of which the original negatives are easily increased to  $\frac{1}{2}$ -plate size—a matter of considerable moment to operators making views for practical purposes, and especially commending it to amateurs, to whom it will commend itself on account of its extreme simplicity and portability.

*Price of Camera and Lenses complete, with Case & Shoulder Strap, £5 5s.*

*Or, including Enlarging Apparatus, £10 10s.*



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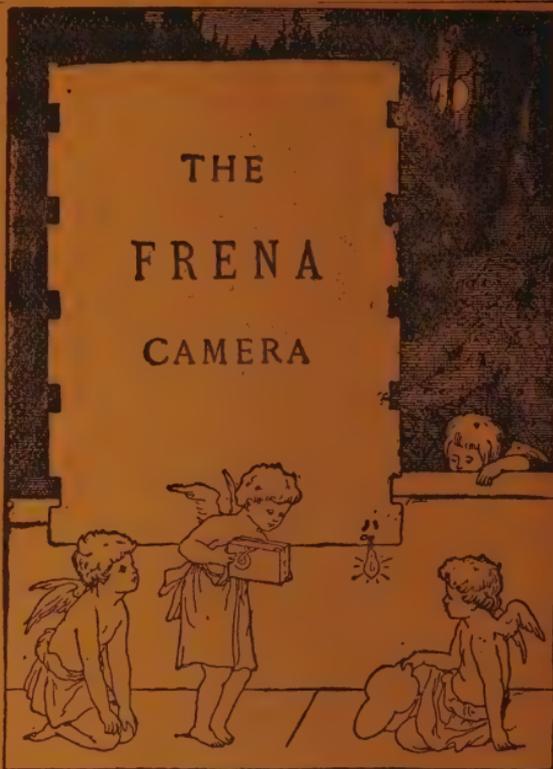
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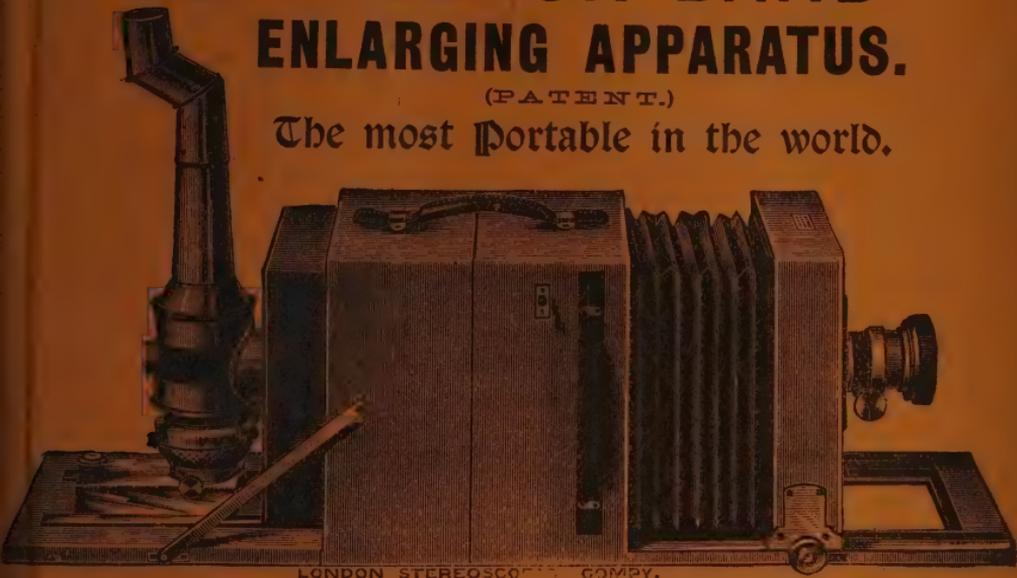
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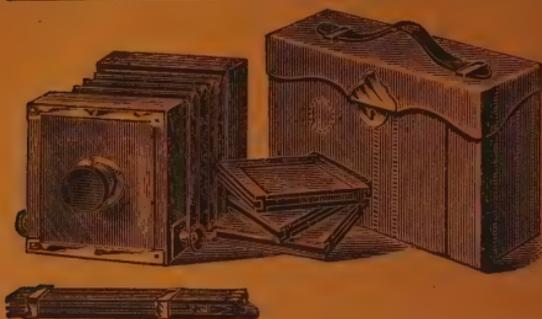
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MÜLLER, A. E.	9 Fenchurch Street, E.C.	PROBATUM, LONDON.

NAME.	ADDRESS.	TELEGRAPHIC ADDRESS.
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NATIONAL PHOTOGRAPHIC Co.	59 & 61 Cromwell Road, Southampton.	NATIONAL, SOUTHAMPTON.
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NELSON, DALE, & Co., Ltd.	14 Dowgate Hill, E.C.	DALESON, LONDON.
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PRESTON, JOB	4 High Street, Sheffield.	PRESTON, CHEMIST, SHEFFIELD.
PRINGLE, R., & Co.	40 and 42 Clerkenwell Road, E.C.	WILDERNESS, LONDON.
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UNDERWOOD, E. & T.	130 & 132 Granville Street, Birmingham.	INSTANTO, BIRMINGHAM.
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VEVERS, C. C.	12 Market Street, Briggate, Leeds.	VEVERS, BRIGGATE, LEEDS.
WACHTL, BERNHARD	VII. Kirchberggasse 37, Wien.	BERNHARD-WACHTL, WIEN.
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THE OLDEST PHOTOGRAPHIC JOURNAL.

PUBLISHED EVERY FRIDAY.

Estab. 1854.

Price Twopence.

— THE —

# British Journal of Photography

**THE BRITISH JOURNAL OF PHOTOGRAPHY** is recognised as the Principal Photographic Journal in the world, and circulates among all leading Professional and Amateur Photographers. The earliest and most reliable news of Photographic Practice and Progress appears in its pages.

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# W. WATSON & SONS'

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W. WATSON & SON, 313 High Holborn, London.

78 Swanston St., Melbourne, AUSTRALIA.



### TERMS.

**PURCHASERS** resident in the country or abroad, making selections from this List, can have any article forwarded on receipt of order and remittance, which latter should be made, either by Post Office Order payable at the General Post Office, or Cheque crossed London & County Bank, or Banker's Draft, obtainable at any respectable banking house abroad, and payable in London; but goods cannot be sent unless the order for them is accompanied by a remittance for the amount, or a satisfactory reference in London. As we ordinarily keep in stock everything we List, customers can rely upon having their indents promptly filled.

### FACILITIES OF SUPPLY.

Our manufacturing premises, which comprise Nos. 9, 10, 11, 16, and 17, Fullwood's Rents, Holborn, the buildings occupying an area of about 6000 square feet, and four floors in height, give us 24,000 square feet of manufacturing space. These factories are probably the largest employed for the manufacture of photographic instruments in the world, and are completely fitted with the most approved machinery obtainable for doing our work, the machines being driven by steam power. Our staff of workmen—many of whom have been apprenticed with and trained by us—are unsurpassed, we believe we might truthfully say unequalled, in skill at their trade; while we ensure the quality of the wood we use, by keeping it ourselves the necessary time for seasoning, and only using what can be absolutely depended upon. We hold a stock of choice mahogany for Cameras of about 100,000 feet. We therefore can supply, as we have hitherto done, the very highest class of Instruments to be obtained, while our increased facilities will allow us to execute promptly orders to any extent.

### ADVANTAGES AND IMPROVEMENTS.

It should be noticed that we as far as possible carry out the system of fitting the parts of our Cameras to standard gauges, so that, in the event of loss or breakage of dark slides, fronts, &c., extra ones may be supplied without the necessity of sending the Camera to fit them. All our lenses also have the diaphragms cut and marked to the standard sizes of the Photographic Society of Great Britain, and also the flanges to the standards of the same Society, so that any lens or flange of a given diameter will interchange with any other of our own of the same size, or that of any other maker working to the standard sizes, and on the same principle any of our dark slides or fronts will fit any other Camera of the same size, and purchasers having two patterns of Cameras for similar size plates, may use their dark slides indifferently with either, or friends with similar Cameras, supplement their battery of slides or Lenses by borrowing of one another on occasions where necessity arises. The extreme convenience of this will be at once apparent to those who have wanted extra parts while in the provinces or abroad, and have been obliged to send their whole apparatus to the maker to have them fitted, being deprived of the use of the same meanwhile.

A Full Stock of our Optical and Photographic Instruments is also kept at

**78 SWANSTON STREET,  
MELBOURNE, AUSTRALIA,**

And Customers in Australia can thence have their wants promptly supplied,

# WATSON'S 'ACME' CAMERA.

NOTICE.—The salient features of these Cameras being protected by Patents, no other House can supply a similarly constructed Instrument.

**T**HIS pattern was introduced and patented by us in 1889, and met at once with very great approval, both from photographers and the photographic press; since then they have been continually growing in favour, and the demand for them has steadily increased almost month by month. We have introduced some slight modifications from the original, to make it more perfect even than it was, and we feel justified in confidently stating that it is at present the most highly esteemed Tourists' Camera before the public, a place which no effort will be wanting on our part, by care in its manufacture, to cause it to retain. That it is not unworthy this position may be gathered from the notices below, cut from the leading Photographic Press; from the fact that it has been exhibited at the leading Exhibitions in the world held since its introduction—at Paris, London, Glasgow, Calcutta, Amsterdam, Budapesth, &c.—and has each time received the first award from the judges; and the many hundreds of Testimonials received from users of the Instrument, for some of which see pages 105 to 109 of General Catalogue.

These Cameras may now be had with the principal metal fittings made in aluminium, making a saving of about one-fourth the total weight of the Instrument.

## →\* PRESS OPINIONS. \*←

### BRITISH JOURNAL OF PHOTOGRAPHY.

'It folds into a smaller compass, and is lighter and more portable than any pattern we have yet seen; the back, by a novel arrangement, may, when required for use with a wide-angle lens, be pushed forward close to the front, so that there is no protruding baseboard to interfere with the angle of the lens. The Portability of the Camera is remarkable.'

### AMATEUR PHOTOGRAPHER.

'A wonderfully compact and fairy-like instrument, exhibiting several new and important features, which are sure to make it a favourite with tourist photographers.'

### PHOTOGRAPHY.

'One of the greatest advances in Camera construction yet reached—something really good, away ahead of anything we have yet seen.'

### THE CAMERA.

In an article on the RICHMOND EXHIBITION, says:—

'Taking the novelties first, we must follow the example of the Judges, and give the premier place to Messrs. W. Watson & Sons' new Camera. It would be thought almost impossible to create anything new in the shape of a Camera, for inventors have been for years trying how they can construct one which should have every movement required by the modern photographer, and at the same time be as light as a feather and as rigid as one of the pyramids of the Pharaohs, and they have been most successful in their endeavours to accomplish this seemingly impossible thing. Yet Messrs. Watson have gone a step further, and have found out by various ingenious modifications how to make the weight still lighter and the rigid still more firm.'

### THE ENGLISH MECHANIC.

'For portability and compactness, combined with practical utility, this Camera may fairly be said to take the lead, and to be deserving of the title "Acme." The dark slides are fitted with patent stops and springs, little details which help to make this Camera as near perfection as probably can be reached.'

**W. WATSON & SONS, 313 HIGH HOLBORN, LONDON, W.C.**

# WATSON'S 'ACME' CAMERA.

## DESCRIPTION.

**T**HE principal points aimed at in the designing of this Camera were to produce an instrument—1st, that it should combine every modern improvement of practical utility; 2nd, that it should be as compact and portable as it possibly could be, commensurate with adequate strength and rigidity; 3rd, that it should be simple in its parts, so as to avoid both difficulties in use and liability to be easily put out of order.



CAMERA OPEN  
FOR USE.

### THE 'ACME' STRUT.

Made of Ash, with 2 hinged joints to attach between leg of Tripod and front of Camera and adjustable to focus, for use only when the Camera is fully extended or a very heavy Lens employed, to maintain perfect rigidity.

For Cameras up to 10x8 7s. 6d., 12x10 and 15x12 10s. 6d., including fitting.

It has Rising and Falling Front, with very great Range in each direction.

It has Swinging Motion both to the Back and Front. The back may be swung in both horizontal and vertical directions; the front in a vertical plane—a great advantage, as, when photographing objects much above or below its own level, the Camera can be tilted up or down, and the front and back being placed vertical and parallel, there is no distortion. (See Fig. 3, next page.)

The Back Portion of the Camera is arranged to slide up close to the Front for use with Wide-angle Lenses (Fig. 2), so there is no projecting baseboard to cut off the angle of view when a very wide-angle lens is used.

The Camera has Double Extension for Focussing, so is useful for Longest Focus Lenses. The front is moved by rackwork adjustment, the back by sliding in grooves, being held in position by clamping screws. The extreme range of focus in the various sizes is marked against each in the list.

### LIGHTNESS AND COMPACTNESS.

The solid material of which the Camera is made has been lightened in every way in which it could be done consistently with retaining necessary strength and rigidity, and while this Camera has not the absolute solidity of the heavy Premier pattern, a portion of which is a necessary concomitant of its weight, it is perfectly strong, fit for hard work and very rigid when set up; in fact, of astonishing rigidity, approaching that of solid body Cameras, and being very different to the light-pattern Cameras usually sold, while its extreme lightness will commend it to every tourist to whom saving of bulk and weight of baggage is of consequence. Especially is the saving manifest in the large sizes. While being important in  $\frac{1}{2}$  and  $\frac{1}{3}$  Cameras, it becomes marvellous in

**W. WATSON & SONS, 313 HIGH HOLBORN, LONDON, W.C.**

THE BRITISH JOI

reducing them to from about one-third to one-half the  
 12 by 10 and 15 by 12. In fact, compactness has been so studied, that, when  
 bulk of ordinary Camera is made up only of the combined substance of  
 Front, and Focus-glass, pressed closely together, beyond  
 Baseboard, Bellow go.  
 which it is impossit



FIG. 1

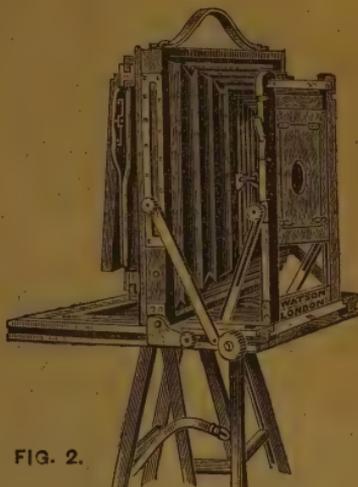


FIG. 2.

The back of the Camera is made with our usual Reversing Frame, so that horizontal or vertical pictures may be taken without altering the position of the Camera.

The base of the Camera may either be panelled in the usual manner with a screw socket in its centre to be fitted to a separate tripod and held by a T screw, or it may have in the base a turntable of a new and exceedingly light and firm design, with a suitable triple folding stand, for extra price of which see price list. The turntable is entirely of brass, perfectly strong, yet so light as to add practically nothing more than the weight of the wood it replaces to the Camera.

*These Cameras are now also supplied with all the Metal Work of Aluminium.  
 For extra cost see page 1043.*

◆◆◆◆◆  
 ✽ PRICE LIST. ✽

Included with each Camera are three double Dark Slides. If less or more are required, the cost of separate Slides may be deducted or added.

Nos.	Sizes in inches.	Prices.		Extra for Turntable in base and 3-fold stand.	Extra if all Brass Bound.	Range of Focus in inches.	Best solid Leather Travelling Cases.
		£	s. d.				
2001	6½ × 4½	9	12 0	2 2 0	1 10 0	16	£ 1 15 0
2002	7½ × 5	10	0 0	2 2 0	1 10 0	17	1 15 0
2003	8½ × 6½	12	5 0	2 2 0	1 15 0	19	2 2 0
2004	10 × 8	14	0 0	2 10 0	2 0 0	22	2 10 0
2005	12 × 10	16	12 6	2 15 0	2 10 0	27	3 0 0
2006	15 × 12	21	0 0	3 3 0	3 0 0	33	3 15 0

Prices are subject to 10 per cent Discount for Cash with Order.

For complete Outfits with 'Acme' Cameras see next page.

**W. WATSON & SONS, 313 HIGH HOLBORN, LONDON, W.C.**

# COMPLETE 'ACME' OPTICAL FITTINGS.

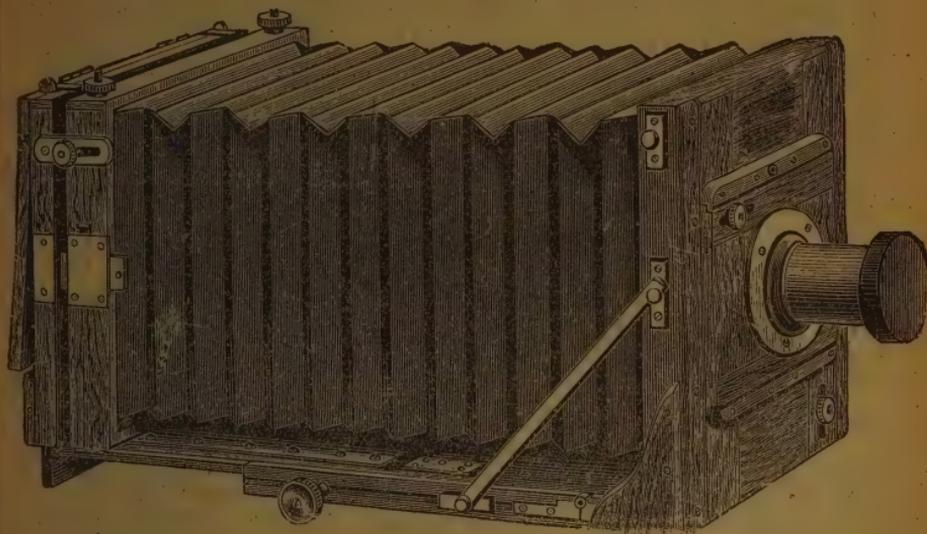
Any item not required may be left out of the Set, and its Cost reduced, or any parts changed to suit the Purchaser.

Nos. .... SIZES ...	CONTINENTAL SIZES IN CENTIMETRES.										
	2011	2012	2013	2014	2015	2016	2028	2029	2030	2031	2032
	6½ × 4½	7½ × 5	8½ × 6½	10 × 8	12 × 10	15 × 12	18 × 13	21 × 15	24 × 18	27 × 21	30 × 24
'Acme' Camera & 3 Double Slides Rapid Rectilinear Lens, with Iris Diaphragm ... Solid Leather Travelling-case, with Spring Lock ... Rotating Turntable in base, & Tripod Stand ... Instantaneous Shutter	£ s. d. 9 12 0	£ s. d. 10 0 0	£ s. d. 12 5 0	£ s. d. 14 0 0	£ s. d. 16 12 6	£ s. d. 21 0 0	£ s. d. 25 0 0	£ s. d. 30 0 0	£ s. d. 35 0 0	£ s. d. 40 0 0	£ s. d. 45 0 0
Extra, if Camera and Slides are brass bound ... Completely fitted Chemical Chests, with 2 doz. Dry Plates and all accessories, as list, page 45 of Catalogue ...	£ s. d. 18 9 6	£ s. d. 19 7 6	£ s. d. 22 12 6	£ s. d. 27 2 6	£ s. d. 32 15 0	£ s. d. 41 0 0	£ s. d. 49 7 6	£ s. d. 58 12 6	£ s. d. 67 2 6	£ s. d. 76 17 6	£ s. d. 85 15 0
Eastman Roll Holders for Films ... Fitting same	£ s. d. 26 4 0	£ s. d. 27 2 6	£ s. d. 31 17 6	£ s. d. 38 2 6	£ s. d. 46 15 0	£ s. d. 57 10 6	£ s. d. 67 2 6	£ s. d. 78 17 6	£ s. d. 89 2 6	£ s. d. 100 17 6	£ s. d. 111 15 0
	£ s. d. 2 17 6	£ s. d. 3 0 0	£ s. d. 3 15 0	£ s. d. 4 10 0	£ s. d. 5 0 0	£ s. d. 6 0 0	£ s. d. 7 0 0	£ s. d. 8 0 0	£ s. d. 9 0 0	£ s. d. 10 0 0	£ s. d. 11 0 0
	£ s. d. 29 8 0	£ s. d. 30 8 6	£ s. d. 35 18 6	£ s. d. 43 0 6			£ s. d. 30 18 6	£ s. d. 35 8 6	£ s. d. 42 3 6	£ s. d. 50 0 0	£ s. d. 60 0 0

These Cameras may also be had with the metal fittings of Aluminium instead of brass, which considerably reduces their weight. For extra cost see page 1043. Any Lens may be furnished with a Certificate from Kew Observatory as to its absolute perfection at the cost of 10/- extra.

For Prices of extra Dark Slides and Inner Frames see page 1057

# Watson & Sons' PREMIER CAMERAS



Made with interchangeable parts, so that the dark slides, fronts, and screw nuts, made for one Camera will fit any other for the same size Plates, and duplicates can at any time be obtained without the necessity of sending the Camera to be fitted. All the sizes up to and including  $10 \times 8$  are fitted with **WIDE FRONT** and **MOVEABLE CENTRAL PARTITION**, so that they are available for Stereoscopic work. Larger sizes may also be so fitted if desired. They may also be fitted with a repeating back interchangeable with the reversing frame and exactly similar to that supplied with the Universal Studio Camera to take 2 pictures on one page. For extra cost see next page. These Cameras are of the

**VERY HIGHEST QUALITY AND WORKMANSHIP.**

This pattern was originally introduced by us in 1883, and, despite the numerous other forms that have appeared since in the market, they still hold their position, and command a large sale, no pattern having been designed to excel them for strength, durability, and convenience to use.

*[For full description and prices see next page.]*

**W. WATSON & SONS, 313 HIGH HOLBORN, LONDON, W.C.**

**WATSON'S 'PREMIER' CAMERAS** have Double Extension to Focus, giving very long range, Double Swinging-Back, Rising and Falling Front, and all sizes up to 10 x 8 have Moveable Central Partitions and Sliding Fronts to use for Stereo-work, or two pictures on a plate with either one or a pair of Lenses. The Dark Slides, Fronts, Clamping Screws, and Nuts made to standard gauges, so as to be interchangeable in the various sizes, while extra ones can at any time be supplied without the necessity of sending a Camera to fit them. This model is probably the most practically useful all-round Camera ever designed, and the demand for them has increased steadily since their introduction in 1883. Made only in the very highest quality and workmanship.

	Continental Sizes in Centimetres.											
	2049 6½ by 4½	2050 7¼ by 5	2051 8½ by 6½	2052 10 by 8	2053 12 by 10	2054 15 by 13	2055 18 by 16	21 by 16	24 by 18	27 by 21	24 by 20	33 by 27
Cameras and 3 double slides ... ..	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Rapid Rectilinear with Iris diaphragm ...	9 12 0	10 0 0	12 5 0	14 0 0	16 12 0	21 0 0	31 10 0	10 0	12 5 0	15 0 0	16 12 0	18 0 0
Solid Leather Travelling Case, with spring lock	4 0 0	4 10 0	5 0 0	6 15 0	8 15 0	11 10 0	16 0 0	4 10 0	5 0 0	6 15 0	8 15 0	11 10 0
Folding Tripod Stand ...	1 15 0	1 15 0	2 2 0	2 15 0	2 4 0	3 4 0	3 8 0	1 15 0	2 2 0	2 15 0	3 3 0	4 0 0
Instantaneous Shutter, with pneumatic release	1 5 0	1 5 0	1 10 0	1 10 0	2 2 0	2 2 0	3 3 0	1 5 0	1 10 0	1 10 0	2 2 0	2 2 0
Extra, if Camera and Slides are brass bound for India	1 0 6	1 0 6	1 3 6	1 7 6	1 12 6	1 12 6	2 2 6	1 0 6	1 3 6	1 7 6	1 12 6	1 12 6
Extra for adding repeating back for portraiture, to take 2 pictures on one plate, as with a Universal Studio Camera...	17 12	6 18 10	6 22 0	6 26 7	6 33 6	6 43 7	6 61 10	18 10	6 22 0	6 26 7	6 33 6	6 38 14
Single Slides fitted for Repeating Back...	1 10 0	1 10 0	1 15 0	2 0 0	2 10 0	3 0 0	4 0 0	1 10 0	1 15 0	2 0 0	2 5 0	2 10 0
	2 0 0	2 0 0	2 10 0	3 3 0	3 10 0	4 0 0	5 0 0	2 0 0	2 10 0	3 3 0	3 10 0	4 0 0
	1 0 0	1 0 0	1 2 0	1 8 0	1 12 6	2 5 0	3 5 0					

Any item in above estimates may be purchased alone; or left out from the set if desired and cost deducted. The prices are subject to 10 per cent Discount for Cash with order.

For Slides to Repeating Back, see various sizes in List, page 1057; or if this addition is made at time of purchasing Camera, one of the slides (single or double) supplied, may be fitted free of cost to use both in this and the ordinary frame.

For prices of 'Premier' Portrait Lenses, see page 1052. For extra Dark-Slides or Inner Frames, see page 1057. For Aluminium Mounts, see page 1043.

**W. WATSON & SONS, 313 HIGH HOLBORN, LONDON, W.C.**

## PREMIER CAMERAS

In Quarter-Plate and 5×4 sizes are made to Special Patterns at the following rates:—

2098.	Quarter-Plate Light Premier Cameras, with conical bellows, double extension to focus, rackwork adjustment, swinging back,								
	three double dark slides	...	...	...	...	...	...	...	£7 15 0
099.	5×4 ditto ditto ditto	...	...	...	...	...	...	...	8 10 0
	Brass binding either of the above, extra	...	...	...	...	...	...	...	1 10 0

## SPECIAL NOTICE. ALUMINIUM.

**T**HE fittings of Cameras usually supplied in Brasswork may now, if desired, be made in Aluminium, which makes a considerable reduction in the weight of the Apparatus, the Aluminium being about only one-fourth the weight of Brass. The metal used is alloyed to make it exceedingly tough and strong, it has the appearance of silver, but keeps its colour, and is not liable to tarnish.

### PRICE LIST OF EXTRA COST FOR ALUMINIUM MOUNTS.

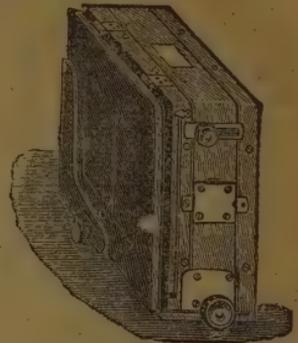
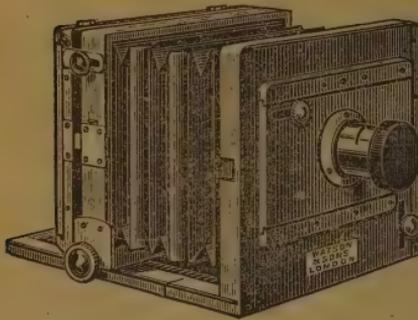
SIZES.		PREMIER CAMERAS, With full Aluminium Fittings. Extra.	'ACME' CAMERAS.	
			Replacing Brass Turntable and Ring by Aluminium.	With full Aluminium Fittings of Turntable, Milled Heads, Side Struts, Hinges, &c.
English.	Continental.			
6½ × 4¾ in.	centimetres.	£3 0 0	£0 15 0	£3 0 0
7½ × 5	18 × 13	3 0 0	0 15 0	3 0 0
8½ × 6½	21 × 16	3 10 0	1 0 0	3 10 0
10 × 8	24 × 18	4 0 0	1 5 0	4 0 0
12 × 10	30 × 24	5 0 0	1 10 0	5 0 0
15 × 12	33 × 27	6 0 0	1 15 0	6 0 0

The above prices are subject to 10 per cent. Cash Discount.

**W. WATSON & SONS, 313 HIGH HOLBORN, LONDON, W.C.**

# \* WATSON'S \* LIGHT PORTABLE TOURISTS' CAMERAS.

*Exceedingly Strong. Very Reliable Instrument for Travellers.*



Made with double-action fronts, and moveable central partitions, useful either for single pictures or stereoscopic, have rackwork for focussing, are adapted to use on the side for upright pictures, have no loose fastenings, have leather bellows, hinged focussing glass, and folding base board, are of the finest workmanship, with the principal parts interchangeable in the various sizes, and as *light* and *compact* as possible, each complete with three double dark slides and two fronts.

		Price, with Swing Back.	Brass Binding, Camera & Slides.	Black Travelling Case with lock & key.
2075	For Plates 6½ by 4½ ...	£7 0 0	... £1 5 0	... £1 1 0
2076	" " 7½ " 5 ...	7 5 0	... 1 5 0	... 1 2 6
2077	" " 8½ " 6½ ...	8 15 0	... 1 12 0	... 1 10 0
2078	" " 18 " 13 c/m. ...	7 5 0	... 1 5 0	... 1 2 6

## COMPLETE SETS WITH ABOVE CAMERAS.

	Sizes.	6½ × 4½	7½ × 5	8½ × 6½	18 × 13 c/m.
Camera and 3 Double Slides ...		£7 0 0	£7 5 0	£8 15 0	£7 5 0
Rapid Rectilinear Lens with Iris Diaphragm ...		4 0 0	4 10 0	5 0 0	4 10 0
Folding Tripod ...		1 1 0	1 1 0	1 5 0	1 1 0
Solid Leather Travelling Case, with Lock and Key ...		1 10 0	1 10 0	2 2 0	1 10 0
		£13 11 0	£14 6 0	£17 2 0	£14 6 0
If Brass-bound for India, add ...		1 5 0	1 5 0	1 12 0	1 5 0

## SPECIAL STEREOSCOPIC CAMERA.

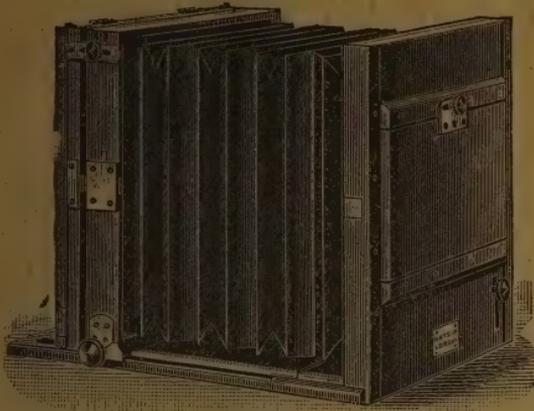
*Similar in pattern to the above illustration.*

		£	s.	d.
2091	For Plates 6½ by 3½, with double action front (2 fronts), moveable central partition, rackwork focussing adjustment, leather bellows body, hinged focussing glass, folding base board, and 3 double dark slides, of the finest quality and workmanship ...	6	10	0
2092	Similar Camera to above, but with swinging back ...	7	0	0
	Extra double slides, 6½ by 3½ ... each	1	0	0

*The above Prices are subject to 10 per cent. Discount for Cash with Order.*

**W. WATSON & SONS, 313 HIGH HOLBORN, LONDON, W.C.**

# Watson & Sons' 'Popular Cameras.'



OPEN.



CLOSED.

THE Cameras have leather bellows body, folding baseboard, rackwork focussing adjustment, swinging back, three double dark slides, and double action front, and are exceedingly light and compact. They are made in two kinds—'A,' horizontal, adapted to use on its side for upright pictures; and 'B,' square, with reversing frame at back, to take either horizontal or vertical pictures without moving the Camera.

They are exceedingly full value for their cost, and are very strong, serviceable instruments, that can be thoroughly recommended to stand hard use; the 'B' form is an especially convenient Camera.

Nos.	SIZES.	PRICES.					
		A			B		
		£	s.	d.	£	s.	d.
2105	4½ × 3¼	4	10	0	5	0	0
2106	5 × 4	4	15	0	5	5	0
2107	6½ × 4½	5	15	0	6	15	0
2108	8½ × 6½	7	10	0	8	10	0

The larger sizes may be fitted with extra front, and movable central partition for stereoscopic work at the following extra cost:—  
 0 10 6  
 0 10 6

*For complete Sets fitted with Popular Cameras see next page.*

**NOTE**—The above prices are subject to 10 per cent. Discount for Cash with order.

**W. WATSON & SONS, 313 HIGH HOLBORN, LONDON, W.C.**

# WATSON & SONS' 'Popular' (Complete) SETS PHOTOGRAPHIC APPARATUS.

## Price List 'A.'

Nos. ... .. Sizes... ..	2121 4½×3½	2122 5×4	2123 6½×4½	2124 8½×
	£ s. d.	£ s. d.	£ s. d.	£ d.
Popular Camera 'A,' with 3 double slides ... ..	4 10 0	4 15 0	5 15 0	7 10 0
Landscape Lens, with rotating diaphragms ... ..	1 15 0	1 15 0	2 10 0	3 0 0
Black Travelling Case ... ..	0 10 6	0 10 6	0 15 0	0 18 6
Folding Tripod Stand ... ..	0 12 6	0 16 0	1 1 0	1 1 0
	7 8 0	7 16 6	10 1 0	12 9 6
<i>Accessory Apparatus to complete above</i> —consisting of 1 doz. dry plates, 2 developing dishes, 1 bottle developing solution, dark-room lantern, 1 measure, 1 printing frame, 1 deep porcelain dish, 3 sheets sensitive paper (cut to size), supply of hyposoda, bottle toning solution ... ..	1 0 0 0 9 6	1 1 0 0 10 6	1 5 0 0 13 0	1 11 6 0 15 0
Partitioned Box for accessories ... ..	0 9 6	0 10 6	0 13 0	0 15 0
	8 17 6	9 8 0	11 19 0	14 16 0

## Price List 'B.'

Nos. ... .. Sizes... ..	2126 4½×3½	2127 5×4	2128 6½×4½	2129 8½×6½
	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Popular Camera 'B,' and 3 double slides ... ..	5 0 0	5 5 0	6 15 0	8 10 0
Rectilinear Lens, with Waterhouse diaphragms ... ..	2 10 0	2 15 0	3 10 0	4 10 0
Black Travelling Case, with lock and key ... ..	0 15 0	0 16 0	1 1 0	1 5 0
Sliding Leg Tripod Stand ... ..	0 17 6	0 17 6	1 1 0	1 5 0
Instantaneous Drop Shutter ... ..	0 12 6	0 12 6	0 12 6	0 15 0
	9 15 0	10 6 0	12 19 6	16 5 0
<i>Accessory Apparatus to complete above as per list above</i> ... ..	1 0 0	1 1 0	1 5 0	1 11 6
Partitioned Box for accessories ... ..	0 9 6	0 10 6	0 13 0	0 15 0
	11 4 6	11 17 6	14 17 6	18 11 6

The above Prices are subject to 10 per cent. Discount for Cash with Order. The Lenses may have Iris Diaphragms at their extra cost, see page 1054, or any addition or deduction may be made to the sets if desired.

**W. WATSON & SONS, 313 HIGH HOLBORN, LONDON, W.C.**

# WATSON'S UNIVERSAL STUDIO CAMERA

Of Spanish Mahogany,  
Leather Bellows  
Body.

Very Strongest and  
Best Workmanship.

Will do all the work in a  
Studio, and  
if properly used  
last a  
lifetime.



**THIS CAMERA** is perhaps the most useful Studio Camera extant. It has bellows body, extending in front by sliding and at back by endless screw, so that it has sufficient range to allow of its being used for the longest or shortest focus lens, and it may be used also for copying. It has swinging back, and takes the size plates quoted either way, horizontal or vertical. The ground-glass frame may either be hinged (as illustrated) or slide along when the dark slide is put in position.

With one of these Cameras alone all the work of an ordinary studio may be done, and with much greater convenience than where two or three different Cameras are employed, the trouble of changing one size Camera for another being avoided.

- |      |  |         |
|------|--|---------|
| 2161 | For Plates $6\frac{1}{2} \times 4\frac{3}{4}$ . May be used for either two Cartes de-Visite on one Plate, $6\frac{1}{2} \times 4\frac{3}{4}$ , or one single Picture on any size up to and including $6\frac{1}{2} \times 4\frac{3}{4}$ , focus from $4\frac{1}{2}$ in. to 18 in. ... ..                                     | £6 0 0  |
| 2162 | For Plates $8\frac{1}{2} \times 6\frac{1}{2}$ . Will take two Cabinets on $8\frac{1}{2} \times 6\frac{1}{2}$ , and two Cartes-de-Visite on $6\frac{1}{2} \times 4\frac{3}{4}$ , or one Picture on any size up to and including $8\frac{1}{2} \times 6\frac{1}{2}$ , length of focus from $5\frac{1}{2}$ in. to 22 in. ... .. | 7 7 0   |
| 2163 | For Plates $9 \times 7$ . For either two Cabinets or two Cartes-de-Visite, with Carriers $8\frac{1}{2} \times 6\frac{1}{2}$ , and $6\frac{1}{2} \times 4\frac{3}{4}$ , focus from $5\frac{1}{2}$ in. to 22 in. ... ..  | 7 17 6  |
| 2164 | For Plates $10 \times 8$ . For two Boudoir Portraits, two Cabinets, or two Cartes-de-Visite, with Carriers for $8\frac{1}{2} \times 6\frac{1}{2}$ , and $6\frac{1}{2} \times 4\frac{3}{4}$ , focus from 6 in. to 24 in. ... ..   | 8 17 6  |
| 2165 | For Plates $12 \times 10$ . With Carriers $10 \times 8$ , and $8\frac{1}{2} \times 6\frac{1}{2}$ ... ..  | 10 15 0 |
| 2166 | For Plates $15 \times 12$ . With Carriers $12 \times 10$ and $10 \times 8$ ... ..  | 15 15 0 |

These Cameras may be supplied, if required, having double swinging back instead of vertical swing only. Cost would then be extra for 2161, 2162, £1; 2163, 2164, £1 5s.; 2165, £1 15s.; 2166, £2.

*The focussing arrangement may be by rack and pinion instead of endless screw, if preferred, at same prices.*

Included with each Camera is one single slide and one inner frame, but double slides may be substituted, if preferred, at the difference in cost. For prices, see page 1057.

Note.—The above Prices are subject to 10 per cent Discount for Cash with Order.

**W. WATSON & SONS, 313 HIGH HOLBORN, LONDON, W.C.**

# COMPLETE STUDIO OUTFITS FOR PORTRAITURE.

The following are as usually supplied to Professional Photographers, No. 2172 being the most in demand, and probably the most useful apparatus obtainable to meet the ordinary requirements of C.-D.-V., Cabinet, and † Work.

2171	‡-plate Universal Studio Camera ... ..	£6 0 0
	Standard Portrait Lens, 8in., for C.-D.-V. or Cabinets ... ..	7 15 0
	Studio Stand, No. 2363 ... ..	3 10 0
	Pneumatic Studio Shutter fitted inside Camera ... ..	1 17 0
		<b>£19 2 0</b>
2172	8½in. by 6½in. Universal Studio Camera ... ..	7 7 0
	Standard Portrait Lens, 6in. for C.-D.-V.'s ... ..	5 5 0
	Standard Portrait Lens, 10in., Cabinets and † ... ..	10 10 0
	Studio Stand, No. 2363 ... ..	3 10 0
	Pneumatic Studio Shutter fitted inside Camera ... ..	1 17 0
		<b>£28 9 0</b>
2173	10in. by 8in. Universal Studio Camera ... ..	8 17 6
	Standard Portrait Lens, 8in. for C.-D.-V.'s and Cabinets ... ..	7 15 0
	Premier Rectilinear Lens for † and 10in. by 8in. Portraits with Iris Diaphragm ... ..	12 0 0
	Studio Stand, No. 2366 ... ..	5 15 0
	Pneumatic Studio Shutter fitted inside Camera ... ..	1 17 0
		<b>£36 4 6</b>
2174	12in. by 10in., Universal Studio Camera ... ..	10 15 0
	Standard Portrait Lens, 8in. for C.-D.-V.'s and Cabinets ... ..	7 15 0
	Premier Rectilinear Lens for Portraits up to 12in. by 10in....	16 10 0
	Studio Stand, No. 2371 ... ..	7 15 0
	Pneumatic Studio Shutter fitted inside Camera ... ..	1 17 0
		<b>£44 12 0</b>
2175	15in. by 12in. Special Studio Camera with Roller Shutter to 15in. by 12in. Slide, moveable repeating back, &c. ... ..	27 10 0
	Standard Portrait Lens, 8in. for C.-D.-V.'s and Cabinets ... ..	7 15 0
	Premier Rectilinear Lens for Portraits up to 15in. by 12in. ... ..	25 0 0
	Studio Stand, No. 2369 ... ..	12 10 0
	Pneumatic Studio Shutter fitted inside Camera ... ..	1 17 0
		<b>£74 12 0</b>

NOTE.—The above Prices are subject to 10 per cent. Discount for Cash with Order.



THE  
'VANNECK'  
HAND CAMERA.

MADE in two sizes, the one to hold 12 glass plates  $4\frac{1}{2} \times 3\frac{1}{4}$  in., and the other to hold either a magazine containing 12 glass plates  $3\frac{1}{2} \times 3\frac{1}{4}$  ins., or a roll-holder for films of the same size.

The View Finder is in the middle of the top of the box, and shows the same picture as is being taken on the sensitive plate, less the margin of the plate. The objects are shown the exact size they are photographed. The one lens is used for both finder and plate, and is so arranged that when the image is *seen* sharply it is necessarily in focus on the plate. To use this finder, a milled head is fitted under the box, which moves the lens to and fro to focus, and, as the operator looks into his finder to see what he is taking, he can, by a turn of this screw, immediately set any object seen, near or distant, into perfectly sharp focus. There is also provided a scale of distances, so that the Camera may be set in focus without using the ground glass.

The shutter will give either instantaneous or timed exposures.

The sensitive plates are contained in a reservoir at the back of the box; this is provided with 12 metal sheaths to hold them, and the changing is done by means of a T nut outside. This is turned round, and actuates a lever which raises the plate into a flexible bag at the top of the reservoir; it may then be lifted by the fingers inside the bag and removed from the back of the reservoir to the front. Either glass plates or celluloid films may be used. The Camera is fitted with a socket to attach to an ordinary Tripod when required.

→\* PRICE LIST. \*←

	£	s.	d.
$4\frac{1}{2} \times 3\frac{1}{4}$ in. Camera, with Special Rapid Rectilinear Lens, and Sheaths to hold 12 Dry plates ... ..	10	10	0
$3\frac{1}{2} \times 3\frac{1}{4}$ in. Camera, with do. do. ... ..	9	10	0
$3\frac{1}{2} \times 3\frac{1}{4}$ in. ditto, with Roll Holder only ... ..	10	0	0
Outer Travelling Case of Solid Leather (with sling) for hard service or use abroad, to fit $4\frac{1}{2} \times 3\frac{1}{4}$ in. ... ..	1	2	6
Do. do. do. $3\frac{1}{2} \times 3\frac{1}{4}$ in. ... ..	1	0	0
Special Dry Plates, thickly coated and very rapid—either $3\frac{1}{2} \times 3\frac{1}{4}$ or $4\frac{1}{2} \times 3\frac{1}{4}$ in., per packet of 3 dozen ... ..	0	4	6

Prices are subject to 10 per cent Discount for Cash with Order.

W. WATSON & SONS, 313, High Holborn, London, W.C.

# THE GENIE HAND CAMERA.



A small and compact Magazine Camera manufactured by the Genie Camera Company, Philadelphia, United States, America. Made in  $\frac{1}{2}$ -plate size only and possessing the following advantages:—

The Magazine is exceedingly small and compact, measuring outside when closed only  $4\frac{1}{2}$  by 4 by  $1\frac{1}{2}$  inches, and weighing empty 12 oz.; this will carry either 12 plate sheaths or 24 film holders, and contains in itself the arrangement for changing the plates, which is done as follows:—The Magazine is double, one part is drawn out from the other and carries with it all but one of the holders, which then drops to the bottom of the fixed part, and on replacing the drawer, this carrier takes its place below the others—the change is therefore done only by the weight of the carrier, and is so simple an arrangement that it is almost impossible for it to get deranged. The Magazines are made entirely of sheet brass, so are unaffected by atmospheric influences, and are fitted to standard gauges so as to be interchangeable to any Camera. Any number of extra Magazines can be supplied with a Camera and the used one can be withdrawn and replaced in the open air with perfect security.

On account of the smallness of the Magazine the Camera is able to be very small, the outside dimensions are  $9\frac{1}{2}$  by  $5\frac{1}{4}$  by  $4\frac{1}{4}$  inches.

There are two Finders—one for horizontal and one for vertical pictures.

There is an automatic register of the number of the exposures made.

The Lens is WATSON'S 5in. focus Rapid Rectilinear working at  $f/8$ , and is fitted with diaphragms and an adjustable instantaneous shutter, working between the combinations, for quick or prolonged exposures, most efficient and reliable, and which does not uncover the Lens when set, but only when discharged; there is a rackwork focussing adjustment and a focus screen to use when required, but a Dial to set by, divided to 10, 20, 50 and 100 feet, is supplied to obviate the necessity of focussing under ordinary circumstances.

There are also two Sockets to attach to a Tripod when required.

The Camera is covered in black leather. Price £8 15s.

The Magazine included with the Camera may contain either 12 Plate Sheaths or 24 Film Carriers.

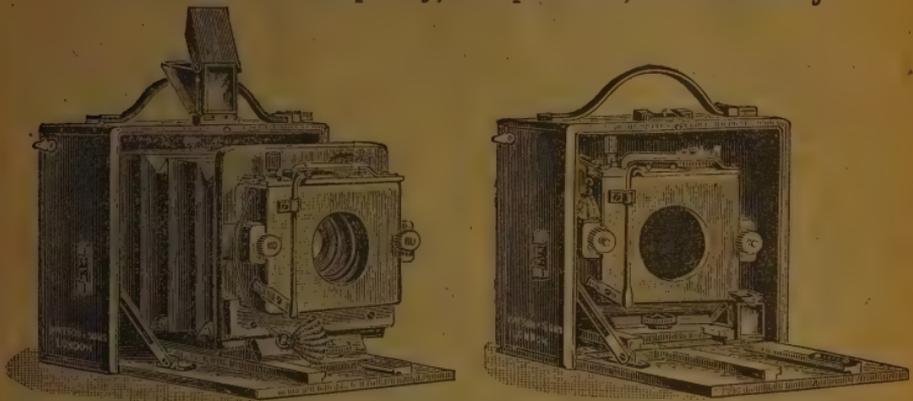
	For 24 Films.	For 12 Plates.
Extra Magazine, with Carriers	each 37/6	33/-
Extra Carriers	per doz. 7/6	7/6
Outer Leather Case, with Shoulder Strap	...	20/-
Umbrella Tripod	...	25/-
Cadett's Lightning Plates	per doz. 1/6	1/6
Fitch's Films, extra rapid	...	1/9

A Book of Instruction to use the Genie Camera is supplied with each Camera.

Prices of Camera, Magazines and Tripod are subject to 10 per cent. Discount for Cash with Order.

# WATSON'S ALPHA HAND CAMERAS.

The A. B. C. of Simplicity, Compactness, and Efficiency.



Made in box form, of sufficient size to contain, when closed, the Bellows, Front, Rapid Rectilinear Lens, Shutter, and Finder. The front of the box falls down to form a base, and is held rigid and horizontal by a strut, which is fixed by being pressed home into a notch at its upper end; to close the Camera, slightly lift the strut, and it will then fold in as the box is closed. The front of the Camera is extended along the base, and there is a scale with distances marked on it, by which the focus can be immediately set, but a ground glass screen is also supplied to use if desired. A socket is fixed in the side and base to attach to a Tripod. The Finder is so arranged that the view may be seen either by looking into or through it, according to the position in which the Camera is held; there are two fittings to receive it—for vertical and horizontal pictures. The shutter is a specially small Thornton-Pickard Time and Instantaneous, fitted with our mechanical discharger. The whole apparatus is of highest quality, workmanship, and finish, and is probably the smallest complete apparatus yet introduced. The Cameras may be supplied complete as above—or alone—or fitted to any suitable Lens, Dark Slides, and Shutter.

Made in Three Sizes ... .. 5x4 1/4-plate.  
 Prices of Cameras, without Slides ... **£1 10 0**    **£1 15 0**    **£2 10 0**  
 Outside Size of Boxes ... .. 5 1/4 x 3 x 5    6 x 3 1/2 x 5 1/2    7 1/4 x 3 1/2 x 6 1/2

## COMPLETE OUTFITS.

	Nos. Sizes	2131 1/4	2132 5x4	2133 1/4-plate.
		£ s. d.	£ s. d.	£ s. d.
Camera and 3 Double Slides ... ..		3 15 0	4 6 0	5 10
WATSON'S Rapid Rectilinear Lens, with Iris Diaphragm		2 17 6	3 2 6	4 0 0
Exposure Shutter ... ..		1 0 0	1 0 0	1 0 0
Finder ... ..		0 10 6	0 10 6	0 6 6
Travelling Case... ..		0 12 6	0 15 0	1 0 0
		<b>£8 15 0</b>	<b>£9 14 0</b>	<b>£12 6</b>

These Cameras may be fitted with the following extras:

	£ s. d.
Rising instead of Rigid Front ... ..	5
Double-action Front (Rising and Sliding) ... ..	10
Swinging Back ... ..	0 15
Simple Rackwork Adjustment, with vertical Pinion ... ..	0 15
Best Rackwork Adjustment, with horizontal Pinion, two Racks and Compound Baseboard, giving Logp Range Focus ... ..	1 10

NOTE.—The above Prices are subject to 10 per cent. Discount for Cash with Order.

# WATSON'S PHOTOGRAPHIC LENSES.

These are made throughout in our Holborn factory, and are of the most perfect workmanship and very highest efficiency, having the excellent qualities of crispness image and depth of focus combined in a eminent degree, according to their various forms; while our system of inspection, and the constant care exercised in supervising the manufacture, ensures that the very high standard of excellence we aim at is regularly maintained. Each individual Lens is also, when it leaves the workshop, carefully tested before being passed as ready for sale, and the quality and efficiency of each one can, therefore, be implicitly relied on. We feel confident in stating that no manufacturer in the world produces more perfect instruments, and at very few establishments can they be equalled. Any Lens can, if desired, be sent to Kew Observatory for trial, and a certificate obtained of its absolute perfection, at a cost of 10s. We would also draw attention to the use of Aluminium for Lens Mounts, which makes an enormous difference in the weights, especially of the larger Lenses. The extra cost for mounts of this material will be found marked against each. The metal used is not pure Aluminium, but is alloyed with a metal which, while not practically affecting its lightness, makes it exceedingly tough, and strong enough to stand the wear and tear of general Lens use, which pure Aluminium fails to do satisfactorily.

## WATSON'S RAPID RECTILINEAR LENSES.

Emphatically the most generally useful, as they are the most popular, Lenses made. For Groups, Views, and all kinds of Outdoor Photography.

In Rigid Mounts.					With case of Waterhouse Diaphragms	If with Iris Diaphragm instead of Waterhouse stops.	Aluminium Mounts, with Iris Diaphragm.
Nos.	Sizes of Plates.		Dia- meter.	Equiv. Focus.	Prices.	Prices.	Prices.
	English In.	Centims.					
2201	4½ by 3½	...	1 ¾ in.	5 in.	£2 5 0	£2 12 6	£3 12 6
2202	5 " 4	12 by 9	1 " "	6 " "	2 10 0	2 17 6	4 0 0
2203	6½ " 4½	16 " 12½	1½ " "	8 " "	3 10 0	4 0 0	5 5 0
2204	8 " 5	18 " 13	1¾ " "	8½ " "	4 0 0	4 10 0	5 15 0
2205	8½ " 6½	21 " 15	1½ " "	11 " "	4 10 0	5 0 0	7 0 0
2206	10 " 8	24 " 18	2 " "	13½ " "	6 0 0	6 15 0	8 10 0
2207	12 " 10	30 " 24	2½ " "	16 " "	8 0 0	8 15 0	11 0 0
2208	15 " 12	33 " 27	2½ " "	20 " "	10 10 0	11 10 0	15 0 0
2209	18 " 16	40 " 30	3 " "	24 " "	15 0 0	16 0 0	22 10 0
2210	22 " 20	...	3½ " "	30 " "	22 0 0	23 10 0	31 10 0

Nos. 2201 and 2202 may be had accurately paired for Stereoscopic Work.

Mr. Debenham's (of Ryde) magnificent Picture of the Prince of Wales' yacht 'Britannia' racing at fullest speed, was taken with Watson's 18x16 Rapid Rectilinear Lens, in July 1893.

## WATSON'S PREMIER LENSES.

Suitable for Portraits and Groups in the Studio, or Rapid Outdoor Work, Moving Objects, &c. Exceedingly rapid, with great depth of focus, and very flat field.

Working aperture,  $\frac{F}{5.6}$ .

IN RIGID MOUNTS, WITH IRIS DIAPHRAGMS.

Nos.	Sizes of Plates.		Diameter.	Equiv. Focus.	Mounted in Brass.	Aluminium.
	English Ins.	Centimetres.			Prices.	Prices.
2215	6½ by 4½	13 by 13	1 ½ in.	8 in.	£7 0 0	£9 0 0
2216	8½ " 6½	21 " 15	2¼ " "	11 " "	9 0 0	11 0 0
2217	10 " 8	24 " 18	2½ " "	13 " "	12 0 0	15 0 0
2218	12 " 10	30 " 24	3 " "	16 " "	16 10 0	22 0 0
2219	15 " 12	40 " 30	3½ " "	20 " "	25 0 0	31 10 0

Larger Sizes to order.

NOTE.—The above Prices are subject to 10 per cent. Discount for Cash with Order.

W. WATSON & SONS, 313 HIGH HOLBORN, LONDON.

## WATSON'S PORTABLE RECTILINEAR LENSES.

or Landscape, Architecture, and copying, giving Wide or Medium Angle according to the stop used.

Nos.	Size of Plates.		Equivalent Focus.	Prices with Iris Diaphragm.
	English inches.	Centimetres.		
221	5 × 4	127 × 102	5 inches,	£3 10 0
2222	6½ × 4½	165 × 114	6 "	4 0 0
2223	8 × 5	13 × 18	7 "	5 0 0
2224	8½ × 6½	21 × 15	8 "	6 0 0
2225	10 × 8	24 × 18	10 "	7 0 0
2226	12 × 10	30 × 24	12 "	8 10 0

All the above Lenses have their Mounts alike, and fit into the same size flange, 1½ in. diam.

## Watson's Wide-Angle Rectilinear Lenses.

For Interiors and use in Confined Situations.

	Sizes.	Equivalent Focus.	With Rotating Stops.	With Iris Diaphragm.	Aluminium Mounts with Iris Diaphragm.
2231	5 × 4	3 in.	£2 10 0	£2 17 6	£3 17 6
2232	6½ " 4½	4 "	3 0 0	3 7 6	4 10 0
2233	8½ " 6½	5½ "	4 0 0	4 10 0	5 15 0
2234	10 " 8	6½ "	5 0 0	5 10 0	7 0 0
2235	12 " 10	8½ "	6 0 0	6 10 0	8 0 0
2236	15 " 12	12 "	7 10 0	8 0 0	10 10 0
2237	18 " 16	15 "	9 0 0	9 10 0	12 10 0

No. 2231 may be had accurately paired for Stereoscopic work.

## Watson's Wide-Angle Single Landscape Lenses.

Yield exceedingly Brilliant Pictures. For Pure Landscape unsurpassed.

	Sizes.	Focus.	Rotating Stops.	Iris Diaphragms.
2241	5 × 4	6 in.	£1 15 0	£2 5 0
2242	6½ " 4½	7½ "	2 10 0	3 0 0
2243	8½ " 6½	9 "	3 0 0	3 10 0
2244	10 " 8	10 "	3 15 0	4 5 0
2245	12 " 10	12 "	4 10 0	5 5 0
2246	15 " 12	15 "	5 10 0	6 10 0

No. 2241 may be had accurately paired for Stereoscopic work.

## WATSON'S HAND CAMERA LENSES.

RAPID RECTILINEAR.

2250 6-inch focus, rigid mount, fixed stop *f*/11, each £2 5s.; per pair, £4 10s.

## FOCUSSING GLASSES.

2261.	Focussing Glasses, plain	... ..	each	£0 3 6
2262.	Ditto, ditto, with Adjustment and Clamping Screw	... ..	... ..	0 7 6
2263.	Ditto, ditto, best quality	... ..	... 8s. 6d. and	0 10 6
2264.	Ditto, ditto, to show the magnified image erect; recommended for Portraiture	... ..	... ..	0 15 0

W. WATSON & SONS, 313 HIGH HOLBORN, LONDON, W.C.

## PHOTOGRAPHIC LENSES by other Makers

Lenses by all the esteemed makers (English and Continental), Grubb, Ross, Dallmeyer, Zeiss, Wray, Taylor, &c., &c., are supplied at List Prices, generally with 10 per cent. Discount.

The following are selected as the most popular:—

### GRUBB'S RAPID APLANATIC DOUBLET LENSES.

For Groups and Views. Each Lens supplied with a set of Waterhouse Diaphragms.

Size of Plate.	Diameter of Lenses.	Focus.	Price, Rigid Mount	Size of Plate.	Diameter of Lenses.	Focus.	Price, Rigid Mount
4 $\frac{1}{4}$ by 3 $\frac{1}{4}$	3 in.	4 $\frac{1}{2}$ in.	£4 0 0	8 $\frac{1}{2}$ by 6 $\frac{1}{2}$	1 $\frac{1}{2}$ in.	11 in.	£6 10 0
5 " 4	3 $\frac{1}{4}$ "	6 "	4 5 0	10 " 8	1 $\frac{3}{4}$ "	13 "	8 10 0
6 $\frac{1}{4}$ " 4 $\frac{1}{2}$	1 $\frac{1}{2}$ "	7 $\frac{1}{4}$ "	5 5 0	12 " 10	2 "	16 "	10 10 0
8 " 5	1 $\frac{3}{8}$ "	8 $\frac{1}{2}$ "	5 15 0	15 " 12	2 $\frac{1}{2}$ "	20 "	14 10 0

### GRUBB'S SINGLE APLANATIC LENSES.

For pure Landscape unsurpassed. Mounted in rigid setting, with rotating stops.

Size of Plate.	Diameter of Lenses.	Focus.	Price.	Size of Plate.	Diameter of Lenses.	Focus.	Price.
Stereo.	1 $\frac{1}{2}$ in.	4 $\frac{1}{2}$ in.	£2 0 0	9 by 7	2 $\frac{1}{4}$ in.	10 in.	£4 10
5 by 4	1 $\frac{1}{4}$ "	5 $\frac{1}{2}$ "	2 10 0	10 " 8	2 $\frac{3}{8}$ "	12 "	5 10 0
6 $\frac{1}{2}$ " 4 $\frac{1}{2}$	1 $\frac{1}{2}$ "	7 "	3 0 0	12 " 10	2 $\frac{3}{4}$ "	15 "	7 0 0
8 " 5	2 "	8 "	3 10 0	15 " 12	3 $\frac{1}{2}$ "	18 "	8 10 0
8 $\frac{1}{2}$ " 6 $\frac{1}{2}$	2 "	9 "	4 0 0	18 " 16	4 "	21 "	10 10 0

### THE 'STANDARD' PORTRAIT LENSES.

As supplied with our Studio Outfits.

	Working aperture f/4. The most popular Lenses for Studio Portraiture.			PRICE.	
	Size of Plate.	Diameter.	Focus.	With Rack and Pinion & Water- house Stops.	Rigid Mount with Iris Diaphragm.
2281	C.D.V. 5 by 4	2 $\frac{1}{2}$ in.	6 in.	£4 15 0	£5 5 0
2282	Cabinet 6 $\frac{1}{2}$ " 4 $\frac{1}{2}$	2 $\frac{1}{2}$ "	8 "	7 0 0	7 15 0
2283	" 8 $\frac{1}{2}$ " 6 $\frac{1}{2}$	3 "	10 "	9 10 0	10 10 0

The above Prices are subject to 10 per cent Discount for Cash with Order.

## IRIS DIAPHRAGMS.

(May be fitted to any Lenses.)

ENTIRELY SUPERSEDING LOOSE STOPS, AS THEY AVOID RISK OF LOSING STOPS, OR FOGGING PLATES, THROUGH LIGHT ENTERING THE SLOT.

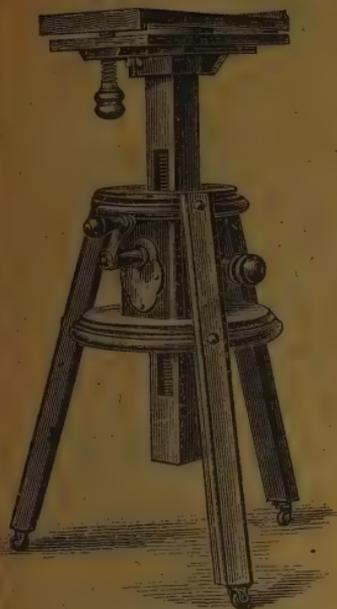
### PRICES (Net).

2271.	For Lenses up to $\frac{1}{2}$ -plate size, Rectilinear	... ..	£0 15 0
2272.	Ditto, ditto, 1/1 and 10x8 size, Rectilinear	... ..	1 0 0
2273.	Ditto, ditto, 12x10 size, Rectilinear	... ..	1 5 0
2274.	Ditto, ditto, 15x12 size, Rectilinear	... ..	1 10 0

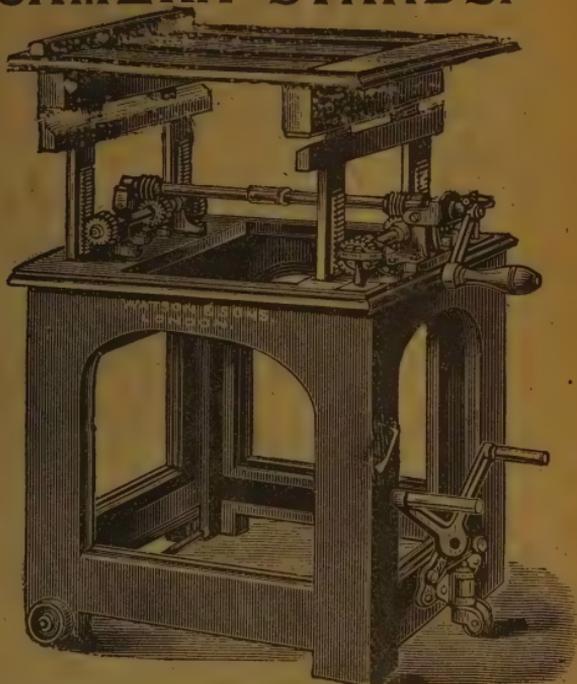
Lenses by any maker supplied at List prices, mostly with 10% discount for cash.

W. WATSON & SONS, 313 High Holborn, London, W.C.

# STUDIO CAMERA STANDS.



236

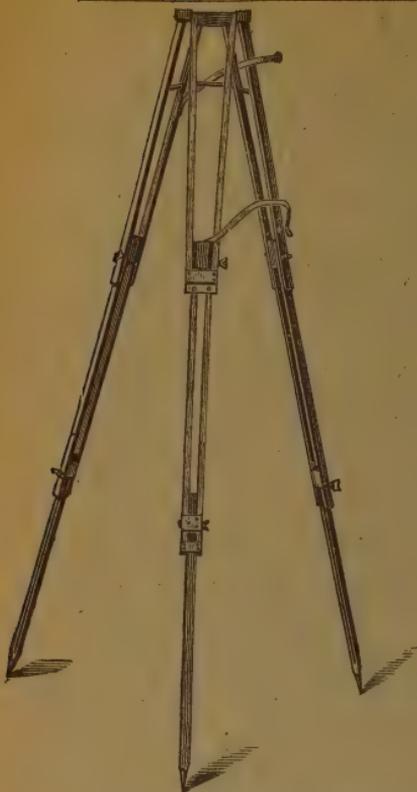


2361

- 236 STUDIO TABLE STAND (as illustrated), polished Pine, with rack for raising or lowering, and screw for tilting. A thoroughly first-class Stand for Cameras up to  $8\frac{1}{2} \times 6\frac{1}{2}$  or  $10 \times 8$ , size of top  $16 \times 11$  in. ... £3 10 0
2365. Ditto, ditto, in polished Oak ... 5 0 0
2366. HANDSOME STUDIO TABLE STAND, in Pine, larger, more solid than above, and made with curved legs, improved pattern rackwork and tilting arrangement, size of top  $20 \times 15$  in. ... 5 15 0
- Large and very handsome STUDIO STAND, made in polished Mahogany and very finest workmanship, with best screw and rackwork to raise and lower, and inclined plane tilting arrangement, size of top  $27 \times 19$  in. ... 12 10 0
2370. Do. do. smaller. Top  $19 \times 14$ . Mahogany ... 9 10 0
2371. Do. do. do. do. Polished Pine ... 7 15 0
2361. WATSON'S PREMIER STUDIO STAND. The top is supported on four pillars and raised by four racks working with one handle, and the weight being thus distributed, the up and down movement is exceedingly easy; also by a simple device, one pair of racks, either the front or back, may be thrown out of gear, and the other be moved alone, and a tilting motion so obtained; this is most convenient to use, and holds the top, inclined at any angle, perfectly rigidly. The Stand is mounted on wheels to move about, but by pushing with the foot the lever at the back to one side the wheels are thrown out of gear, and the Stand remains solid on the ground; by reversing the lever the wheels are at once available to move the Stand. There are also adjusting screws to adapt the legs to stand firm on uneven floors when required. A thoroughly practical Stand. Strongly recommended. Made in Mahogany, size of top  $24 \times 20$  in. 8 10 0

The above Prices are subject to 10 per cent Discount for Cash with Order.

**W. WATSON & SONS, 313 HIGH HOLBORN, LONDON, W.C.**



## WATSON'S 3-FOLD STANDS

(as illustrated and as supplied with the  
Acme Cameras),  
emphatically the BEST Tourist's Tripod, with  
mahogany heads, cloth lined:—2378  
6-in. tops ... £1 5 0 | 8-in. tops ... £1 10 0  
10-in. tops ... £1 15 0

## WATSON'S CYCLISTS' TRIPOD.

This marvellous little Stand measures  
when closed only 16 in., and weighs under  
2 lb.; yet it is exceedingly rigid when  
set up, *far even beyond the average  
ordinary solid leg stands*. It folds into  
four pieces, and the height when opened  
is 52 inches. It is *the* Stand for small  
Tourist Cameras.

Price, net Cash ... £1 1 0  
Improved pattern, with  
patented sliding legs... 1 5 0

*These Stands are suitable for any size  
Camera up to 7½ × 5.*

2375	Best Ash Tripod Stand, with legs jointed to fold in half, with 4-in. or 6-in. tops ...	£1 1 0
2376	Ditto ditto 8-in. tops ...	1 5 0
2377	WATSON'S Improved Pattern Single Folding Stand, exceedingly strong and rigid, 4-in. and 6-in. ... 25/-; 8-in. ...	1 10 0
2379	Specially Heavy 3-fold Stands, suitable for Large Cameras, as 15 × 12 and 18 × 16 Premiers ...	4 4 0
2380	Best Adjustable, Sliding-Leg Tripods, heavy make, with mahogany tops, and brass screw clamps to fix very rigidly. Recommended. 10-in. tops, £2 2s.; 12-in. ...	2 10 0
2381	Light Folding Tripod, with 4-in head, suitable for ¼-plate or 5 × 4 Camera ...	0 10 6
2382	Ditto, ditto, for ½-plate ...	0 15 0

## PATENT ADJUSTABLE STAND HOLDER.

To keep Tripod steady and prevent it from Slipping.

Consists of three Cords fastened at one end of each to a clamp, which readily attaches to the legs of any Tripod. The other ends of the cord meet at a brass centre, on which they are drawn tight when the Tripod is in position, and they effectually hold it and prevent the legs from slipping. Very simple and very useful. 4s.

## CASES FOR TRIPODS.

Solid Leather ... For Nos. 2375, 2376 2377, 12s. 6d.; for Nos. 2379, 2380, 20s.  
Mail Canvas ... " " " " 8s. 6d.; " " " " 15s.

The above Prices are subject to 10 per cent. Discount for Cash with Order.

**W. WATSON & SONS, 313 High Holborn, LONDON.**

## EXTRA DARK SLIDES FOR CAMERAS.



NOTE. — The Dark Slides quoted below, and all supplied by us, excepting those with the Popular Sets of Apparatus, have now the Shutters fitted with our patent AUTOMATIC SPRING FASTENING at top to keep them closed, and render them not liable to open accidentally. Our IMPROVED FLEXIBLE HINGES, the joints of which overlap one another, and perfectly prevent light passing them under any circumstances, and our PATENT STOPS, which dispense with the ordinary screws that are used generally on shutters to stop them when drawn out, and obviates the necessity of any projection inside or outside the dark slide. The advantages are, the Shutter is stronger and less liable to breakage, the chance of scratching the negative by the screw stops is done away with; Inner Frames require no fitting, there being no projection to allow for.

PATENT STOP

Sizes.	English Inches.	French c/m.	Single Backs.	Double Backs.	Brass-bound extra.
4 1/2 x 3 1/2	...	...	£0 12 6	£0 15 0	£0 3 6
5 x 4	...	9 x 12	0 15 0	0 17 0	0 3 6
6 1/2 x 4 1/2 and 7 1/2 x 4 1/2	...	...	0 17 6	1 0 0	0 3 6
8 x 5 and 7 1/2 x 5	...	18 x 13	0 18 6	1 1 0	0 3 6
8 1/2 x 6 1/2	...	21 x 15	1 0 0	1 3 6	0 4 0
8 1/2 x 8 1/2 and 9 x 7	...	...	1 2 0	1 6 0	0 4 0
10 x 8	...	24 x 18	1 6 0	1 10 0	0 5 0
10 x 10	...	...	1 8 0	1 14 6	0 5 0
12 x 10	...	30 x 24	1 10 6	1 16 0	0 5 6
12 x 12	...	...	1 12 6	1 18 6	0 5 6
15 x 12	...	...	2 0 0	2 10 0	0 6 0
15 x 15	...	...	2 5 0	2 15 0	0 6 6
18 x 16	...	30 x 40	3 0 0	3 15 0	0 6 6
18 x 18	...	...	3 5 0	4 0 0	0 6 6
22 x 20	...	...	4 0 0	5 0 0	0 7 0
22 x 22	...	...	4 10 0	5 10 0	0 7 6

### INNER FRAMES

(FOR DRY OR WET PLATE SLIDES). Outside Sizes of Frames.

5 x 4	6 1/2 x 4 1/2	7 1/2 x 5	8 x 5	8 1/2 x 6 1/2	10 x 8	12 x 10	15 x 12
1/6	1/9	2/-	2/-	2/3	2/6	3/-	4/-

### EXTRA LOOSE FRONTS FOR CAMERAS.

Sizes..	1 1/2-plate	7 1/2 by 5	8 1/2 by 6 1/2	10 by 8	12 by 10	15 by 12
Prices {	For "Acmes"	3/-	3/6	4/-	5/6	6/-
	"Premiers"	5/6	6/-	7/6	10/6	7/6

Prices are subject to 10 per cent. Discount for Cash with order.

# WATSON & SONS' ENLARGING LANTERNS

*Made specially for use with the Gelatino-Bromide Paper.*

THESE Lanterns are made light-tight for use in a dark room. The lamp in use has a very powerful burner, using paraffin oil, and gives a very brilliant white light, while the Condensing Lenses are first quality compound ones, and of such sizes as to perfectly take in the various size plates they are intended to be used for. On the front of Lantern is attachment for lens and adjustment for focussing.

The enormous demand we have experienced for these conclusively proves their efficiency, and the satisfaction obtained in their use. Any first-class Rectilinear or Portrait Lens may be used as Front Lens, but those supplied by us are chosen to give the maximum of definition and the minimum of exposure.

Sizes of Condensers.	Price with Sliding Tube Fronts.	Or with Front Lens complete.	Extra if with Camera Front with Bellows Body and Rack and Pinion Adjustment.
5½ in., for ¼-plate Negatives	£5 5 0	£6 15 0	£1 10 0
7 " 3×4 "	7 10 0	10 0 0	1 10 0
8½ " ½-plate "	9 10 0	12 10 0	2 10 0
9 " 7½×5 "	10 10 0	14 0 0	2 10 0
10½ " 8½×6½ "	14 0 0	18 10 0	2 10 0

Included with each lantern is one Mahogany Carrier, to hold the Picture to be enlarged, and each Lantern is packed in suitable Case.

These Lanterns may also be supplied to burn Oxy-hydrogen lime-light instead of Oil if desired, by adding the following:—Best Burner for Oxygen and House Gas, 17s. 6d. net; Sliding Tray and extra Lantern Top, 7s. 6d. net.

## GLASS BOTTOM DISHES.

With Varnished Deal Sides, for Developing, Bromide Paper, &c.

Sizes, inside.	s. d.	Sizes, inside.	s. d.
13×11	4 6	27×23	10 6
16×13	5 6	31×23	11 6
17×14	6 6	33×28	12 6
24×19	9 6		

## EASEL STAND TO HOLD THE BROMIDE PAPER,

With Rise-and-Fall Adjustment ... .. £2 6 6  
Do. do. plainer, single pillar ... .. 1 10 0

Prices subject to 10 per cent discount for Cash with Order.

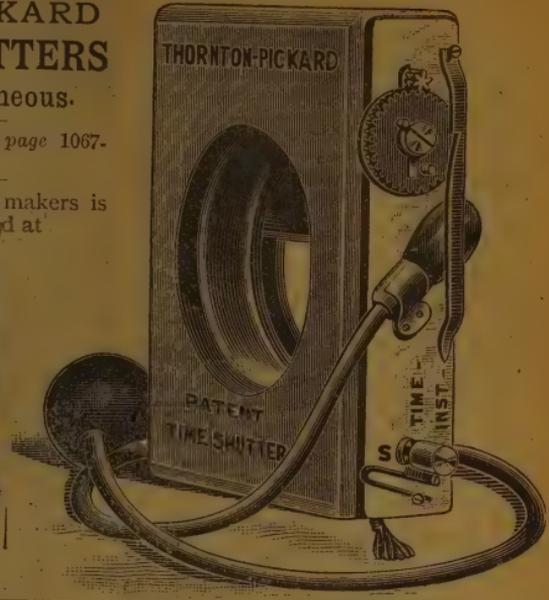
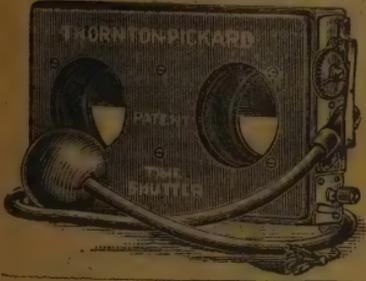
W. WATSON & SONS, 313 HIGH HOLBORN, LONDON, W.C.

# THORNTON-PICKARD EXPOSURE SHUTTERS

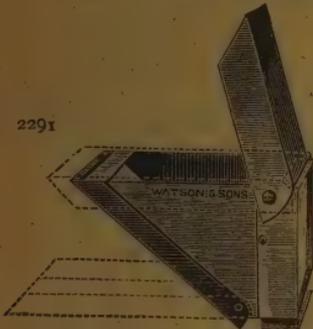
For Time or Instantaneous.

See Thornton-Pickard Co.'s Advt., page 1067-1106

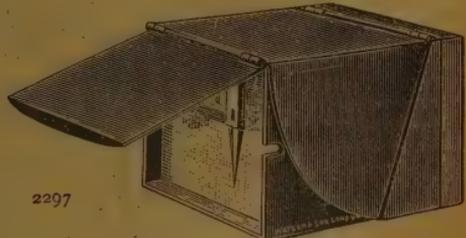
Every type of Shutter by these makers is kept in stock and supplied at List prices net.



2291



## FINDERS AND VIEW METERS.



2297

- 2291 The 'Alpha' Finder consists of a concave lens mounted in brass, with a mirror behind it, and shows the object when looked down upon in an upright position. The mirror may also be moved from the Field of View and the concave lens used alone for looking through. When the Camera is placed on a stand, it is equally good therefore for hand or stand purposes. This is the most popular and efficient of ordinary Finders. With plates for attachment ... .. £ 10 6
- 2292 Brass Finder, to show a representation of what is seen on focus glass of Camera, with socket for attaching ... .. 0 5
- 2293 Ditto, ditto, very superior, with screw adjustment for focussing, and with removable back to allow of using the front part alone as a focussing glass ... .. 0 12 6
- 2294 Mahogany Box Finder. This shows the image erect instead of inverted; with socket complete, to attach to any Camera ... .. 0 8 6
- 2295 Square Finder, as above, but smaller, oxidised metal body, with cover, shows image erect ... .. 0 5 6
- 2296 Ditto, ditto, shows the image inverted on a ground glass at back as in the Camera ... .. 0 5 6
- 2297 Combined Finder, to show the image either on top or through at will (as sketch) ... .. 0 8 6
- 2298 Simple Finder, consisting of deep concave lens, in brass mount, with Camera attachment, rotates to use for either horizontal or vertical views ... .. 3 6



# SENSITIVE DRY PLATES,

By all the Leading Manufacturers—Ilford, Edwards, Thomas, Wratten and Wainwright, &c.—kept in stock, and supplied at List Prices.

W. W. & S. are the WHOLESALE and RETAIL LONDON AGENTS

FOR

# THE CADETT DRY PLATES,

*Unsurpassed for speed, uniformity, and reliability.*

PRICE LIST—Net for Cash with Order.

Sizes.	Ordinary.	Lightning.	Sizes.	Ordinary.	Lightning.
Inches.	<i>s. d.</i>	<i>s. d.</i>	Inches.	<i>s. d.</i>	<i>s. d.</i>
4½ × 3½	1 0	1 6	8½ × 6½	4 3	6 6
5 × 4	1 7	2 6	10 × 8	7 3	10 0
6½ × 4½	2 3	3 8	12 × 10	10 6	16 0
7½ × 5	3 5	5 3	15 × 12	18 0	24 0
Centimetres.			Centimetres.		
9 × 12	1 8	2 3	15 × 21	4 2	6 0
13 × 18	3 0	4 3	18 × 24	5 6	8 3
21 × 27	7 8	11 0	24 × 30	10 0	15 0

Lantern Plates ... .. 3¼ × 3¼ ... .. 1/- per dozen.

# Fitch's Improved Xylonite Films,

A perfect substitute for Glass—Flexible, Unbreakable, Reliable.

— PRICE LIST. —

NEGATIVE FILMS. ANY RAPIDITY:— French Sizes.

Ordinary, per dozen	½	5×4	½	7½×5	8½×6½	10×8	9×12	13×18	18×24
1/9	...	3/-	...	4/-	...	6/-	...	7/-	...
12/-	...	2/2	...	6/-	...	12/-	...	2/2	...
Specialty Thick, do.	3/6	...	4/6	...	8/-	...	12/-	...	18/-

*The Thin are usually supplied and require to be backed by a piece of Cardboard in the dark slide. The Thick are stout enough to require no backing.*

# POSITIVE IVORY FILMS.

Matt and Polished Surfaces.

For Printing out by development. An advance on Opal Plates. Flexible, unbreakable, and giving superb results, equal to Ivory miniatures. Expose 6 to 10 seconds, 4 feet from gas flame.

PRICE LIST—White, Pink, or Blue.

Thick...	...	3/-	...	3/6	...	6/6	...	12/-	...	17/-	per dozen.
Thin (White only)...	...	2/3	...	2/6	...	5/-	...	7/6	...	14/6	"

THE ABOVE PRICES ARE NET FOR CASH.

W. WATSON & SONS, 313 HIGH HOLBORN, LONDON, W.C.

2770

## VIEW MOUNTS.

Sizes.	First quality Bristol, Plain edges.		First quality Enamelled, Light Colours, Plain edges.		Dark Enamelled, Black, Chocolate, Olive, Plain edges.	
	Per 100. s. d.	Per 1000. s. d.	Per 100. s. d.	Per 1000. s. d.	Per 100. s. d.	Per 1000. s. d.
4 $\frac{1}{4}$ × 3 $\frac{1}{4}$ ... (5 sheet)	1 6	13 6	1 9	16 0	2 0	18 0
5 " 4 ... (5 sheet)	2 3	20 0	2 9	24 0	3 0	26 0
6 $\frac{1}{2}$ " 4 $\frac{1}{4}$ ... (5 sheet)	3 0	28 0	3 9	34 0	4 0	37 0
7 $\frac{1}{2}$ " 5 ... (6 sheet)	4 9	45 0	5 9	52 6	6 0	56 0
8 $\frac{1}{2}$ " 6 $\frac{1}{2}$ ... (6 sheet)	6 6	60 0	8 0	72 6	9 0	80 0
10 " 8 ... (8 sheet)	10 0	95 0	12 0	110 0	13 6	—
12 " 10 ... (8 sheet)	15 0	140 0	17 0	160 0	18 6	—
15 " 12 ... (8 sheet)	22 0	200 0	26 0	240 0	28 0	—

## EXTRA STOUT VIEW MOUNTS.

772

**WITH GOLD BEVELLED EDGES.**

First quality Enamelled Mounts.

Sizes.	Light Colours.			Dark Colours.		
	Per doz s. d.	Per 100. s. d.	Per 1000. s. d.	Per doz s. d.	Per 100. s. d.	Per 1000. s. d.
4 $\frac{1}{4}$ × 3 $\frac{1}{4}$ ... (6 sheet)	0 9	3 9	35 0	0 10	4 0	37 0
5 " 4 ... (6 sheet)	1 0	5 0	46 6	1 0	5 3	48 6
6 $\frac{1}{2}$ " 4 $\frac{1}{4}$ ... (6 sheet)	1 2	6 6	62 0	1 3	7 0	65 0
7 $\frac{1}{2}$ " 5 ... (8 sheet)	1 6	10 6	97 6	1 6	11 0	100 0
8 $\frac{1}{2}$ " 6 $\frac{1}{2}$ ... (8 sheet)	2 0	13 9	132 6	2 3	14 6	140 0
10 " 8 ... (8 sheet)	2 9	18 6	175 0	3 0	19 0	182 6
12 " 10 ... (12 sheet)	5 0	33 6	320 0	5 0	34 6	330 0
15 " 12 ... (20 sheet)	7 6	50 0	470 0	7 6	52 0	490 0

## PLATE SUNK MOUNTS.

2773

**SPECIAL QUALITY, VERY ELEGANT.**

The margins surfaced with WHATMAN'S extra rough Drawing Paper, India Tinted centres. Very effective for Platinotype, Bromide, and Matt Paper Prints.

Outside size.	Size of Tint.	Per doz s. d.	Per 100. s. d.	Outside size.	Size of Tint.	Per doz. s. d.	Per 100. s. d.
8 $\frac{1}{2}$ × 6 $\frac{1}{2}$ ...	5 × 4	1 3	8 0	17 $\frac{1}{2}$ × 13 $\frac{1}{2}$ ...	12 × 10	5 0	35 0
10 " 8 ...	7 $\frac{1}{2}$ " 5	1 9	11 6	21 " 14 $\frac{1}{2}$ ...	14 " 12	7 6	52 6
12 " 9 ...	8 " 6	2 3	14 0	20 " 16 " ...	14 " 11	7 0	50 0
12 " 10 ...	9 $\frac{1}{2}$ " 7 $\frac{1}{2}$	2 6	16 0	21 " 17 $\frac{1}{2}$ ...	15 " 12	10 6	72 0
14 $\frac{1}{2}$ " 10 $\frac{1}{2}$ ...	10 " 8	3 6	22 0	23 " 18 " ...	15 " 12	12 6	84 0
16 " 12 ...	10 $\frac{1}{4}$ " 8 $\frac{1}{4}$	4 6	28 6				

Every other popular kind of Photo Mount kept in stock, and supplied at Lowest price for cash.

**THE ABOVE PRICES ARE NET FOR CASH.**

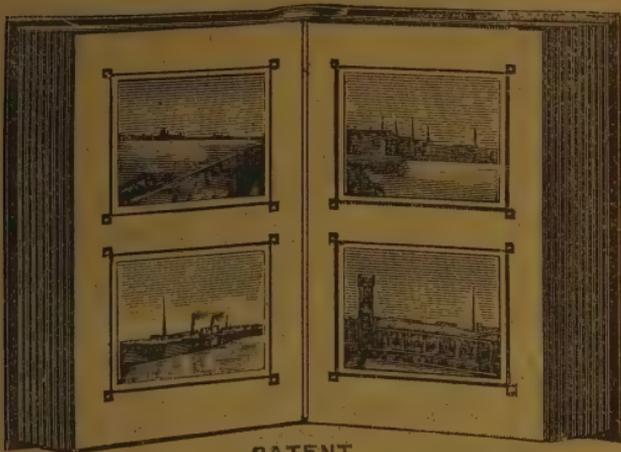
**W. WATSON & SONS, 313 HIGH HOLBORN, LONDON, W.C.**

# SCRAP ALBUMS.

## FOR MOUNTING COLLECTIONS OF VIEWS.

### NEW PATENT SLIP ALBUMS,

For unmounted Photographs.



PATENT

By the use of these albums the prints may be removed and re-arranged without damaging the album or the print; the unmounted and untrimmed prints are inserted in the same way as in an ordinary album, slipped in from top or bottom between the leaves, saving trouble of pasting, or cutting to size. They are specially suitable for gelatino-chloride prints with highly glazed or Matt surfaces, as, by the use of them, all the extra trouble of mounting is avoided. They are exceedingly well got up, neat and tasteful and well fitted to be filled with Photos for presentation.

Bound in elegant cloth cover, with cream plain edged leaves and chocolate line.

					Each.	Doz.
2791	...	For 12	$\frac{1}{4}$ plate prints	(1 on a page)	...	10/-
2792	...	" 24	" "	(2 " )	1/3	12/6
2793	...	" 48	" "	(4 " )	2/-	22/-
2794	...	" 12	5x4	" (1 " )	1/3	12/6
2795	...	" 12	Cabinet	" (1 " )	1/3	12/6
2796	...	" 12	$\frac{3}{4}$ -plate	" (1 " )	1/3	12/6
2797	...	" 12	$\frac{1}{2}$ " "	(1 " )	2/-	22/-

Bound in half French morocco, with cream gilt edged leaves and chocolate line round edge of opening.

					Each.	Doz.
2801	...	For 48	$\frac{1}{4}$ -plate prints	(1 on a page)	3/6	39/-
2802	...	" 96	" "	(2 " )	5/-	57/-
2803	...	" 48	$\frac{3}{4}$ " "	(1 " )	5/-	55/-
2806	...	" 48	$\frac{1}{2}$ " "	(1 " )	8/6	94/-
2803	...	" 96	$\frac{1}{4}$ " "	(2 " )		
	India tints	...	...	...	7/-	80/-

The above Prices are Net for Cash.

W. WATSON & SONS, 313 HIGH HOLBORN, LONDON, W.C.

## THE 'SNAP-SHOT' ALBUMS.

Coloured stiff cloth cover, block lettered in front 'Snap-Shots,' 24 toned cardboard leaves, linen joints.

2810	$\frac{1}{4}$ -plate,	$5\frac{1}{4} \times 6\frac{1}{4}$ ,	to hold 48	...	...	...	...	1/-	each.
2811	$\frac{3}{8}$ "	$8 \times 6\frac{1}{4}$ ,	" 48	...	...	...	...	2/-	"
2812	$\frac{1}{4}$ "	$5\frac{3}{4} \times 4\frac{3}{4}$ ,	handsomely bound in morocco, gold lettered,					3 6	"
			24 leaves, India-tinted centres, gilt edges...						
2813	Ditto, ditto, with large margin and plate mark, size outside	$7\frac{1}{2} \times 6\frac{1}{4}$ ,	with centres $4\frac{1}{2} \times 3\frac{1}{2}$ —a very choice album	...	...	...	...	7/6	"

Albums, cloth bound, 24 leaves, linen joints, tastefully gold lettered in front 'Photographs.'

	Size of leaf.		to hold	plates	Each.	Dozen.
2814	$5\frac{1}{4} \times 4\frac{1}{4}$	...	48	$\frac{1}{4}$ -plates	1/-	10/6
2815	$8 \times 6\frac{1}{4}$	...	48	$\frac{3}{8}$ "	2/-	22/-
2816	II $\times 9$	...	48	$\frac{1}{2}$ "	4/6	5/0

Albums, as above, but full-bound morocco, 24 leaves, gilt edges, strong linen joints, lettered in gold 'Photographs.'

	Size of leaf.		to hold	plates	Each.	Dozen.
2817	$6 \times 5$	...	48	$\frac{1}{4}$ -plates	2/6	27/-
2818	$8 \times 6\frac{1}{4}$	...	48	$\frac{3}{8}$ "	4/-	45/-
2819	II $\times 9$	...	48	$\frac{1}{2}$ "	7/6	84/-

Best Scrap Albums, full bound in French morocco, gilt edges, gilt designs on Covers.

	Sizes of Leaves.		leaves	Hard Covers.	Padded Covers.
2824	$10\frac{3}{4} \times 8\frac{1}{2}$	...	30	10/6	12/6 each.
2825	$12 \times 10$	...	"	12/6	15/- "
2826	$13\frac{1}{2} \times 11$	...	"	15/-	17/6 "

**Special Albums made to suit any requirements.**

## SLIP-BACK MOUNTS.

278e

FOR UNMOUNTED PRINTS.

The prints go in from the side as into an ordinary slip album, and are held quite flat. No sticking required. Cream Boards, with Chocolate line.

Outside size.	For Prints.	Per dozen.	Per 100.
$7 \times 5\frac{7}{8}$	$\frac{1}{4}$ -plate	-/8	4/-
$7\frac{7}{8} \times 6$	$5 \times 4$	-/8	4/-
II $\times 8$	$\frac{1}{2}$ -plate	1/-	6/6
II $\frac{1}{4} \times 9\frac{1}{4}$	$\frac{1}{2}$ "	1/6	10/-

Similar Mounts as above, Chocolate, enamelled, with Gilt Line on face and Gold Bevelled edge.  $\frac{1}{4}$ -plate, 6/-;  $\frac{1}{2}$ -plate, 7/6;  $\frac{1}{2}$ -plate, 9/6 per dozen.

**The above Prices are Net for Cash.**

**W. WATSON & SONS, 313 HIGH HOLBORN, LONDON, W.C.**

## SENSITIZED ALBUMENIZED PAPER.

**Very Best Quality.**

WHITE, ROSE, and MAUVE TINTS.

Per Quire, 13/-;  $\frac{1}{2}$ -Quire, 6/6;  $\frac{1}{4}$ -Quire, 3/6. Sample Sheet, 10d., post free.

## SENSITIZED DOUBLE ALBUMENIZED PAPER.

**Very Best.**

WHITE, ROSE, and GREEN for MOONLIGHT EFFECTS.

Per Quire, 16/-;  $\frac{1}{2}$ -Quire, 8/-;  $\frac{1}{4}$ -Quire, 4/6. Sample Sheets, 1/-, post free.

## WATSON'S MATT SURFACE SENSITIZED PAPER

PRICE.—13s. per Quire; 6s. 6d. per  $\frac{1}{2}$ -Quire; 3s. 6d. per  $\frac{1}{4}$ -Quire; 10d. per Sample Sheet, forwarded Free by Post.

ILFORD PRINTING-OUT PAPER, EASTMAN'S SOLIO PAPER.  
 PAGET'S PRINTING-OUT PAPER,

Always in stock, and supplied at Manufacturers' Prices.

## DEVELOPING EXPOSED PLATES.

EXPOSED Plates or Cut Celluloid Films are developed by experienced Operators at the following rates per dozen, and Customers entrusting us with their work may rely on its being promptly executed, and the best possible results obtained.

Sizes ...  $\frac{1}{2}$ -Plate ...  $5 \times 4$  ...  $6\frac{1}{2} \times 4\frac{1}{2}$  ...  $7\frac{1}{2} \times 5$  ...  $8\frac{1}{2} \times 6\frac{1}{2}$  ...  $10 \times 8$  ...  $12 \times 10$

Prices ... 3s. ... 4s. ... 6s. ... 7s. ... 8s. ... 10s. ... 15s.

Spools of Films also developed, in all sizes, at corresponding rates.

## LANTERN SLIDES.

MADE FROM CUSTOMERS' NEGATIVES, 1s. 6d. for first Copy, and 1s. each subsequent one  
 MADE FROM CUSTOMERS' PRINTS, 2s. 6d. for first Copy, and 1s. each subsequent one.

## PRINTING, IN SILVER OR PLATINOTYPE.

FROM CUSTOMERS' OWN NEGATIVES.

Done in the most efficient manner at the following rates—to include spotting and mounting, but not the mounting boards; these may be chosen from our list, and are charged for at their various costs.

NOTE.—Every care is taken with Negatives, but we do not hold ourselves responsible for breakage.

Sizes.	Prices per dozen.		Sizes.	Prices per dozen.	
	Platinotype.	Silver.		Platinotype.	Silver.
C.D.V. & $\frac{1}{2}$ -plate ...	4s. 0d. ...	2s. 6d.	$8\frac{1}{2} \times 6\frac{1}{2}$ ...	12s. 0d. ...	6s. 6d.
$5 \times 4$ ...	4s. 6d. ...	3s. 6d.	$10 \times 8$ ...	15s. 0d. ...	8s. 0d.
$\frac{1}{2}$ -plate ...	7s. 6d. ...	4s. 0d.	$12 \times 10$ ...	17s. 6d. ...	10s. 0d.
$7\frac{1}{2} \times 5$ ...	10s. 0d. ...	5s. 0d.			

## ENLARGEMENTS.

On Bromide Paper or Opal, made from Negatives or Photographs in the best manner, and finished to any desired degree of excellence.

*All above Prices are Net for Cash with Order.*

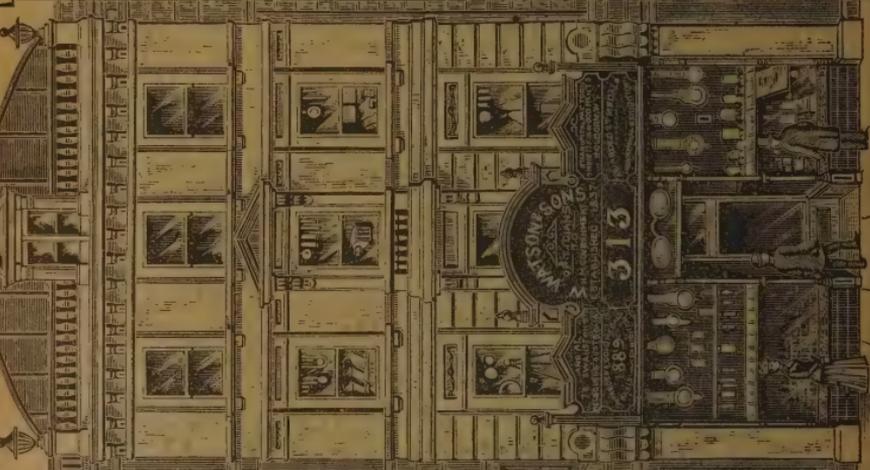
**W. WATSON & SONS, 313 HIGH HOLBORN, LONDON, W.C.**

FACTORY FOR PHOTOGRAPHIC  
CABINET WORK  
9, 10 & 11, FULWOODS RENTS W.C.

WATSON & SON

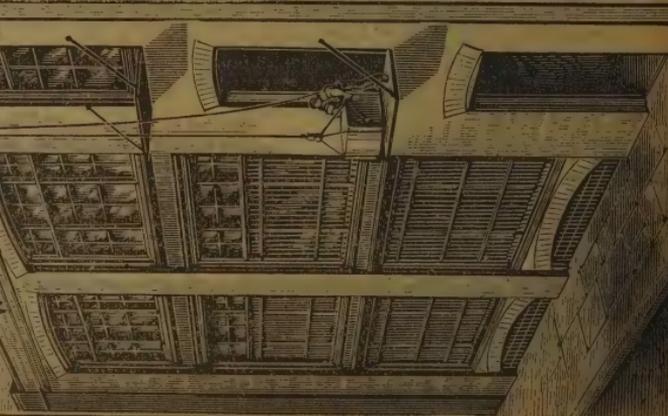


WAREHOUSE & SHOW ROOMS  
HOLBORN  
313 HIGH



FACTORY FOR SCIENTIFIC INSTRUMENT  
MAKING & OPTICAL GLASS GRINDING  
16 & 17 FULWOODS RENTS W.C.

WATSON & SON





THE  
**THORNTON-PICKARD**  
 PATENT  
**SHUTTERS**

OF  
 WORLD-WIDE  
 RENOWN.

ARE THE  
**SIMPLEST**  
 AND THE  
**BEST.**

FOR  
 ALL KINDS OF  
 WORK.





Taken with the Thornton-Pickard Focal Plane Shutter.

THE



## THORNTON-PICKARD MANUFACTURING CO.

beg to announce that they are now established in their New Factory and Offices, to which the whole of their business has been transferred.

The Factory has been designed and built expressly for the manufacture of the Thornton-Pickard Specialties, and is fitted with the best machinery and appliances for the purpose.

It possesses every facility for the prompt despatch of Goods, being in close proximity to four Railway Stations, and in direct communication with the following systems—London and North-Western Railway, Midland Railway, Great Northern Railway, and Manchester, Sheffield, and Lincolnshire Railway. The rapid increase in the Company's business has rendered this extension absolutely necessary, and they have no doubt that the improved facilities will enable them to successfully cope with it.

Postal and Telegraphic Address: "Thornton-Pickard, Altrincham."

## THE THORNTON-PICKARD SHUTTERS.

THERE are doubtless few, if any, practical photographers at the present day who would question the superiority of the Roller Blind Shutter over every other type; and no doubt all who have carefully studied the theory, construction, and practical use of various kinds of shutters are agreed that there is no other form so satisfactory and reliable. It is now some years since we became convinced of this fact, since which we have made it our business to improve and perfect this particular form of Shutter, and to make it the SHUTTER OF THE DAY. How far we have succeeded may be judged from the fact that The Thornton-Pickard Shutters have now

## THE LARGEST SALE IN THE WORLD.

They have been sent to and are in use in the following places, and many others. It will be seen from this list that the Shutters are suitable for use in all foreign climates.

**EUROPE.**—France, Spain, Portugal, Germany, Russia, Austria, Hungary, Italy, Turkey, Greece, Switzerland, Norway, Sweden, Denmark, Holland, Belgium, Malta.

**ASIA.**—India, China, Japan, Burmah, Ceylon, Palestine, Arabia, Straits Settlements, Java.

**AFRICA.**—Egypt, Algeria, Sierra Leone, Central Africa, Natal, Cape Colony, Mauritius.

**AMERICA.**—United States, Canada, Mexico, West Indies, Argentina, Bermudas, Brazil, British Guiana.

**AUSTRALIA.**—New South Wales, Victoria, South Australia, West Australia, Tasmania.

**NEW ZEALAND.**

**FIJI ISLANDS, &c., &c**

THE introduction of our Patent Time and Instantaneous Shutter has made it possible to give any exposure, from fractions of a second up to minutes or hours, *without vibration*, and therefore to dispense with the use of the lens cap entirely. This Shutter is used for all kinds of work, both by professional and amateur photographers.

THE merits of the Thornton-Pickard Patent Time and Inst. Shutter are so widely known that it is unnecessary to dwell upon them here; we may, however, mention that last season's sales again show an enormous increase upon previous records—another proof of this Shutter's sterling quality and suitability for its purpose.

**Introduction—(continued.)**

For the information of those who may not have studied the matter, we beg to offer the following remarks upon the

**REQUIREMENTS OF A PERFECT SHUTTER:**

It should be simple in construction and not liable to get out of order; it should be well made and carefully fitted; it should work without vibration, or the picture will be blurred and the lens will eventually suffer by the constant jar; there should be no sudden reversal of the moving parts, they should be light and well-balanced, and travel in one direction only, otherwise vibration will be unavoidable; the shutter should work equally well in front or behind the lens, and upside down, sideways, or in any other position; it should be safe and not liable to go off accidentally; it should give even illumination all over the picture; it should open instantly, remain completely open for the greater part of the exposure, and then close instantly; the time exposure should be completely under the control of the operator, so that should the subject show signs of movement he can close the shutter by the pneumatic ball instantly, and so prevent the picture being blurred; the pneumatic release should work with one squeeze of the ball, so that short exposures, such for instance as 1-4th, 1-6th, or 1-10th of a second (which would be too quick to get with a lens cap, and too slow to get with an instantaneous shutter) may be obtained by squeezing the ball to open the shutter, and letting it go quickly to close; these short exposures cannot be got when two squeezes are necessary.

Both in theory and practice the above points are necessary in a perfect shutter for all-round work.—*The Thornton-Pickard Time and Inst. Shutter possesses every one of them.*

**COMPARATIVE SIZES, WEIGHTS, & SPEEDS of the THORNTON-PICKARD SHUTTERS (various patterns.)**

For General all-round work the TIME AND INSTANTANEOUS Shutter (Standard Pattern) is recommended. The SNAP SHOT is of equal value for Instantaneous work.

PATTERNS.	PARTICULARS OF THE SMALLEST SIZE ONLY				
	Described in Catalogue on page	Size of Shutter	Range of Speed in Fractions of a Second	Dimensions	Weight
<b>TIME AND INST. SHUTTERS.</b>					
<b>Time and Inst.</b> (Standard) ..	8.9	in.	$\frac{1}{15}$ to $\frac{1}{90}$ and Time	Dp. Wd. Th in. in. in.	oz.
<b>Time and Inst.</b> (Standard) ..	8.9	1 $\frac{1}{8}$	$\frac{1}{15}$ to $\frac{1}{90}$ and Time	$3\frac{1}{2} \times 2\frac{3}{8} \times \frac{3}{16}$	4 $\frac{1}{2}$
<b>Foreground</b> .. .. .	11	1 $\frac{1}{2}$	$\frac{1}{15}$ to $\frac{1}{90}$ "	$5 \times 3\frac{1}{2} \times 1\frac{1}{2}$	7 $\frac{1}{2}$
<b>Extra-Rapid</b> .. .. .	11	1 $\frac{1}{2}$	$\frac{1}{30}$ to $\frac{1}{180}$ "	$5 \times 3\frac{1}{2} \times 1\frac{1}{2}$	7 $\frac{1}{2}$
<b>Stereoscopic</b> .. .. .	10	1 $\frac{1}{8}$	$\frac{1}{15}$ to $\frac{1}{90}$ "	$3\frac{1}{2} \times 6\frac{1}{2} \times 1\frac{1}{2}$	8
<b>INSTANTANEOUS SHUTTERS.</b>					
<b>Snap Shot</b> .. .. .	12, 13	1 $\frac{1}{8}$	$\frac{1}{15}$ to $\frac{1}{90}$	$3\frac{1}{2} \times 2\frac{3}{8} \times \frac{3}{16}$	4 $\frac{1}{2}$
<b>Special</b> .. .. .	14	1 $\frac{1}{2}$	$\frac{1}{30}$ to $\frac{1}{180}$	$5 \times 3\frac{1}{2} \times 1\frac{1}{2}$	6 $\frac{1}{2}$
<b>Focal Plane</b> .. .. .	17-19	$\frac{1}{2}$ -Plate	$\frac{1}{30}$ to $\frac{1}{180}$	$5\frac{1}{2} \times 5\frac{1}{2} \times 1\frac{1}{2}$ fittings extra	10
<b>HAND CAMERA SHUTTERS.</b>					
<b>Time and Inst.</b> , } fitted with	21	1 $\frac{1}{8}$	$\frac{1}{15}$ to $\frac{1}{90}$ and Time	$3\frac{1}{2} \times 2\frac{3}{8} \times 1\frac{1}{2}$	5 $\frac{1}{2}$
<b>Snap Shot</b> , } Self-Capping Blind	21	1 $\frac{1}{8}$	$\frac{1}{15}$ to $\frac{1}{90}$	$3\frac{1}{2} \times 2\frac{3}{8} \times 1\frac{1}{2}$	5 $\frac{1}{2}$

**BEHIND-LENS SHUTTERS.**—The Time and Instantaneous (Standard Pattern) and the Stereoscopic Time and Inst. can be supplied to attach to camera front behind the lens, without increase of size or weight (see pages 10 and 11).

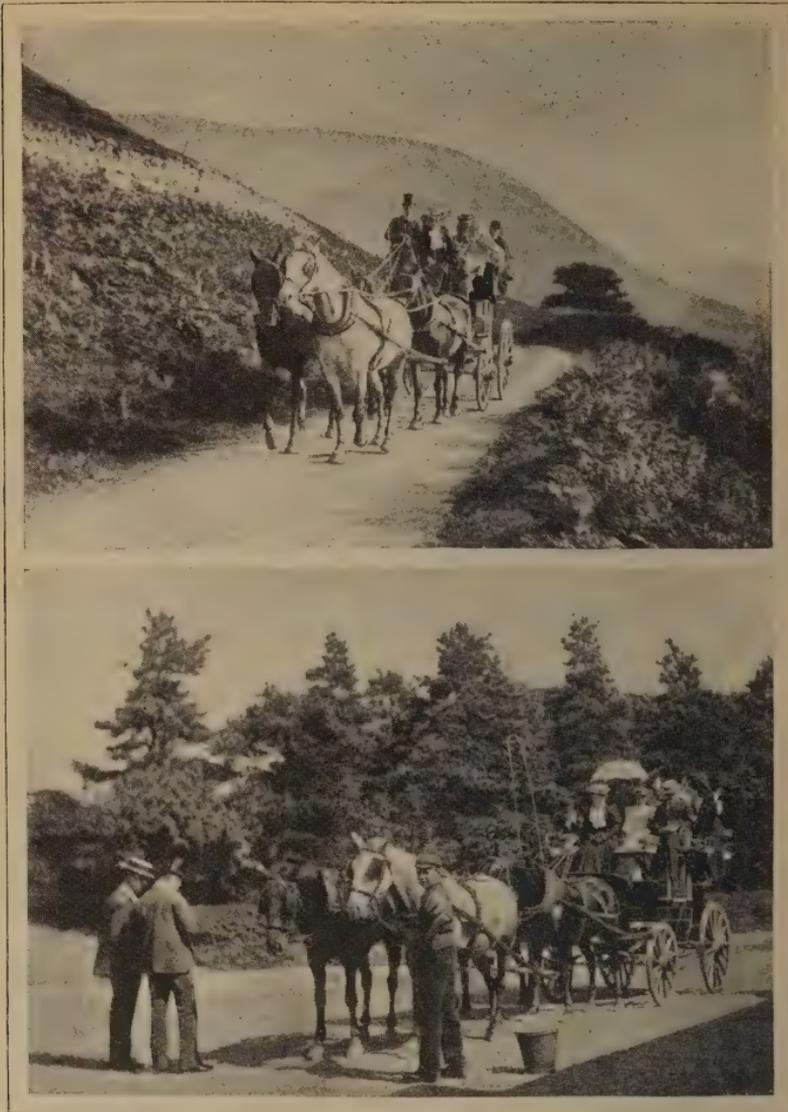
THE THORNTON-PICKARD MANUFACTURING CO., ALTRINCHAM, NR. MANCHESTER.





POLO.

*Exposure  $\frac{1}{500}$  sec. Taken by Mr. Edgar Pickard, with a*  
THORNTON-PICKARD FOCAL PLANE SHUTTER.



## COACHING IN THE LAKE DISTRICT.

*Exposure,  $\frac{1}{10}$  sec., and  $\frac{1}{15}$  sec. respectively. Taken by Mr. Edgar Pickard, with a*  
THORNTON-PICKARD TIME & INST. SHUTTER.

## TESTIMONIALS FROM USERS OF THE THORNTON-PICKARD SHUTTER.

### UNITED STATES OF AMERICA.

"For the last couple of years I have used one of your Time Shutters with the greatest satisfaction. Nearly all of my exposures since I first possessed the instrument have been made through it."—  
J. C. S.

### SWEDEN.

"I am very pleased with the Time Shutter, indeed; it has great range of speed, no vibration at all, is light and solid, easy to work, and gives an even exposure over the whole field. The Time arrangement is excellent and safe. Of course, it is much more convenient to use the shutter instead of the lens cap for what is called Time exposures."—P. K.

### PRUSSIA.

"It is a great pleasure for me to pronounce that I am very content with your shutter. I take every opportunity of recommending your shutters to every photographer."—P. K.

### FRANCE.

"I am highly satisfied with the two Shutters you supplied some time ago."—C. D. A.

### ITALY.

"We are perfectly satisfied with it, in fact we are quite sure and are prepared to say it ranks the first amongst all its sort of Photographic Apparatus we have here in Italy."

### UNITED STATES OF AMERICA.

"I am much pleased with it and can cheerfully commend it to any amateur or professional who requires a first-class shutter for all-round work. Compact, ornamental—theoretically and practically what we have been looking for."—S. O. T.

### CAPE COLONY.

"I have had one of your Time Shutters in use for some time, and found it the best I have ever used. In fact it is a pleasure to work with it."—W. L. C.

### INDIA.

"I find absolutely no vibration in either the Time or Instantaneous movements, freedom from which I have found in no other Shutter (and they are many) that I have tried."—F. D.

### SINGAPORE.

"I have had this Shutter over four years, and have used it many hundreds of times, and it has never failed me. When I got the Shutter several of my friends professed that it would not stand this tropical climate, but I am pleased to say that it has done all that could be desired. It was the first of its class to come out here, and now there are several dozens in the settlements, and I have not heard of one failing."—A. W. B.

### NEW ZEALAND.

"The Shutter gives my customer great satisfaction."—E. B.

### AUSTRALIA.

#### STEREOSCOPIIC SHUTTER.

"The Shutter works very well."—H. R. E.

### INDIA.

"I work with no other. It never fails me, and there is no vibration. This Shutter is especially good for India, as there is nothing to rust about it."—*Journal of the Photo Society of India.*

### CHINA AND JAPAN.

"The Shutter has proved very serviceable both in China and Japan."—W. D. R.

### FRANCE.

"It has given me entire satisfaction, and I have succeeded better with it than other shutters."—H. R. P.

### NEW ZEALAND.

"The Shutter has come to hand. It fits like a glove, and works like a charm."—W. D.

### BRITISH GUIANA.

"Though it is scarcely possible to find a climate worse for all rubber goods than this, we have never experienced any trouble with the blind, and our Hand Camera has on many occasions of exposure become quite hot in the sun."—H. & Co.

"I may mention that during eighteen months' not very careful use, including much cycle travelling, it has never given me a moment's trouble."—H. G.

"I have had one of your 'Time and Inst.' shutters in use for some years, and it is still in as good working condition as when I got it, and I can assure you it has given every satisfaction. I really think it has no equal."—R. S.

"I've used it for everything, and could not possibly do without it, it is so useful. I have recommended your Shutters to several friends, and who I know have purchased them and like them as well as I do."—I. W. T.

### What the Press says.

"Its action is really admirable, the mechanism being both ingenious and simple. It is well made, and the various actions are effected without any jar."—J. TRAILL TAYLOR, Esq., Editor *British Journal of Photography.*

"The Thornton-Pickard Time Shutter exactly fulfils your requirements."—*Photography.*

"You cannot do better than obtain the Thornton-Pickard Shutter for the special purpose you require it."—*Photography.*

"The Thornton-Pickard Time Shutter is a very good instrument. We have used one for the past two seasons, with considerable pleasure and success."—*Photography.*

"We can thoroughly recommend the Thornton-Pickard Time and Instantaneous Shutter, and think you will find it the preferable of the two."—*Photography* (Answers to Correspondents).

"The Shutter of Thornton-Pickard, shown by several dealers, still holds the palm, and it will be noticed that several of the chief makers of detective Cameras have adopted it. There is perhaps no accessory on which so much ingenuity has been spent—and wasted—as the Instantaneous Shutter. The demand for rapidity has for years been so insatiable that many scores of patents have been brought out. But in most cases the complicated mechanism adopted has not been able to stand the wear and tear of constant use. The Thornton-Pickard Shutter is almost the only one which has withstood all tests, and is usable for 'Time' as well as 'Instantaneous' purposes."—*The Globe.*

THE THORNTON-PICKARD MANUFACTURING CO., ALTRINCHAM, NR. MANCHESTER.

THE  
**THORNTON-PICKARD**  
 Patent  
**Time** and  
 Instantaneous  
**Shutter**

(STANDARD PATTERN).

**Description of the Shutter.**

THE illustration Fig. 2 shows the Shutter in section. In the interior of the case (which is made of mahogany of a rich dark colour, and is nicely polished and finished) there are two rollers A and B, one at the top and the other at the bottom. A piece of flexible and perfectly light-proof cloth D, the full width of the case, is joined at its opposite ends to these rollers, so that it can be wound off one on to the other like a blind or curtain. Midway in the blind a rectangular hole is cut somewhat larger than the lens hood; this is indicated by the thick dotted line H. The interior of the bottom roller contains a spiral spring made of the best fine steel wire. This spring can be wound up to increase the speed by the knob S (see Fig. 1). The spring catch (shown in the same illustration) drops into a notch cut in the knob, for the purpose of holding it when wound up. A slight downward pressure on this catch will allow the spring to run down to its lowest tension.

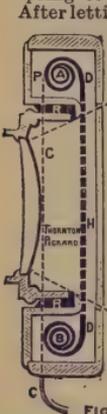


Fig. 2.

THE accompanying illustration shows the external appearance of the THORNTON-PICKARD Time and Instantaneous Shutter which has gained world-wide celebrity. The Shutter is simplicity itself; there is no complicated mechanism to get out of order. It is a perfect substitute for the lens cap, and much more handy and reliable.

The same Shutter may be used with any number of lenses, of different sizes, by the use of our Patent Adaptors (price from 8d. each). See page 23.



Fig. 1.

After letting the driving spring run down to the lowest, one or two turns should be given to the knob, if necessary, so as to put just sufficient tension on the spring to pull down the blind. This remark does not apply if the Shutter is fitted with a Speed Indicator, as the latter forms a stop. At the end of the top roller is a small pinion, which works into a toothed wheel on the outside of the case, as seen in Fig 1. The arm or pointer, also seen in the engraving, may be placed at "TIME" or "INST." When the Shutter is worked with the pointer at "Inst.," as shown, it keeps clear of the wheel, and allows the blind to run to the bottom, giving an Instantaneous exposure; but if the pointer is placed at "Time" the wheel is stopped by means of a projecting stud, which causes the half-unwound blind to remain open and give a prolonged exposure, until the ball is released. At the end of the top roller, inside the case, there is a pulley P, on to which the cord C winds. This cord, which is made specially strong for the purpose, terminates in a small tassel as shown. The Shutter has a large round aperture through it from back to front. The back part is recessed, and is lined with a piece of Patent Rubber Moulding R, of special form, for the purpose of accurately fitting the lens, which is also shown. Should the fit be rather too slack, it may be made tighter by turning an adjusting screw at the side of the Shutter, not shown in the engraving.

*[Continued on next page, prices on page 4.]*

## Time and Inst. Shutter, Standard Pattern—(continued.)

The action of the Shutter is as follows :—

**For an "Instantaneous" Exposure** place the lever opposite the word **INST.**, as shown in Fig. 1, page 8. The cord is then pulled out as far as it will come by means of the tassel, which causes the wheel to revolve until the second stud catches in the notch of the lever, making two clicks. The pulling of the cord winds the blind upon the top roller, so that the opaque bottom end covers the opening, and consequently the lens. If, now, the pneumatic ball is pressed, it will lift the lever clear of the stud and release the wheel, allowing the blind to rapidly re-wind upon the bottom spring roller. The aperture in the blind therefore passes rapidly across the opening in the Shutter, which is instantly covered again by the opaque end of the blind. The exposure thus given is an Instantaneous one.

**The Duration of the Exposure** can be ascertained by counting the number of turns given to the winding knob S, and referring to the table on page 22, in which the speeds for all sizes of shutters are given. For a small extra charge the Shutter can be fitted with a *Speed Indicator*. This consists of a dial, marked in fractions of a second, attached to the side of the Shutter, and a pointer on the end of the spring-roller spindle. The speed is indicated on the dial in fractions of a second by the pointer, which can be set to the speed desired by means of the knob. There is, therefore, no necessity to refer to the Table. The Indicator is a great acquisition, and does not retard or affect the working of the Shutter in any way.



FIG. 3.

**For "Time" Exposures** the cord is pulled to its limit as before, but the lever is placed opposite the word "**TIME**." On squeezing the pneumatic ball the blind stops open by means of the stud, which catches in the notch in the lever as before described; it remains open until the pressure on the ball is released. Thus a Time exposure of any required duration may be given. In this case the exposure commences instantly the ball is squeezed, and terminates immediately the pressure is released. Beyond this there is no limit to the duration of the exposures that may be obtained.

**For very long Exposures**, such, for instance, as are required for **INTERIORS**, there is no necessity to hold the ball all the time. Without first setting the Shutter pull the cord *half-way*, that is, until the first click is heard. This sets the Shutter full open, and it may be left so for the desired time of exposure, after which it can be closed by simply squeezing the ball.

**For Focussing**, the Shutter remains open in the same manner, that is, if the cord is pulled only half-way—until the first click is heard.

### NOTE.

For general all-round work we recommend the

## Time and Instantaneous Shutter, Standard Pattern,

as described on pages 8, 9, and 10.

The Foreground, Extra-rapid, Stereoscopic, and other patterns are for special kinds of work.

**A**LL our Shutters are made upon the Roller Blind principle (like the above); it is unquestionably *the best*, and it is acknowledged to be so by all experts—both in theory and practice. No other Shutter has yet been invented that has the same advantages.

**T**HOSE who have not time to study the Catalogue in detail should not miss reading "Hints on Instantaneous Photography" (page 24), and the "Requirements of a Perfect Shutter" (page 3).

[For Time Shutter see also pages 8 and 10; Price List on page 4.]

## Time and Instantaneous Shutter (Standard Pattern)—(continued.)

### FOR HAND CAMERAS.

THE Time and Inst. Shutter is especially suitable, on account of the lightness of its moving parts, which therefore do not cause movement or shake of the Camera; also for its great range of speed and simplicity of action. For this purpose we have a special form of the Shutter, which will be found described on page 21; it is fitted with the Self-Capping Blind, and can be supplied with either Cord, Pneumatic, or Trigger Release, as there described.

PARTICULARS of the  
SMALLEST SIZE,  
1½ in.

Weight 5½ ozs.

Dimensions, 3½ x 2½ x 1½ inches.

Range of Speed, from 1/15th to 1/90th of a second, and Time.

(Table of Speeds, see page 22)

PRICE, from 18/6. Speed Indicator 3/6 extra.

(Price List, see page 4).

THE  
**THORNTON-PICKARD**  
Patent

**Stereoscopic** Time and  
Inst.

Shutter,

TO FIT ON THE HOODS OR TUBES OF LENSES.

FOR Stereoscopic work a good Time and Inst. Shutter is an *absolute necessity*. This is the Simplest and the Best Shutter for the purpose. It is constructed upon exactly the same lines as the Standard Pattern Time and Inst. Shutter, of which a detailed description is given on pages 8 and 9. It has a great range of speed for Instantaneous Exposures, in addition to Time Exposures, and will, therefore, give any exposure from fractions of a second up to minutes or hours. The exposure is exactly the same to each lens, and there is no vibration.

THIS SHUTTER IS UNEQUALLED FOR STEREOSCOPIC WORK.

PARTICULARS of the  
SMALLEST SIZE  
(for 1½ in. hoods up to 3¼ in. centres).

Weight 8ozs.

Dimensions, 3½ x 6¼ x 1½ inches

Range of Speed, from 1/15th to 1/90th of a second, and Time.

(Table of Speeds, see page 22)

PRICE, from 26/=. Speed Indicator 3/6 extra.

Price List, see page 4.

For particulars of Speed Indicator see page 22.

PLEASE NOTE Instructions for Ordering on page 4.

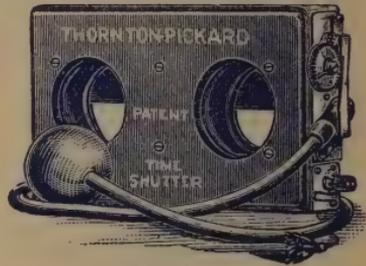


FIG. 4.

### Behind=Lens for Stereoscopic and Single Lens combined.

THIS is a special form of the above Shutter to be attached to Camera Front. The lenses are mounted upon a detachable panel that fits into the front of the Shutter. The Shutter therefore works behind the Lenses, practically forming an Inside Shutter, and is always in position ready for work. The detachable panel can be instantly removed when it is desired to substitute another carrying other lenses or a single lens. The opening in the blind being the full width of the Shutter permits the using of either a pair of lenses for Stereoscopic work, or a single lens opposite the centre of the plate for ordinary views.

PRICE, Extra beyond Prices of Ordinary Pattern Stereoscopic 3/6.  
Extra Panels 2/- each.

The Behind-Lens Stereoscopic Shutter can be supplied with Panels having Adjustable Centres, from 2½ to 3½, so as to place the Lenses at different distances apart. Price 5/- each.

THE  
**THORNTON-PICKARD** Manufacturing  
Company,  
ALTRINCHAM, NR. MANCHESTER.

THE following are special forms of Time and Instantaneous Shutters, suitable for special requirements. They are a little more bulky than the Standard Pattern Time and Inst., but in other respects have equal advantages. A general description of the working will be found on pages 8 and 9.

**Extra-Rapid Shutter** **Thornton-Pickard**  
Patent  
(Time and Instantaneous).

A Shutter having two openings in the double blind, which cause it to open from and close to the centre. Speed, one-half quicker than the Standard Pattern Time and Inst. Shutter. For Table of Speeds, see page 22.

**Foreground Shutter** **Thornton-Pickard**  
Patent  
(Time and Instantaneous).

GIVES more exposure to the foreground than the sky. Specially suitable for cloud effects, landscapes, seascapes, and similar subjects. NOTE.—This Shutter is recommended on the Hood in preference to the Tube. Speed, same as Standard Pattern Time and Inst. Shutter. For Table of Speeds see page 22.

Price of both the above from 23/6. Speed Indicator 3/6 extra.  
Price List for both patterns on page 4.

WHEN ORDERING, please send a narrow slip of paper just long enough to meet round the Lens Hood.

**The Thornton-Pickard**  
Patent  
**Behind-Lens**  
**Shutter**  
(Time and Instantaneous).

Shutter. Extra Panels for other flanges can be had, so that any number of lenses may be used with the same Shutter, and any one instantly dropped into its place ready for immediate use.

PRICE 1/- more than the Standard Pattern quoted in Price List on page 4. Extra Panels 1/- each, up to 3in. size; up to 4in. size, 1/6 each.

For Behind-Lens Stereoscopic Shutter, see page 10.

The Shutter should be attached to the Camera Front Panel by four ordinary small wood screws passed through from the back of the Panel into the velvet-covered back of the Shutter. Care should be taken that these Screws are not too long so as to injure the blind.

THIS Shutter can be screwed to the Panels of most Camera Fronts, as in the illustration of the Ruby Camera on Fig. 20, p. 23, practically acting as an inside Shutter. It then forms a part of the Camera, and is always firmly attached and in position. The back is fitted with velvet, which ensures a light-tight joint when the Shutter is screwed to the Panel of the Camera Front. The lens flange can be screwed to a detachable panel which fits into the front of the

**THE**  
**THORNTON-PICKARD** Manufacturing Company,  
ALTRINCHAM, NR. MANCHESTER.

# THE THORNTON-PICKARD Snap Shot Shutter.



*For all kinds of Instantaneous Subjects. It is the Simplest. It is the Cheapest and Most Efficient. It is well-made and beautifully finished.*



THE enormous success of our well-known Thornton-Pickard Time and Instantaneous Shutter led us to introduce this new Shutter, which is equal to it for Instantaneous work. It always commands a large sale, on account of its moderate price, excellent quality, and suitability for its purpose.

As its name implies, this is an Instantaneous Shutter. It has the merit of great simplicity, coupled with a great range of speed (see Table of Speeds on page 22).

LIKE the Thornton-Pickard Time and Instantaneous Shutter, it is made upon the roller-blind principle, and is therefore absolutely free from vibration when working. Although low in price, it is just as well made and finished. The motive power is obtained by a spiral spring made of the best fine steel wire.



FIG. 6.

THE working of the Shutter will be readily understood by reference to the illustration, Fig. 6, which shows it in section. The Shutter is similar in general construction to the Time and Instantaneous, which is fully described on pages 8 and 9.

A FLEXIBLE blind D, in the centre of which is a rectangular opening H, is fastened to the two rollers A and B, so that it can wind off one on to the other. The bottom roller contains the driving-spring, which can be wound up to increase the speed by turning the knob S, Fig. 5; the speed can be decreased by pressing the catch slightly downwards so that the spring may run down.

THE top roller has a pulley P inside the case, on to which the cord winds, and a notched wheel or disc on the outside. The lever outside the case engages with the notches in the disc by the pressure of a spring.

THE action is as follows:—The cord is pulled to its limit, which causes the blind to wind on to the top roller A and close the aperture. The Shutter is then ready for exposure. When the pneumatic ball is squeezed the lever is lifted out of the notch, and the blind rapidly re-winds on to the spring roller, thus giving an Instantaneous exposure. The speed can be ascertained by reference to the Table on page 22.

*[Snap Shot Shutter continued on next page.]*

THE THORNTON-PICKARD MANUFACTURING CO., ALTRINCHAM, NR. MANCHESTER.

**Snap Shot Shutter—(continued).**

FIG. 7.

It should be mentioned that after allowing the driving spring to run down to the lowest, one or two turns should be given to the knob, if necessary, so as to put just sufficient tension on the spring to pull the blind down. This remark does not apply if the Shutter is fitted with a Speed Indicator, as the latter forms a stop.

Like the Thornton-Pickard Time and Instantaneous Shutter, there is in practice

**ABSOLUTELY NO VIBRATION WITH THE SNAP SHOT SHUTTER.**

PARTICULARS  
OF THE  
SMALLEST SIZE,  
 $\frac{1}{8}$ in.

Weight,  $5\frac{1}{4}$ ozs.

Dimensions,  $3\frac{1}{4} \times 2\frac{3}{8} \times 1\frac{1}{4}$  inches.

Range of Speed, from  $\frac{1}{15}$ th to  $\frac{1}{90}$ th of a second.

(Table of speeds, see page 22).

**PRICE from 10/-.** Speed Indicator,  $\frac{3}{6}$  extra.

(Price List, see page 4).

**WHEN ORDERING** please send a narrow strip of paper just long enough to meet round the Lens Hood or Tube. Insist upon having the Shutter made a good fit upon the Lens.

*The Shutter works equally well whether fitted to the Lens Hood or the Lens Body.*

.....

### For Hand Cameras

THE Snap Shot Shutter is especially suitable, on account of the lightness of the moving parts, which therefore do not cause movement or shake of the Camera; also for its great range of speed and simplicity of action. A Cord Release instead of Pneumatic can be supplied, and the Shutter may be fitted with the Self-Capping Blind, if desired, which is strongly recommended (see page 20, for Hand Camera work, &c. A special arrangement of the Snap Shot Shutter for Hand Cameras is described on page 21.

.....

### TESTIMONIALS.

"The Snap Shot Shutter is a little 'gem' and will, I feel sure, give great satisfaction.—W. E. P.

"I have an  $\frac{1}{4}$ in. Snap Shot Shutter, with which I am very well pleased.—A. K."

"The Snap Shot Shutter works perfectly.—A. T."

"I have a Snap Shot Shutter and am very pleased with it.—I. M. R."

"The Shutter works quite well, without perceptible vibration.—U. F."

.....

# THE THORNTON-PICKARD Manufacturing Company,

ALTRINCHAM, near MANCHESTER.

[For Snap Shot Shutter see also previous page.

# THE THORNTON-PICKARD

## Special For High Speed Instantaneous Work.

### Shutter

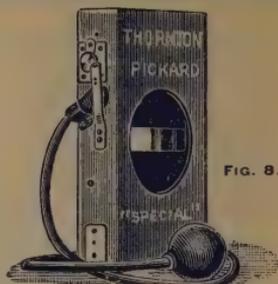


Fig. 8.

FOR those who require a quicker Shutter than the ordinary Time and Inst. or Snap Shot patterns, for special work, it is the quickest form of Roller Blind Shutter it is possible to make to work on the lens. It has a double blind, which passes across the lens in opposite directions at the same time, opening and closing from the centre.

ALTHOUGH it cannot be made to give such short exposures as our Focal Plane Shutter, which fits into the back of the Camera, it is fast enough for many subjects that require a very rapid Shutter, and possesses the great advantage of being small in bulk. It can be fitted in front or behind the lens.

Speed of the smallest size up to 1/180 of a Second.

IT is suitable for such special work as race finishes, athletes running, jumping, or leaping, animals in motion, and similar subjects.

THE Shutter is wound up by turning a knob. An extra strong driving-spring is used, and the various parts are made specially strong to withstand the extra strain.

FOR a small extra charge the Shutter can be fitted with a Speed Indicator, which shows the speed in fractions of a second by a dial and pointer (see Fig 9). The pointer is set to the required speed by the knob. This is a great acquisition to the Shutter and is strongly recommended.

IT should be mentioned that after allowing the driving spring to run down to the lowest, one or two turns should be given to the knob, if necessary, so as to put just sufficient tension on the spring to pull the blind down. This remark does not apply if the Shutter is fitted with a Speed Indicator, as the latter forms a stop.

Fig. 9.



Like the Thornton-Pickard Time Shutter, there is in practice ABSOLUTELY NO VIBRATION WITH THE SPECIAL SHUTTER.

PARTICULARS  
OF THE  
SMALLEST SIZE,  
1½ in.

Weight, 6½ ozs.  
Dimensions, 5 x 3¼ x 1½ inches.  
Range of Speed, from 1/30th to 1/180th of a second  
(Twice as fast as the Time and Inst. Shutter).  
(Table of Speeds, see page 22).

PRICE from 23/6. Speed Indicator, 3/6 extra.  
(Price List, see page 4).

WHEN ORDERING please send a narrow strip of paper just long enough to meet round the Lens Hood or Tube.

NOTE.—This Shutter is recommended to be used on the Lens Tube in preference to the Hood

#### TESTIMONIAL.

WE have fully tested the Special Shutter upon the Chronograph, and find the claim of the Company for very high speed is fully justified; the image which it cast at all speeds being sharp and clear, thus denoting full illumination. We congratulate the Company upon the undoubted success they have obtained in the construction of this Shutter.—HENRY STURMEY, Esq., Editor of *Photography*.

THE THORNTON-PICKARD Manufacturing Company,  
ALTRINCHAM, NR. MANCHESTER.



CRICKET.

BOWLING.

A BLOCK.

PLAYING FORWARD.

A HIT.

*Exposure  $\frac{1}{100}$  sec. each. Taken by Mr. Edgar Pickard, with a*  
**THORNTON-PICKARD FOCAL PLANE SHUTTER.**



FOOTBALL. Exposure  $\frac{1}{100}$  sec.

(Dalton Club v. Brooklands.)

THROWING WATER. Exposure  $\frac{1}{100}$  sec.

Taken by Mr. Edgar Pickard, with a

THORNTON-PICKARD FOCAL PLANE SHUTTER.

The  
**Thornton-Pickard**  
**Focal**  
**Plane**  
**Shutter,**

WITH PATENT ADJUSTABLE SLIT.

EXTRAORDINARY RAPIDITY! REMARKABLE RESULTS!

PARTICULARS OF THE } Weight, 10 ozs.  
 SMALLEST SIZE, } Dimensions,  $5\frac{1}{4} \times 5\frac{3}{8} \times 1\frac{1}{2}$  inches, (not including Adaptors).  
 For  $4\frac{1}{4} \times 3\frac{1}{4}$  in. plates. } Range of Speed from  $\frac{1}{50}$  to  $\frac{1}{1000}$  of a second.

PRICE from 35/-. Speed Indicator, 3/6 extra. Price List, see page 4.

When Ordering please send the Reversible Back and a Dark Slide or Plate Holder. If the Camera has no Reversible Back, send the Slide or Holder only.

THE "Focal Plane" Shutter is made upon the Roller Blind principle, like all the Thornton-Pickard Shutters. It fits at the back of the Camera, and the dark slide fits into the back of the Shutter. The Shutter Blind, therefore, works just in front of the plate, and has a narrow slit in it the full width of the plate, which gives the exposure as it passes rapidly across. The speed is regulated by the small knob. The Shutter is set for exposure by winding the knob at the top, and to show how far to wind there is a Winding Indicator at the opposite side, not shown in the engraving, for use when the slide is in position.

In the bottom end of the blind there is an opening the full size of the plate, by means of which the picture may be focussed on the ground glass if the blind is wound to the top. After focussing, the blind is released to allow it to run down until set for exposure, as above described. The speed can be altered by means of a small knob that winds up the driving spring, and also by altering the width of the Adjustable Slit. The Speed Indicator, described on page 22, is always fitted to this Shutter unless otherwise ordered.

### The New Patent Adjustable Slit

IS added to all Focal Plane Shutters, in addition to the adjustable spring roller, without extra charge. This improvement adds greatly to the range of speed of the Shutter, extending from 1-20th of a second to 1-1000th of a second, and allowing not only for the fastest instantaneous work possible, but also for all ordinary instantaneous work down to the slowest. For prolonged exposures the Shutter is wound up to the top as when focussing, and a cap or a Time Shutter may be used in the ordinary way without removing the Focal Plane Shutter from the Camera. This simple and ingenious invention is the only practical and perfect method which has yet been devised for varying the width of the slit in a Focal Plane Shutter. It is done by means of a chain at each end of the slit, which can be lengthened and shortened at will, making the sides of the slit perfectly parallel without skill.

### Directions for Altering the Width of Slit.

AFTER removing the focussing screen take hold of the two struts which form the parallel sides of the slit in the blind, and turn them astrak, at the same time drawing them forward out of the Shutter. The chains at the ends of the slit can then be manipulated.

It will be observed that one end of the chain is fixed permanently to one strut, while the other part of the chain is linked on to the extreme end of the other strut, the end of it passing inwards along the length of the strut. This part may be pulled

[Focal Plane Shutter continued on next page.]



FIG. 10

THE THORNTON-PICKARD MANUFACTURING CO., ALTRINCHAM, NR. MANCHESTER.

## The Thornton-Pickard Focal Plane Shutter—(Continued.)

out and linked on to the end of the strut to make the slit wider, or allowed to spring back into the strut which makes the slit narrower. All that is necessary is to see that the same number of links are used at each end of the slit.

### The Speed of the Shutter

IS found by DIVIDING THE SPEED GIVEN ON THE INDICATOR BY THE NUMBER OF LINKS IN USE at each end. That is to say, with only one whole link the speed is that given on the Indicator; with ten links (which is the extremity) it is one-tenth of the same.

NOTE.—Unless ordered otherwise, an Indicator is fitted to all Focal Plane Shutters.

Hints on the development of very short exposures will be found on page 24 of the Catalogue.

### Fitting the Shutter to the Camera.

(No extra charge, the price for fitting being included in the price of the Shutter).

THIS Shutter can be readily fitted to almost every kind of Camera, including those of the American type in which the focussing screen is fast to the Camera. We make the Shutter to fit at the back of the Camera in place of the reversing back, which is therefore not required, as the Shutter itself is made to reverse instead. It does not alter the Camera in any way, and the reversing back can be substituted in a moment, whenever desired. The Shutter is made with a wooden flange which may be cut down to the required size. Similar pins or catches should be fitted on the Shutter to those that are used on the reversing back. The focussing screen sent out with the Shutter should be made to register with the slides.

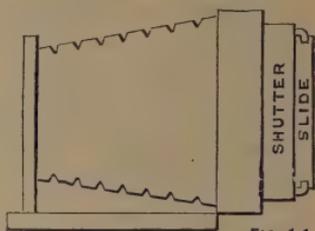


Fig. 11.

In a few Cameras (such for instance those having no reversible back) we make the Shutter to occupy the same grooves in the Camera that the dark slide fits; or, if preferred, fix the Shutter permanently at the back of the Camera. In either method the back of the Shutter is made to receive the dark slide.

NOTE.—When the Focal Plane Shutter has been fitted to a Camera, it does not interfere with other Shutters working on the lens, nor with the use of lens cap for exposure.

### Some advantages of the Focal Plane Shutter.

FOR High Speed Instantaneous work the advantages of the Focal Plane Shutter have not been thoroughly appreciated. It is capable of giving results that cannot be obtained by any other form of Shutter. For the information of those who may not have studied the matter, we beg to draw attention to the following facts

In the first place it should be remembered that the speed at which a Shutter ought to be worked is limited by the rate of movement of the object photographed, and its distance from the Camera. This is the *primary factor* in all instantaneous work. On page 24 will be found the rule for calculating the allowable amount of movement in the subject.

The second important factor is the quality of the light and the intensity or rapidity of the lens. We are assuming that the speed of the plate is the most rapid obtainable. A fast plate is an *absolute necessity* for extremely short exposures.

To obtain the best results with an exposure of say 1-200th of a second, a lens having a large focal aperture must be used, or the plate will be very much under-exposed. The lenses which have by far the largest focal aperture are of the Portrait type (so called); these are made to work with an aperture of  $f/4$ , or sometimes  $f/3$ .

Take, for example,  $f/4$ , this lens will pass four times as much light as  $f/8$ , and will, therefore, take a photograph with a proportionately shorter exposure. Such a lens, however, is proportionately larger: a shutter fitted to the hood of same is also larger, and therefore will not give nearly as short an exposure as one of a smaller

[Focal Plane Shutter continued on next page.]

THE THORNTON-PICKARD MANUFACTURING CO., ALTRINCHAM, NR. MANCHESTER.

### The Thornton-Pickard Focal Plane Shutter—(continued.)

size, and especially so as the opening in the shutter must be as large or larger than the diameter of the lens. It will be seen from this how it is that this Shutter is so much superior for obtaining high speed results with large sizes of Cameras, such as 12in. x 10in. and 15in. x 12in.

The advantage of the Focal Plane Shutter is that it works just as quickly with a large lens as with a small one. Using a small lens, and a small shutter on the front of it may give the speed required, but will not pass the requisite amount of light, and therefore will only result in under exposure. Sufficient light can be admitted by lengthening the exposure, but this, of course, would result in a blurred image, owing to the object moving during exposure.

The short exposures obtainable with the Focal Plane Shutter are due to the fact that only a part of the plate is exposed at once. The Shutter consists of a Roller Blind working in front of and close to the plate. The blind has a narrow slit in it which travels rapidly across the plate. The whole exposure is made, say, for the quarter-plate size (4½in. by 3¼in.) in 1-50th part of a second, but assuming that the slit is only 1-10th the width of the plate, each particular portion of the plate will receive only 1-10th of that exposure, viz., 1-500th of a second.

Exception might be taken on the ground that in a subject such as an athlete running, or a man diving into water, the portion of the figure exposed last would be slightly in advance of the portion exposed first. This is, in fact, theoretically true, but the whole duration of the exposure from first to last being so very rapid this slight distortion is practically nothing, and is quite invisible to the eye. This may be proved by reference to the photographs on pages 5, 15, 16, 35, and 36; all these were taken with a half-plate "Focal Plane" Shutter and a Cabinet Portrait Lens. We would refer readers also to the remarks on this subject on page 24, wherein will be found some useful information.

We may mention one minor advantage of the Focal Plane Shutter, namely, that it protects the plate from rays reflected from the inside of the bellows during exposure; none can pass except through the narrow slit, owing to the opaque portion of the blind being close in front of the plate.

### TESTIMONIALS.

"Your Focal Plane Shutter is a splendid instrument."—H. M.

"I am very pleased with the Focal Plane Shutter, the principle upon which it works is, I am sure, the best one yet invented for a shutter of such high speed."—E. H.

"The Adjustable Slit is a great improvement."—A. P.

"I believe in the principle of the Shutter, and think you have carried it out very satisfactorily."—P. R. T.

"I have great pleasure in informing you that the Shutter has given me every satisfaction."—W. K.

"The Adjustable Slit is a wonderfully ingenious arrangement and adds much to the utility of the Shutter."—R. B. L.

"I am very much pleased with the Shutter, and I think the Slit is a splendid thing."—R.W.P.

"The Prints before us are marvellous specimens of clearness and sharpness, and quite sufficient proof of the makers' statement as to speed, etc."—*Hand Camera and Lantern Review*.

"It works splendidly. I am very much pleased with it."—M. E.

"With the Focal Plane Shutter I got a result which I never got before in the matter of rapidity and exposure combined."—A. P.

"The Focal Plane Shutter gives my customer great satisfaction."—E. B.

"The Focal Plane Shutter goes exceedingly well."—W. K.

"I am much pleased with its workmanship and smoothness of action."—C. W. W.

"The Shutter gives the most complete satisfaction, being perfectly reliable and covering such a large range of exposures. I cannot speak too highly of it."—B.T.N.

*The above are bona-fide unsolicited testimonials.*

**THE**  
**THORNTON-PICKARD** Manufacturing Company,  
 ALTRINCHAM, NR. MANCHESTER.

# THE THORNTON-PICKARD

Patent

## SELF-CAPPING BLIND.

Suitable for  
either Hand Cameras or  
Ordinary Cameras.

A NECESSITY with a  
Magazine or Roll Holder.

Can be fitted to the "Time  
and Inst." Shutter,  
or "Snap Shot" Shutter.

WE have pleasure in introducing this accessory, as it fills a want which has been keenly felt by all users and makers of Hand Cameras for years past. It is a Self-Capping Blind which, when fitted to the Shutter, will automatically cover the lens during the act of re-setting the Shutter for the next exposure. Thus the sensitive plate may always remain uncovered in the Camera, as no light can pass through the Shutter at any time, except when the exposure is being made. It can be fitted to either our Time and Inst. (Standard Pattern) Shutter, or to the Snap Shot Shutter. This useful addition makes our Shutter the only Self-Capping Blind Shutter in the market.

ONE great point is that it only adds  $\frac{3}{16}$  in. to the thickness of the Shutter, and does not increase the dimensions otherwise. The smallest size of shutter, therefore, measures, including the Safety Blind,  $3\frac{1}{2}$  in. x  $2\frac{1}{2}$  in. x  $1\frac{1}{2}$  in., and will fit a Lens Hood up to  $1\frac{1}{2}$  in diameter. These measurements apply to both the Time and Inst. and the Snap Shot patterns; they can, therefore, be fitted to most kinds of Hand Cameras.

WE may mention that many Shutters are made so small that they act as a stop in front of the Lens and cut off some of the outside rays of light, so that the Lens will not cover the plate all over. All the Thornton-Pickard Shutters are made as small as possible, but without this defect, as will be seen by reference to Fig. 12, which shows the Lens, the opening in front of Shutter, and the outer pencils of light entering the lens as indicated by the angular dotted lines.

THE illustration shows a section of Self-Capping Blind attached to an ordinary Shutter, either Time and Inst., or Snap Shot Pattern. Fig. 13, page 21, shows a Hand Camera Shutter complete with Self-Capping Blind.

### Action of the Self-Capping Blind.

WHEN the tassel is pulled the Exposing Blind D is wound on to the top roller A by means of the cord C, and at the same time the Self-Capping Blind K is pulled up over the top roller M by the cord N. It will be seen from the illustration that the Self-Capping Blind K and the opening H in the Exposing Blind both pass across the aperture in the Shutter together, so that no light can pass through. When the tassel is released after pulling the cords as far as possible, the Self-Capping Blind immediately re-winds on to the spring roller Q, leaving the Exposing Blind set ready for exposure.

A Shutter with this addition has obviously many advantages; for instance in a Camera having a Plate Magazine or a Roll Holder it dispenses entirely with the necessity of pushing the slide shutter in to cover the sensitive surface whilst the Exposing Shutter is set for the next exposure. Also in Studio or Field Cameras, if one forgets to set the Exposing Shutter first before drawing the slide shutter, it is not necessary to again push it in before doing so, as the Exposing Shutter may be set afterwards.

Prices: { Patent SELF-CAPPING BLIND fitted to either the TIME AND INST. } 5/-  
(Standard Pattern) or the SNAP SHOT Shutter, up to  $2\frac{1}{2}$ " size }

Larger Sizes in proportion. Fitted to Shutters previously supplied without it, 7/6.

# THE THORNTON-PICKARD

Manufacturing Company,  
ALTRINCHAM, NR. MANCHESTER.

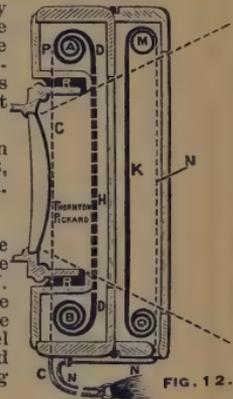


FIG. 12.

# THE THORNTON-PICKARD Patent Hand Camera Shutter,

WITH SELF-CAPPING BLIND.

of any duration, and for Instantaneous exposures, from  $\frac{1}{15}$  to  $\frac{1}{30}$  of a Second.

It is set for Exposure by pulling the cord and tassel as far as possible. No light is admitted through the Shutter while setting, as the Self-Capping Blind automatically covers the opening at the same time; and as soon as the Shutter is set it springs back again, leaving the Shutter ready for making the exposure. For Hand Cameras having magazines or roll holders, in which the sensitive surface remains uncovered all the time, this Self-Capping Blind is invaluable, as there is no necessity to cap the lens whilst setting the Shutter.

A SIMPLE movement of the lever alters the Shutter for either Time or Instantaneous Exposures. For a small extra charge the Shutter can be fitted with a Speed Indicator, which shows the speeds in fractions of a second upon a dial. It is extremely compact, the smallest size (for 1 $\frac{1}{2}$  in. hood) measuring  $3\frac{1}{4} \times 2\frac{3}{8} \times 1\frac{1}{2}$  inches, including Self-Capping Blind.

For those who do not require the Time and Inst. Shutter we supply the Snap Shot Shutter fitted up in the same way; this is equally good for Instantaneous Exposures.

## Action of the Shutter.

(The Illustration shows a section of the Shutter).

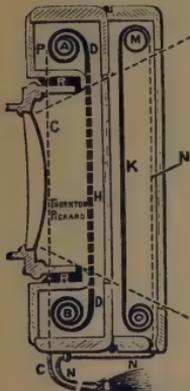


FIG. 14.

When the tassel is pulled the Exposing Blind D is wound on to the top roller A by means of the Cord C, and at the same time the Self-Capping Blind K is pulled up over the top roller M by the Cord N. It will be seen from the illustration that the Self-Capping Blind K and the opening H in the Exposing Blind both pass across the aperture in the Shutter together, so that no light can pass through. When the tassel is released after pulling the cords as far as possible, the Self-Capping Blind immediately re-winds on to the spring roller Q, leaving the Exposing Blind set ready for use.

Method of Release.

## Method of Release.

THE Shutter is arranged to release in various ways according to the kind of Hand Camera to which it is fitted.

**PNEUMATIC.** It may be fitted with Pneumatic Release, which is preferred by some for every kind of Hand Camera. Price, 1/- extra.

**TRIGGER.** It may be fitted with a Trigger Release (as shown in Fig. 13) which is very suitable when the front part of the Camera is open, as is the Folding type. Price 1/- extra.

**BUTTON.** When the Shutter is enclosed inside the Camera, a cord passing through a hole in the outside of the Camera and connected with a button or bead, as shown in Fig. 15, is a very simple and efficient means of release. By simply pressing the Button downwards the release is accomplished.

Shutters are supplied with the Button Release, unless otherwise ordered.



FIG. 15.

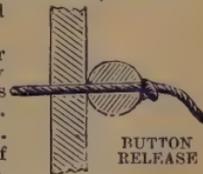


FIG. 15.

For PRICES of the HAND CAMERA SHUTTER see PRICE LIST, Page 4.

THE THORNTON-PICKARD MANUFACTURING CO., ALTRINCHAM, NR. MANCHESTER.

# Speed Indicator, FOR THE Thornton-Pickard Shutters.



FIG. 16.

**Very Simple. Does not retard the Speed of the Shutter. Shows at a glance at what speed the Shutter is Set.**

THE Speed Indicator consists of a dial and pointer as shown in the illustration. It is fixed to the side of the Shutter. The speeds are shown on the dial in fractions of a second, and the pointer is set to the desired speed by means of the knob that winds up the driving spring of the Shutter.

THIS can be fitted to any of the Shutters described in the previous pages, price 3/6; or fitted to Shutters previously supplied without it, price 5/-. Shutters must be sent to us for fitting; the Indicator cannot be fitted elsewhere. When ordering Shutters please state if it is required.

## Table of Speeds OF THE Thornton-Pickard Shutters.

THESE approximate Speeds have been arrived at after a series of very careful tests with apparatus constructed specially for the purpose. The method used gives undeniably accurate results. This Table only applies to Shutters that are not fitted with a Speed Indicator.

TIME and INST. Shutter (Standard Pattern).	FOREGROUND Shutter.					
	STEREOSCOPIC Shutter.			SNAP SHOT Shutter.		
Size of Shutter, up to	1½"	2"	2½"	3"	3½"	4"
No. of turns of Speed Knob . . .	0 5 15	0 5 15	0 5 15	0 5 15	0 5 15	0 5 15
Speed in fractions of a Second . .	1/12 1/18 1/24	1/15 1/20 1/24	1/12 1/18 1/24	1/10 1/15 1/20	1/12 1/18 1/24	1/15 1/20 1/24

The **EXTRA RAPID** Shutter (Double Blind Time and Inst.) works at one-and-a-half times the above speeds.

### SPECIAL Shutter (Double Blnd Instantaneous).

Size of Shutter, up to	1½"	2"	2½"	3"	3½"	4"
No. of turns of Speed Knob . . .	0 5 10	0 5 10	0 5 10	0 5 10	0 5 10	0 5 10
Speed in fractions of a Second . .	3/30 1/15 1/20	3/30 1/15 1/20	3/30 1/15 1/20	3/30 1/15 1/20	3/30 1/15 1/20	3/30 1/15 1/20

The **FOCAL PLANE** Shutter has a range of speed from 1/20 to 1/1000 of a second.

**THE** THORNTON-PICKARD **Manufacturing** Company,

ALTRINCHAM, near MANCHESTER.

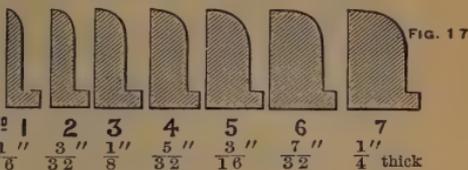
THE  
**THORNTON-PICKARD**  
Patent  
**Rubber** \*

**Moulding**

THE MOULDING

is made of the thicknesses shown

PRICE 8D. PER FOOT.



FOR FITTING SHUTTERS TO LENSES, AND FOR ADAPTING ONE SHUTTER TO TWO OR MORE LENSES.



**FITTING.**—It should be cut to the required length with a sharp knife, and sprung into the aperture with the rib or flange on the inside, as shown in the engraving.

**ADJUSTMENT.**—The screw in the side of Shutter will give the exact adjustment by turning with a screw-driver. An accurate fit upon the lens hood is thus insured.

Any thickness may be rubbed down on the back with a piece of sand paper when too thick, or in case of emergency a piece of cardboard may be used as packing behind the Moulding when it is not thick enough.

**Adapters.**—When it is desired to fit two or more Lenses to the same Shutter a second piece of Moulding may be used inside the first one, so as to form an adapter which can be put in or taken out as required.

Price 8d. each.

In case a very large Shutter has to be adapted to a very small Lens, a Wooden Adapter, lined with velvet, is necessary; price 1/6 up to 2½ in. diam., and 2/- if larger.

**Duplicate Pneumatic Release for Shutters.**—The Ball is fastened to its tube by an air-tight screw connection, so that should the Ball become deflated it may be unscrewed; it will then instantly fill with air, and after screwing up tight again is ready for use.

**Ordinary Pattern,** as supplied with Shutters, consisting of Ball with two feet of Tubing and Teat complete, price 1/6.

**Large Size for Self-Portraiture with Groups, &c., and for Studio use,** consists of Large Ball, price 4/-, and Long Tubing, 5d. per foot. Please state length required.

**NOTE.**—When ordered we supply the Long Tubing with a screw connection, so that it may be attached to the short length already on the Shutter, by simply unscrewing the Small Ball. Thus, either the long or short length are readily interchangeable.

THE  
**THORNTON-PICKARD** Manufacturing Company,  
ALTRINCHAM, NR. MANCHESTER.

## Hints on Instantaneous Photography.

**S**UCCESSFUL Instantaneous Photography is easy and simple if a little care and judgment is used in observing the necessary points that apply to this kind of work. The most essential conditions are:—

Good light.

A rapid plate.

A shutter having a high co-efficiency.

As full an exposure as the movement of the subject will allow.

A large focal aperture.

Slow development with a very dilute developer, when the plate is under-exposed.

**For Instantaneous Subjects** as long an exposure should be given as the subject will allow. This depends upon the rate of motion and the distance from the camera, both of which affect the movement of the image on the plate during the moment of exposure.

**Movement on the Plate.** It is necessary to ascertain how much the subject may move without showing any movement on the plate. It is generally considered that to obtain a sharp photograph the movement of the image on the plate must not exceed 1-100th part of an inch.

**Movement of the Subject.** The simplest way of arriving at the allowable amount of movement in the subject to obtain a sharp photograph is as follows:—Divide the distance of the subject from the camera in inches by 100 times the length of focus of the lens in inches. For example: Distance of subject 25ft. = 300 inches; divide this by the focus of lens, say 6 inches multiplied by 100 =  $\frac{300}{600} = \frac{1}{2}$  inch (allowable amount of movement of subject).

The movement of subject during any given length of exposure can be easily calculated from the known speed per second or per minute, as the case may be.

**Focal Aperture of Lens.** In ordinary instantaneous work perhaps nothing is more important than to have a lens with a large focal aperture, and for high speed work, such as the photos on pages 5, 15, 16, 35, and 36, it is almost necessary. A lens working at F5.6 is twice as rapid as one working at F8; F4 is four times as fast.

Such lenses are of necessity larger in size than others of smaller focal apertures, and are, therefore, not so convenient for hand cameras, but when portability is not of the first consequence they have great advantages.

**Shutter for Extreme Speeds.** When such extreme high speed is required, a shutter which fits on the lens will not work fast enough, but our Focal Plane Shutter works up to any desired speed for either a large or small lens. It is by the use of a lens of the Portrait type (so called), and this shutter of high co-efficiency, that the best possible results can be obtained.

**The Development** of instantaneous photographs may be divided into two kinds, Firstly, when all or most of the above conditions have been present, and sufficient exposure has been obtained. Secondly, when the conditions have not been fulfilled, and the plates have been under-exposed.

In the former case no special remarks are necessary; development takes place in the ordinary way; but when the plates are under-exposed (as is almost always the case with an extremely short exposure, such as 1-500th part of a second), special means should be taken to make the best of it. Of these means Text Books are almost always silent or very indefinite. In the development of extremely short exposures, such as the photos on pages 5, 15, 16, 35, and 36, before referred to, we have personally found the following method successful.

**FOR THE DEVELOPER** we use the three necessary constituents only, viz., Dry Pyro., Ammonia and Bromide in the following proportions:—Pyrogallic Acid (dry), 2 grains; Bromide of Potassium, 1 grain; Liquid Ammonia, '880, 2 minims; Water, 1 oz.

**IN EXTREME CASES.** Take an ordinary ammonia and pyro. developer (such as the above) and dilute it with five times the usual bulk of water; development will be very slow, but detail should appear all over the plate. In twenty minutes add an amount of ammonia equal to 25 per cent. of that already used, to make up for that which has evaporated. Repeat the same at the end of the next twenty minutes. After the developer has been used for about an hour, replace it by another made up as at first, and continue the operation in the same manner. After two hours probably no further detail may be coaxed out, but we have sometimes continued for three hours. Very often sufficient density is obtained at the end of two hours (and much sooner, except in extreme cases), but, if not, sufficient density may be obtained by applying a normal developer for a short time.

We have recently obtained good results with the Amidol developer. For extremely short exposures the developer is made up as recommended by the makers (using the Amidol Powder dry) but we dilute it with three times its bulk in water. We can highly recommend this developer in most cases, as it is simpler to use than pyro., owing to the fact that it does not necessitate so much rocking of the dish during prolonged development.

**ROCK THE DISH.** When using pyro. the developer must be kept moving all the time, or the negative will be covered with spots, &c. We use a simple form of rocking table, which is kept in motion by a heavy weight. Four or five plates in a large or in separate dishes may be kept going at the same time, and attended to as required.

**Cover the Dish.** During development the dish should be covered with the lid of a larger sized plate box, or other means, so as to avoid fogging of plate by the continuous light of the dark room lamp.

**The Dark Room** should be comparatively brightly illuminated with a yellow light; development should take place in the darkest corner away from the light, and in the shadow of the person developing.

THE THORNTON-PICKARD MANUFACTURING CO., ALTRINCHAM, NR. MANCHESTER.



THE PERISTYLE, & STATUE OF LIBERTY.  
FISHERIES BUILDING.

ADMINISTRATION BUILDING.  
AGRICULTURAL BUILDING.

CHICAGO EXHIBITION.

*Exposure  $\frac{1}{30}$  sec. Taken by Mr. J. E. Thornton, with a*

THORNTON-PICKARD TIME & INST. SHUTTER.



## CHICAGO EXHIBITION.

MACHINERY HALL.

INDIAN BUILDING.

COLUMBUS' SHIP.

MANUFACTURES AND LIBERAL ARTS BUILDING.

*Exposure  $\frac{1}{30}$  sec. Taken by Mr. J. E. Thornton, with a*

THORNTON-PICKARD TIME & INST. SHUTTER.

**PRICE LIST OF THE THORNTON - PICKARD CAMERAS AND ACCESSORIES.**

SIZE OF PLATE	6½in. x 4½in. (Half-plate),	7½in. x 5½in.	8½in. x 6½in. (W hole-plate),	10in. x 8in.	12in. x 10in.
* CAMERA, including Turntable and three Double Dark Slides ... ..	7 7 6	8 16 6	10 2 6	12 8 6	15 8 6
Automatic STAND to fit Turntable ... ..	- 17 6	- 17 6	- 17 6	1 2 6	1 2 6
Fitted with Time and Inst. SHUTTER, attached to Camera Front ... ..	1 0 6	1 3 6	1 3 6	1 7 6	1 12 6
SPEED INDICATOR, fitted to Shutter, extra ... ..	- 3 6	- 3 6	- 3 6	- 3 6	- 3 6
	£9 9 0	£11 1 0	£12 7 0	£15 2 0	£18 7 0
If supplied with three Plate Holders (Double), which are recommended instead of three Double Dark Slides... ..	less 18/-	—	less 21/-	—	—
Extra, if Camera and three Slides are Brass Bound ... ..	1 10 0	1 10 0	1 15 0	2 0 0	2 10 0
+ Waterproof Case, to hold Camera, Lens, and three Slides; Dark Tweed, with Handle and Strap that may be used to carry on Shoulder or Knapsack fashion ... ..	- 16 0	- 18 0	1 0 0	1 3 0	1 8 0
(If with Lock, 2/6 extra).					
Waterproof Case to hold Stand ... ..	- 8 0	- 8 0	- 8 0	- 9 0	- 9 0
Rapid Rectilinear Lens (see illustration on page 32) with Iris Diaphragm ... ..	3 0 0	4 0 0	4 10 0	6 5 0	7 10 0
Extra Double Dark Slides (Book-form), fitted with Recorders and Spring Snaps ... ..	- 15 0	- 17 6	1 0 0	1 7 6	1 12 6
Plate Holders (Double) (as described on page 37) ... ..	- 9 0	—	- 13 0	—	—
Panels—Front Panels (to fit the Front of Camera) ... ..	- 1 6	- 1 9	- 1 9	- 2 6	- 3 6
Shutter Panels (to fit into the Shutter, to carry Lens Flange) ... ..	- 1 0	- 1 0	- 1 0	- 1 6	- 1 6
Carriers, for using smaller size of plates. Each Carrier holds one plate; two can be used in a Dark Slide or Plate Holder. Charged according to the outside size	- 1 4	- 1 6	- 1 8	- 2 0	- 2 6

\* Continental sizes of Cameras made to order. † Solid Leather Cases, and others of special shape, made to order.

**THE THORNTON-PICKARD MANUFACTURING COMPANY, ALTRINCHAM, NEAR MANCHESTER.**

# THE THORNTON-PICKARD Camera.

("RUBY" pattern.)



FIG. 19.

The Shutter is permanently attached to the Front of the Camera, and folds up with it.

The Workmanship is perfection, and unsurpassed in any other Camera.



**I**N designing this Camera our aim has been to produce an instrument at a reasonable price, having all the movements and advantages of the best high-class Cameras, with others that are distinctly its own. Perfect in every movement, the "Ruby" Camera has many striking advantages, mentioned in detail in the following pages.

**T**HE Shutter is attached to the Camera Front, and the Turntable forms a part of the Base-board, so that they are always in position ready for work. The Shutter folds up with the Camera, packing into the aperture in the Turntable (see Fig. 19 above). The lens is mounted on a panel that fits into the front of the Shutter. It may, if desired, remain in position, and fold up with the Camera.

*[Continued on next page.]*

## Special Features.

The "RUBY" Camera is fitted with Turntable.

It has a Front with an unlimited amount of Rise and Fall.

Has Double Pinion, so that it can be racked from longest to shortest focus.

The Back can be pushed up to the Front, for use with Wide Angle Lenses.

It has Vertical and Horizontal Swings.

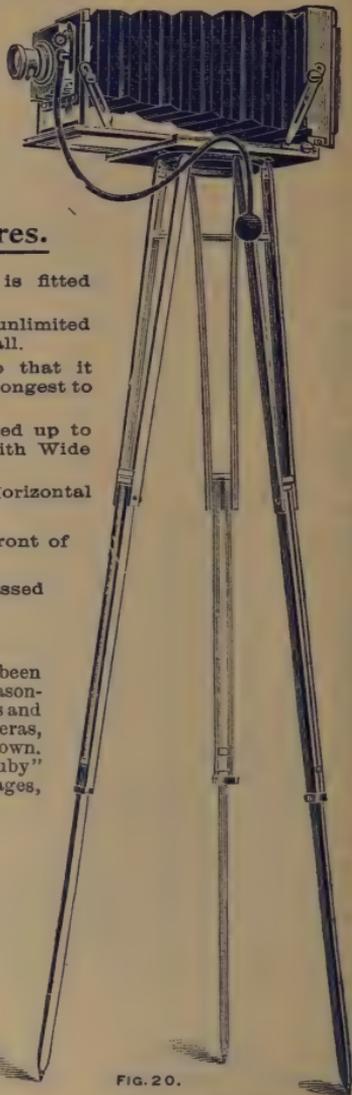


FIG. 20.

THE THORNTON-PICKARD MANUFACTURING CO., ALTRINCHAM, NR. MANCHESTER.

## The Thornton-Pickard Camera—(continued.)

**The Turntable** is shown in Fig. 19. This forms part of the Camera, and the legs are quickly attached to it, as shown in Fig. 20. This arrangement is infinitely superior to the old-fashioned loose triangle, as there is no chance of leaving it behind and so rendering the Camera useless when away from home. The centre of the Turntable is cut away, so that the Lens and Shutter fold up with the Camera, as shown in Fig. 19. There is no need to detach them each time it is folded. The large size of the Turntable insures a very rigid base for the Camera.

**The Front** of the Camera is very simple. It can be quickly erected, and is rigid and firm when in position. Fig. 21 shows how to fix it. After opening the Camera place the Front in the position shown, leaning backwards, so that the bottom corner hooks of the Front are over the pivots marked P. Press the Front down between the pivots, and then place it in the vertical position, as shown in the other illustrations. Fasten in position by turning the winged clamping screws marked W. The Front is fitted with a removable Lens-Panel, which is of sufficient size to take large lenses.

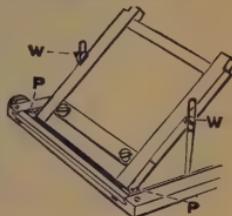


FIG. 21.

**Double Pinion** for focussing. The Camera is fitted with two focussing Pinions which enable it to be racked from the shortest to the longest focus without any unscrewing or shifting of the Front-board as shown in Fig. 22, and without removing the head from beneath the focussing cloth. This is a great advantage, as any lens, whether short, medium, or long focus, can be focussed without delay. The Pinion shown at the front end of the Baseboard in the illustration racks the Front of the Camera outwards for medium or long focus lenses; and the other, at the back end of the Baseboard, racks the Camera Front inwards for short focus lenses.

**The Shutter** is the Thornton-Pickard Time and Instantaneous (Standard Pattern), described on pages 8 and 9. It allows any kind of exposure to be given, from the most rapid Instantaneous to the most prolonged Time (even such as would be given to an interior, without need of a lens cap. It is attached to the Camera Front, and works behind the lens, forming practically an Inside Shutter. It is fitted with a detachable Panel, to which the lens flange can be attached. Additional Panels can be supplied for other lenses, so that various lenses can be used with the same Shutter, and changed in a moment at will. The Shutter is always in position, ready for use, but can be removed bodily from the Camera, if desired, by simply lifting the Front Panel, to which it is attached, out of the Front. Cap exposures can be made without removing the Shutter,

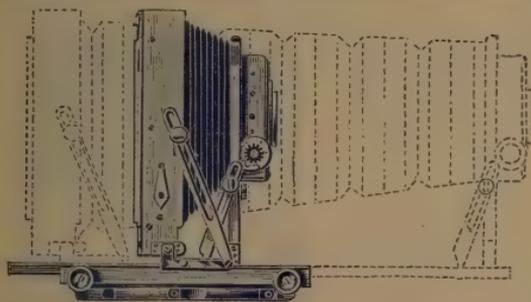


FIG. 22.

if desired, by first setting it full open as for focussing. For extremely rapid Instantaneous work we recommend the Focal Plane Shutter (see pages 17, 18, and 19, in addition to the Time and Inst. one. One Shutter does not in any way interfere with the other.

in position by the screw at the side; or the front may be racked inwards towards the back by the back pinion, as shown in Fig. 22. For long focus Lenses the Camera racks out to more than double the length of plate. See Fig. 22.

### Wide Angle Lenses

may be used with this Camera without danger of the Baseboard cutting off part of the picture. This is done by pushing the back of the Camera nearer to the front, as shown in Fig. 23, and then clamping it

[Continued on following pages.]

THE THORNTON-PICKARD MANUFACTURING CO., ALTRINCHAM, NR. MANCHESTER.

## The Thornton-Pickard Camera—(continued.)

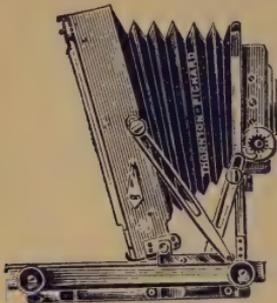


FIG. 23.

the front is shown raised considerably above its central position, which is only necessary in extreme cases.

**A** CORRESPONDING amount of Fall may be obtained, so as to bring the lens below the centre of the plate, which is very useful and necessary when taking photographs from a window or elevated situation.

**All Swinging Movements.** These are complete, every necessary movement being obtainable.

**VERTICAL SWING.**—The Back may be swung backwards or forwards, and clamped by the set screw at each side (see Fig. 23). The front may be swung and clamped in a similar manner. To ascertain whether the Back or Front are exactly at right angles with the Baseboard, slightly press the fingers upon the slotted stays before tightening up the screws. This will cause the screws to enter the notches cut in the stays, which indicates that the parts are at right angles to each other.

**HORIZONTAL OR SIDE SWING** is obtained by loosening the clamping screw that secures the Back at any position on the Baseboard. One side may then be placed nearer to the lens than the other, after which the screw should be tightened up again. This movement is sometimes of great advantage to get objects in sharp focus that are nearer to the Camera at one side than the other.

**I**T should be remembered that distant objects and very close objects cannot be both got into sharp focus in the same plane easily without swinging some part of the Camera to a suitable angle. The Back of the Camera is the most convenient to swing, and upon these facts depend the advantages of a Vertical and also Horizontal Swing Back.

**Plumb Indicator.** For subjects having straight vertical lines, such as buildings, &c., whatever the position of the Camera (whether tilted up or down), the Back (and therefore the sensitive plate) *must hang plumb*. If it does not, the vertical lines will converge instead of being parallel. By swinging the Back until the point of the Plumb Indicator (shown in Figs. 22 and 24) coincides with the pin or stud on the side of the Camera, and then tightening the set screws, the Back will be plumb.

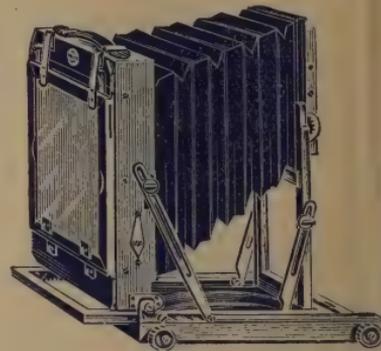


FIG. 24.

[Continued on following pages.]

THE THORNTON-PICKARD MANUFACTURING CO., ALTRINCHAM, NR. MANCHESTER.

## The Thornton-Pickard Camera—(continued.)

**Reversing Back.** The frame to which the Focussing Screen, is attached, and into which the Dark Slides fit, can be placed either way up for horizontal or vertical pictures. It is instantly locked when placed in position by a couple of spring snaps. The Reversing Back can also be used either way up, so that if the Shutter of the Slide cannot be drawn out, owing to the Camera being close to a wall say, as is often the case when taking interiors, the Back can be turned upside down so that the Shutter of Slide can be drawn out at the opposite side of the Camera.

**The Dark Slides** are of the best finished workmanship, and have hinged folding Shutters, which may be folded back under the Focussing Screen, so as not to catch the wind during exposure. They are fitted with Improved Spring Snap which securely fastens the Shutter when pushed in. The Slides simply drop into position at the back of the Camera and are held securely by two catches. There is no sliding movement and therefore no chance of accidentally shifting the Camera after fixing it in position by pushing the Slide sideways. Additional Dark Slides can always be supplied to fit by mentioning size of Camera. The Slides are perfectly light-tight, and are therefore suitable for the most sensitive plate. This is due to the careful workmanship, to the special form of velvet backing placed under the Shutter, and to the Snap being on the OUTSIDE instead of recessed into the Shutter. They are book form, and hold two plates each, which are separated by a hinged division that cannot be misplaced or lost in the dark room. They are fitted with the Patent Dark Slide Recorder, as shown in Fig. 25. This is a great acquisition, as it shows at a glance which plate has been exposed and prevents mistakes such as taking two pictures on one plate. It is described in detail on pages 38 and 39.

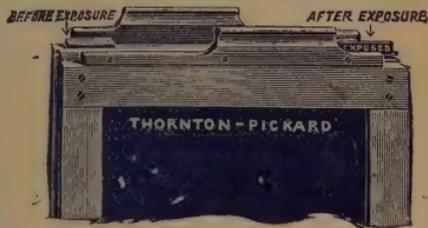


FIG. 25.

They are book form, and hold two plates each, which are separated by a hinged division that cannot be misplaced or lost in the dark room. They are fitted with the Patent Dark Slide Recorder, as shown in Fig. 25. This is a great acquisition, as it shows at a glance which plate has been exposed and prevents mistakes such as taking two pictures on one plate. It is described in detail on pages 38 and 39.

THE "Ruby" Camera can either be supplied with the Dark Slides as above, or with our new

**Patent Plate Holder.** This is very simple, light, and efficient. It is not made book form, but solid, the plates being inserted by drawing the Shutters on either side and pulling back the Spring-Bar at one end of the Holder. The Plate can then be dropped into place and is held securely by the spring-bar. The Shutters pull right out, being perfectly light-tight on account of the spring cut-off under each Shutter which closes the groove when Shutter is withdrawn. These Holders are  $\frac{1}{2}$  lb. lighter than the Dark Slides in  $\frac{1}{2}$ -plate size, so that they save  $\frac{1}{2}$  lb. in the weight for a set of three. A full description and illustrations will be found on page 37.



FIG. 26. STAND CLOSED.

convenient Stand made. The joints of the Stand rigidly lock themselves when they are opened out. The top and bottom joints are shown in Figs. 27 and 28. Each leg is made with three sections, the bottom one of which slides so that the length may be adjusted when required for uneven ground, and clamped by a set screw. The Stand opens out to a height of 4ft. 7in., and closes up to 22 inches in length for convenience in carrying (see Fig. 26). This Stand is described in greater detail on pages 33 and 34.

## Our Patent Automatic Tripod Stand

is supplied with the Camera and fits the Turntable.

It is the simplest and most convenient

FIG. 27.

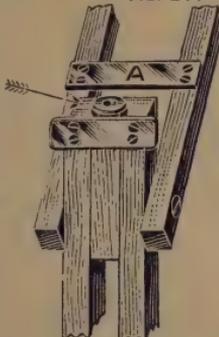
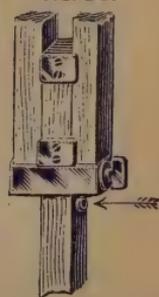


FIG. 28.



**To Set up the Camera** open the legs and attach to the turntable. Turn up the Camera Body or Back, and clamp vertically by the set screws. Lift up the Front, fix and clamp, as above described.

**To FOLD THE CAMERA** the movements are reversed.

[Continued on following pages.]

The Thornton-Pickard Ruby Camera—(continued.)

The "Ruby" Camera is remarkably compact and light. Note the following particulars:—  
**SIZE** when folded, including all projections, without Turntable and Shutter, Half plate 9 x 8½ x 2½ in.; Whole plate 11½ x 10½ x 2½ in. When folded, including all projections, and including Turntable and Shutter, Half plate 9 x 8½ x 3 in.; Whole plate 11½ x 10½ x 3 in.  
**WEIGHT**, without Turntable and Shutter, Half plate 2½ lbs.; Whole plate 4½ lbs. Including Turntable and Shutter, Half plate 3½ lbs.; Whole plate 5½ lbs.  
**LONGEST FOCUS**, with Shutter, Half plate 16 in.; Whole plate 19½ in.  
**THE "RUBY" CAMERA** has EVERY NECESSARY MOVEMENT. It is the SIMPLEST and the BEST all-round Camera, and is suitable FOR ALL KINDS OF WORK, amongst which we may mention the following: Travelling and Touring; Architectural Works; Home Portraiture; Copying Photos, Engravings, &c.; Making Lantern Slides from negatives of larger or smaller sizes. Enlarging or Reducing, &c., &c.  
 The Photographs on pages 2, 5, 15, 16, 35, and 36, were taken with the Ruby Camera.

TESTIMONIALS.

CAMERA is a splendid instrument, the dark slides are pieces of exquisite workmanship."—W. J. W.  
 "I am very pleased with the intelligent contrivance shown in every part of it, every movement is well studied and carried out."—L. P.  
 "The Camera is extremely satisfactory and fully capable of dealing with any subject which could possibly arise. The Permanent Shutter is a great acquisition."—V. D.  
 "The Camera gives every satisfaction."—J. W. & Co., South Africa.  
 "The Camera is noted for its beautiful finish and lightness."—*Exeter Evening Post.*

"I have found the Ruby Camera perfect in every way."—JNO. C.  
 "I find it quite up to my expectations; everything has given me satisfaction."—H. R. K.  
 "The Ruby Camera gives me great satisfaction."—R. T.  
 "The Ruby is a beautiful compact instrument."—*Hand Camera and Lantern Review.*  
 "A very fine instrument indeed, and the power of keeping the Shutter fixed ready is a great convenience. The Camera is also very light and compact."

*Amateur Photographer.*

The above are bona-fide unsolicited Testimonials.

THE THORNTON-PICKARD Special Lenses.

THESE are of the finest quality, and have splendid definition and covering power, and are capable of performing the best work. They can be supplied with either the Iris or Ordinary Diaphragms or Stops. The Iris is recommended with the Rapid Rectilinear Lenses, and the Revolving Diaphragm with the Wide Angle Lens.

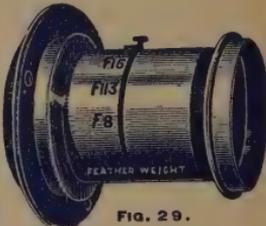


FIG. 29.

**The RAPID RECTILINEAR.** The best all-round Lens. Suitable for Instantaneous Work, Architecture, Landscape, Portrait, Copying, &c. Largest aperture, F/8. Made with either Waterhouse or Iris Diaphragms

To cover plates	5 x 4	6½ x 4½	7 x 5	8½ x 6½	10 x 8	12 x 10	15 x 12 in.
Focus about	5½ in.	8½ in.	9½ in.	11 in.	13½ in.	17 in.	21 in.
With "Waterhouse" Diaphragm	£1 18	£2 5	£3 0	£3 10	£5 5	£6 5	£9 0
With Patent "Iris" Diaphragm	2 11	3 0	4 0	4 10	6 5	7 10	10 10

The "Iris" Diaphragm fitted to these Lenses is very neat; it is contained entirely within the Lens tube, and has a small projecting knob to set it by.

**The WIDE ANGLE RECTILINEAR.** Suitable for Interiors, Architecture, Landscape, Copying, and any views in confined situations. Largest aperture, F/11. Made with revolving diaphragms.

To cover plates	5 x 4	6½ x 4½	8½ x 6½	12 x 10	15 x 12 in.
Focus about	3½ in.	5½ in.	7 in.	9 in.	10 in.
	£1 16	£2 5	£3 10	£4 7 6	£4 14 6

ALL the above Lenses may be used as Single Lenses of longer focus by unscrewing either the front or back combination. It is preferable to use the back one; thus a Lens of about double the length of focus is obtained, which is very suitable for distant objects, such as hills, &c., which sometimes look very diminutive when taken with the ordinary Lens. Thus a W. A. of 5 in. focus, and a R. R. of 7½ in. focus, gives practically four lenses of 5 in., 7½ in., 10 in., and 15 in. focus respectively. These would be sufficient to embrace all kinds of subjects on a half-plate (6½ by 4½ in.).

TESTIMONIALS.

"I tried the Lens, it is very good value for the money, and as good as some I have seen at double the price."—J. P.  
 "I am very pleased with the Lens, indeed."—E. H. B.

THE THORNTON-PICKARD MANUFACTURING CO., ALTRINCHAM, NR. MANCHESTER.

# The THORNTON-PICKARD

AUTOMATIC

CAMERA STAND.

(Patent).



FIG. 30. STAND CLOSED.

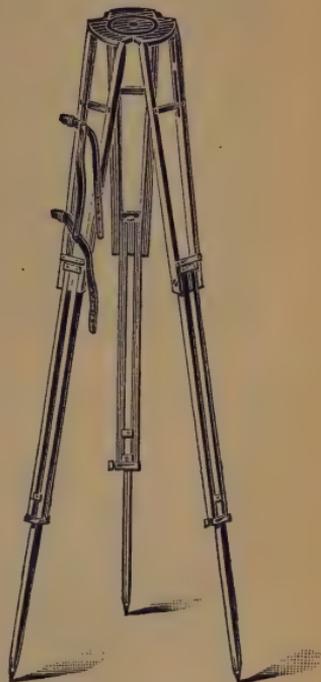


FIG. 31.

Automatically-Locking Joints ;  
Simple and Efficient.  
Light. Compact. Rigid.

Prices:      SIZE No. 1. For ½-pl. and ¼-pl. Cameras .. .. 17/6  
                  ,, No. 2. For 10 x 8 and 12 x 10 Cameras .. .. 22/6

The Patent Automatic Lock Joints can be fitted to any of the Thornton-Pickard Ruby Stands previously supplied, at a cost of 5/- per Stand.

The weight of No. 1 Stand is about 3lbs.  
                  ,, No. 2 ,, ,, ,, 4lbs.

Length—opened out for use, 4ft. 7in. ; folded up for travelling, 20in.

[Automatic Camera Stand continued on next page.]

THE THORNTON-PICKARD MANUFACTURING CO., ALTRINCHAM, NR. MANCHESTER.

### Automatic Camera Stand—(continued.)



**HIS** is the simplest and most convenient Stand yet made. It is quickly erected; each leg is simply opened to its extreme limit, when the joints instantly and automatically lock themselves. There are no buttons that can be accidentally turned and allow the Stand and Camera to collapse.

The Stand is made of the best English ash, and is in three sections, the bottom one of which is adjustable for uneven ground, &c., and is fitted with a screw to clamp it at any height required.

On pulling out this section as far as possible, the spring bolt marked by the arrow in the engraving springs out and instantly locks the joint. To close again, the spring bolt is pressed with the thumb, which allows the section to slide back again. A thumbscrew is provided at this joint, so that the section may be adjusted to any height, as above mentioned, and may be used in addition to the spring bolt, to give extra rigidity if desired.

The upper joint is locked on exactly the same principle, but it folds instead of slides; the spring bolt is larger and stronger and snaps into position, behind the plate A, as soon as the upper section is unfolded. The two sections are therefore wedged together in a very practical manner, and the utmost rigidity is secured.

This Automatic Lock is much superior to the usual form of button or screw fastener, as it entirely prevents any danger of the Stand collapsing, and is instantaneous in its action when being erected.

The form of tripod top should be noticed; this is as small as is consistent with rigidity, measuring across 5 inches, and is made of mahogany, French-polished both on the top and bottom; and has a ring of velvet let in the top, so as not to scratch the Camera baseboard.

It has no projecting studs or sharp corners liable to scratch other parts of the Camera when packed in the bag.

Handle straps are provided for convenience in carrying.

In packing up the three legs before strapping, the middle one should be placed the reverse way from the outside ones; they will then fit close together and form a compact package.

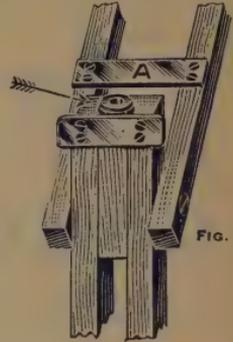


FIG. 32

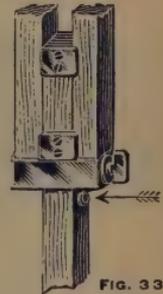


FIG. 33

THE  
**THORNTON-PICKARD**  
 MANUFACTURING COMPANY,

ALTRINCHAM, NEAR MANCHESTER.

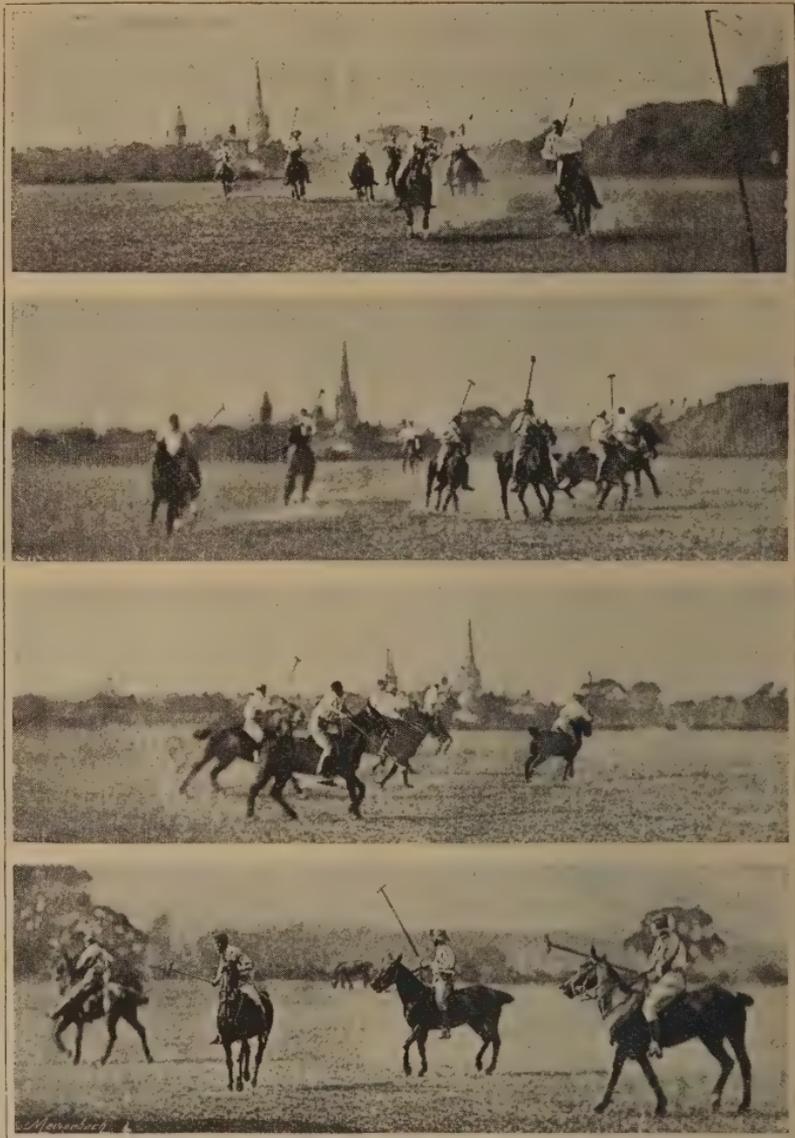


THE GRAND CIRCLE. Exposure,  $\frac{1}{100}$  sec.

SKATING—(FORWARD AND BACKWARD ROLL). Exposure,  $\frac{1}{300}$  sec.

*The Photos of Skating are of Joseph Spence Hodgson, Esq.  
Taken by Mr. Edgar Pickard, with a*

THORNTON-PICKARD FOCAL PLANE SHUTTER



## POLO. AT BOWDON.

*Exposure  $\frac{1}{300}$  sec. Taken by Mr. Edgar Pickard, with a*

THORNTON-PICKARD FOCAL PLANE SHUTTER.

# THE THORNTON-PICKARD Plate Holder,

With Patent Spring Bar.

A set of three Half-plate size weigh  
½ lb. less than the ordinary form.

They can be changed in half the  
time.

A great saving in cost.

## Prices :

SIZE 6½ in. x 4½ in. (Half-plate) .. 9/- EACH.

„ 8½ in. x 6½ in. (Whole-plate) 13/- „

*Including fitting to Camera, complete with Spring  
Snaps and Recorders.*

**When Ordering** please send a Dark Slide  
belonging to the Camera, or else the Reversing Back ;  
the latter preferred if it can be spared.

**T**HIS is a Dark Slide of very simple construction, to carry two plates. It is very much lighter than the ordinary book form of Slide and being made with a solid frame there is no liability to warp. It is perfectly light-tight and safe for the most sensitive plates.

**T**HE Shutters are very light, and pull right out, the aperture being closed automatically by a spring cut-off that prevents access of light. They are fitted with an improved form of Spring Snap or Catch, which prevents the Shutter from being drawn accidentally, and also with our patent Recorders that show at a glance which plates have been exposed—adding greatly to their efficiency.

**T**HE important feature about this Plate Holder, which is both different and far superior to any other previously introduced, is the automatic Spring Bar, which securely holds the plate in position so that it cannot possibly fall out, however much the Holder may be shaken about.

**To Insert a Plate in the Holder,** pull one of the Shutters right out, (or nearly so). Then, taking hold of the plate in the left hand, push the plate under



FIG. 34.

spring which is not shown in the engraving. Now with the left hand press the plate down into position, then the Spring Bar is allowed to spring forward and instantly locks the plate firmly.

**To take the Plate Out,** it is only necessary to pull back the Spring Bar with the forefinger, as above described ; the plate is at once lifted up by the spring underneath to the position shown in Fig. 1, and it can therefore be taken out with the other hand.

**T**HERE is an opaque division inside the Holder which divides the two plates and carries on each side one of the above-mentioned springs. These springs serve the double purpose of keeping the plates close up to correct focus, and lifting them out when required.

**W**HETHER the Holder is being loaded or unloaded it is best to place it flat upon a table. The Shutter is drawn, the Plate inserted, and the Shutter pushed in, without moving the Holder. This is infinitely more convenient than the various operations that are necessary with a book form of Slide.

**T**HESE Plate Holders are beautifully made of mahogany and French polished, and are therefore suitable for use with the most expensive or highly-finished Cameras.

THE THORNTON-PICKARD MANUFACTURING CO., ALTRINCHAM, NR. MANCHESTER.

THE  
**THORNTON-PICKARD**  
 Patent  
**Dark Slide**  
**Recorder.**

SHOWS AT A GLANCE  
 WHICH  
 PLATES HAVE BEEN  
 EXPOSED.

PREVENTS  
 TWO PICTURES BEING  
 TAKEN  
 ON ONE PLATE.

Price of Recorder, 6d. each. Fitting to Slide, 3d. extra.

One Recorder is required for each plate—that is, two for a Double Slide or one for a Single Slide.

NOTE.—*The Recorder is fitted to all Dark Slides and Plate Holders of our manufacture without extra charge.*



HIS simple little device is a great success and gives everybody satisfaction; it ought to be fitted to every Dark Slide and Plate Holder. It records automatically which plates have been exposed and which have not.

THE Recorder is fitted at the top of the Slide (as shown in Fig. 3) and can therefore be seen without taking the Slides out of the carrying case or bag. It lies down flat before exposure (see Fig. 35), but flies up and stands upon edge after exposure (as in Fig. 36); so that it can be seen at a glance which plates have been exposed and which have not. At the same time it does not lock the Shutter of the Slide, and if this has been drawn, but the plate has not been used, the Shutter can be pushed back again and drawn a second time when required.

THIS simple device prevents the danger of taking two pictures on one plate. It saves a world of trouble and is an infallible substitute for the memory.



BEFORE EXPOSURE

FIG. 35.



AFTER EXPOSURE

FIG. 36.

THE Recorder consists of a small hinged plate or lid, which lies down flat before exposure. It is fitted at the top of the Slide, as above stated, and in such a position that the handle or projecting part of the Shutter holds it down. As soon as the Shutter of the Slide is withdrawn to expose the plate, the lid flies open by means of a steel spring, which at the same time forms the hinge of the Recorder and discloses the word "EXPOSED," remaining in this position until the Slide is again charged with a fresh plate in the dark room. The Recorder may be set ready for the next exposure by simply closing down the lid with the forefinger, at the same time closing the Shutter of the Dark Slide.

[Dark Slide Recorder continued on next page.]

THE THORNTON-PICKARD MANUFACTURING CO., ALTRINCHAM, NR. MANCHESTER.

## The Thornton-Pickard Dark Slide Recorder—(continued.)

## DIRECTIONS for FITTING.



ENERALLY speaking, there are two kinds of Dark Slides—those having projecting tops or handles, as shown in Fig. 37, and those with leather tabs instead.

**For Slides that have overhanging tops or handles to the Shutters** (as in the illustration)—Screw the Recorder on to the uppermost end of the Slide, as shown in position, so that the projecting top will hold down the lid of the Recorder when the Shutter is pushed in. Cut away just sufficient of the woodwork of the top of the Slide to make room for the Recorder, and to allow the Shutter to close properly. One end of the Recorder should be about  $\frac{1}{2}$  in. from the corner of the Slide. If fitted in this way the cranked plate supplied with each Recorder is not required.



FIG. 37.

**For Slides which have no projecting tops but have leather tabs to withdraw them by**—The small bent plate supplied with each Recorder must be screwed carefully on to the end of the Shutter, so that the plate projects over the lid of the Recorder when fixed, and will therefore hold it down in place when the Shutter is pressed home.

**T**HE Recorder is easily fitted to Slides, but we prefer to do this where possible. Slides may be sent direct or through any dealer. As a rule they can generally be returned fitted the next day. A convenient way to send them is by parcel post. The weight of a parcel containing three  $\frac{1}{2}$ -plate Slides is about 2 $\frac{1}{2}$  lbs., which costs 6d.

## TESTIMONIALS.

"I can't tell you how valuable I have found your little Dark Slide Recorder to be. Many a time they have saved me from exposing a plate twice over. I would not be without them at any cost."—E.H.

"The idea is excellent, and I should have secured by their use some excellent pictures, which, by the not uncommon misadventure of a double exposure, I failed to take, and may never have the opportunity of obtaining again."—W. L.

"Your recorder is an excellent one; most simple and most effective."—W. L.

"I am very pleased with the Dark Slide Recorders, which I have found invaluable, when exposing many plates in one day."—M. C.

"The Dark Slide Recorder is a very simple and useful indicator. It does not lock the shutter after an exposure, but it shows that the slide has been withdrawn."—*Photography*  
"By its use plates will be saved, and much loss of time and temper obviated."—*Hana Camera and Lantern Review*,

**THORNTON-PICKARD**  
MANUFACTURING COMPANY,  
ALTRINCHAM, near MANCHESTER.

THE  
**THORNTON-PICKARD**  
Patent

**Plumb**  
**Indicator.**

FOR  
ATTACHING TO  
CAMERA.

CANNOT GET LOST.

NO SKILL  
REQUIRED TO  
FIX.

Price SIXPENCE each.

(Post free, Sevenpence.)

Also supplied to dealers on Show Cards containing one dozen.

WHEN photographing any subject in which there are vertical lines, such as buildings, &c., it is **absolutely necessary** that the sensitive plate should **hang plumb**, or the vertical lines will not be parallel in the resulting photograph. It is difficult to judge when the plate does hang plumb without either a spirit level or a **Plumb Indicator**. The latter is by far the **simplest** and the **best** device. It is permanently screwed to the Swing Back of the Camera, and **cannot get lost**. It shows at a glance, with certainty, when the Camera Back and Sensitive Plate are true and plumb.

As shown full size in Fig. 38, it consists of a swinging pointer, attached to a plate that can be screwed permanently to the Swing Back of the Camera. It is very sensitive in its action, immediately



FIG. 38

showing at a glance the slightest deviation from the perpendicular.

WHEN photographing buildings, &c., in confined situations, it is often necessary to incline the Camera upwards (as shown in Fig. 39) in order to get the more elevated part of the subject upon the sensitive plate, which brings the back of the Camera (and consequently the plate) to the position shown by dotted lines **B**. If the plate is exposed in this position the vertical lines of the buildings will not be parallel in the resulting photograph; the effect will be what is generally termed "drunken architecture"—everything will look askew. If, however, the Swing Back of the Camera is placed in the position **A** (see Fig. 39) with the Indicator exactly plumb the photograph will be correct, and there will be no diverging or converging vertical lines in it.

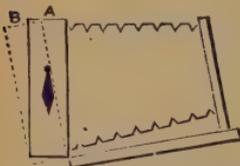


FIG. 39

**Fitting to Camera.**

DECIDE upon a position on one side of the Camera that does not interfere with the brass plates or stretchers. Place one edge of the black plate carrying the swinging Plumb exactly parallel with the straight edge of the Camera, and screw down tight with the screws supplied.

.....

Sent out complete with screws ready for fixing.

THE  
**THORNTON-PICKARD** Manufacturing  
Company,  
ALTRINCHAM, near MANCHESTER.

# PAGET PRIZE PLATES

Are used by the most Eminent Professional  
and Amateur Photographers throughout the  
entire world, and are

## INDISPENSABLE

To those who  
would make or retain a reputation for

## FIRST-CLASS

## WORK.

---

PAGET PRIZE PLATE COMPANY,  
→\* WATFORD, \*←

# PAGET PRIZE LANTERN PLATES.

---

## SLOW.—

For Contact Printing by Artificial Light. These give a range of tone from BLACK to RED, according to exposure and development.

1/-

PER  
DOZEN.

## RAPID.

For Reduction in Camera by Artificial Light. These give only Black tones.

## PRINTING-OUT.

For Contact Printing by Daylight. These give warm tones, and are printed, toned, and fixed in the same manner as Printing-out or Albumenized Paper. They may also be printed for a small fraction of the time required for full printing, and completed by development in the same manner as Our Printing-out Paper.

1/6

PER  
DOZEN.

---

PAGET PRIZE PLATE COMPANY,

→\* WATFORD. \*←

# PAGET PRIZE PRINTING-OUT OPALS

Make the most Charming Pictures with the  
least possible trouble.

NO DARK ROOM REQUIRED.

OPTIONAL DEVELOPMENT.

NO MOUNTING.

Print, Tone, and Fix in the same manner as Printing-Out or Albumenized Paper, or they may be printed for a small fraction of the time required for full printing, and completed by development in the same manner as Our Printing-Out Paper.

## PRICE LIST.

MATT SURFACE.				GLAZED SURFACE.			
$4\frac{1}{2} \times 3\frac{1}{2}$	...	...	1/8	$4\frac{1}{2} \times 3\frac{1}{2}$	...	...	2/3
$6\frac{1}{2} \times 4\frac{1}{2}$	...	...	4/-	$6\frac{1}{2} \times 4\frac{1}{2}$	...	...	5/-
$8\frac{1}{2} \times 6\frac{1}{2}$	...	...	7/6	$8\frac{1}{2} \times 6\frac{1}{2}$	...	...	9/6

All sizes above  $\frac{1}{4}$ -plate are packed in half-dozen boxes.

## CARDBOARD CARRIERS FOR PRINTING OPALS IN ORDINARY PRINTING FRAMES.

Quarter-plate, 4d.    Half-plate, 6d.    Whole-plate, 8d. each.

Special Printing Frame complete, for Printing Lantern Plates,  
quarter-plate or half-plate Opals, price 7/6 each.

\*\*\*\*\*

# PAGET PRIZE PLATE COMPANY,

⇒❖ WATFORD. ❖←

PAGET PRIZE PAPER  
— FOR —  
PRINTING-OUT  
— OR —  
DEVELOPMENT

May be used in the customary manner as a first-class Printing-Out Paper, giving results unsurpassed by anything yet produced ;  
or the Printing may be stopped at

**ONE-TENTH of THE ORDINARY  
TIME,**

Or even less, or at any period between that and full printing. The picture is then fully brought out by a very simple and speedy process of development, and afterwards toned and fixed as usual. In dull weather the saving of time by this process over that of full printing is enormous, and the results by either method are

**ABSOLUTELY INDISTINGUISHABLE  
FROM EACH OTHER.**

~~~~~  
In Sheets or Packets at Prices same as other  
Printing-Out Papers.

————— ◆◆◆◆◆ —————  
**PAGET PRIZE PLATE COMPANY,**  
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# MAGIC LANTERNS.

Enormous Success of the  
NEW  
**PAMPHENGOS**

*Has stood the test for*  
**OVER FOURTEEN YEARS**  
*against all Imitations.*  
**OVER 3000 SOLD.**

Price £2 10s., £4 4s. & £6 6s.



B. J. MALDEN, Esq., compares it to Limelight.

**AN INTENSELY WHITE LIGHT. NO SMELL OR SMOKE.**  
Glasses that are Impervious to Heat, and Proof against Fracture.  
**REFLECTOR OUTSIDE THE HOOD.**

**Full Volume of Light at all Times.**

The perfect combustion of this Lamp enables it to burn at any time without the aid of dampers or chimney lengtheners. Personal attention is given to each Lamp to insure finest results. Supplied to hundreds of Clergymen, Institutions, and the Government.

*Elegant and substantial Solid Brass front, high class Lenses, with latest Lamp, £6 6s.*

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**THE UNIVERSAL FOUR-WICK LANTERNS,**

With 4-inch Condenser Portrait Combination Lens, rack and pinion, £1 5s. 6d

Elaborately ILLUSTRATED CATALOGUE, with valuable information, with over 180 fine wood blocks, 6d.; postage, 3d. Slide list of over 60,000, 6d. Pamphlets free.

**W. C. HUGHES,** PATENTEE and INVENTOR, Brewster House,  
Mortimer Road, Kingsland Road, London, N.

B B B

See following pages.

# THE MINIATURE MALDEN TRIPLE.

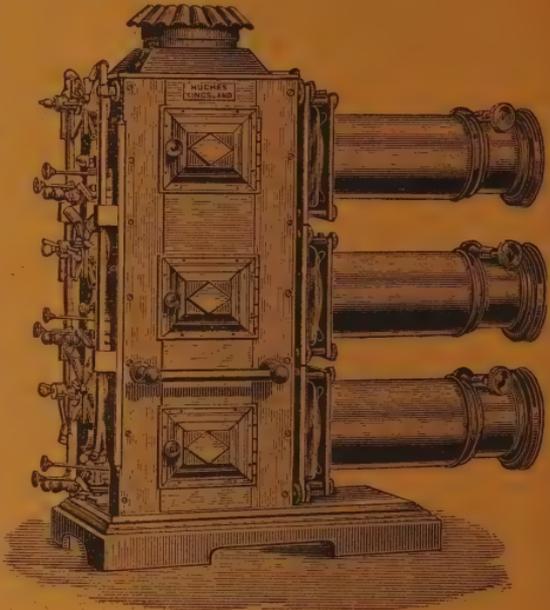
## HUGHES' PATENT.

**A PERFECT BIJOU MODEL** used nightly by **B. J. Malden, Esq.**, with great success. **Ventilation perfect**, and keeps cooler than the larger ones. Height, 23 inches; width, 8½ inches; weight, lessened. Splendidly constructed on scientific principles, well made, and great strength to carry the large diameter Lenses. Perfect rigidity for registering, which could not be obtained with bellows fronts. Everything has been studied for portability.

Elegant Brass Fronts.

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**BI-UNIALS**, unsurpassed at the price, well-made, mahogany body, lined, solid brass fronts, £6 10s.; cheaper form, brass front tubes, £5 5s.

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**REGULATORS AND GAUGES**. Further reductions. 12s. each.

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**SECOND-HAND LANTERNS AND SLIDES**. Tremendous bargains that have mostly been exchanged in latest productions. Send for List.

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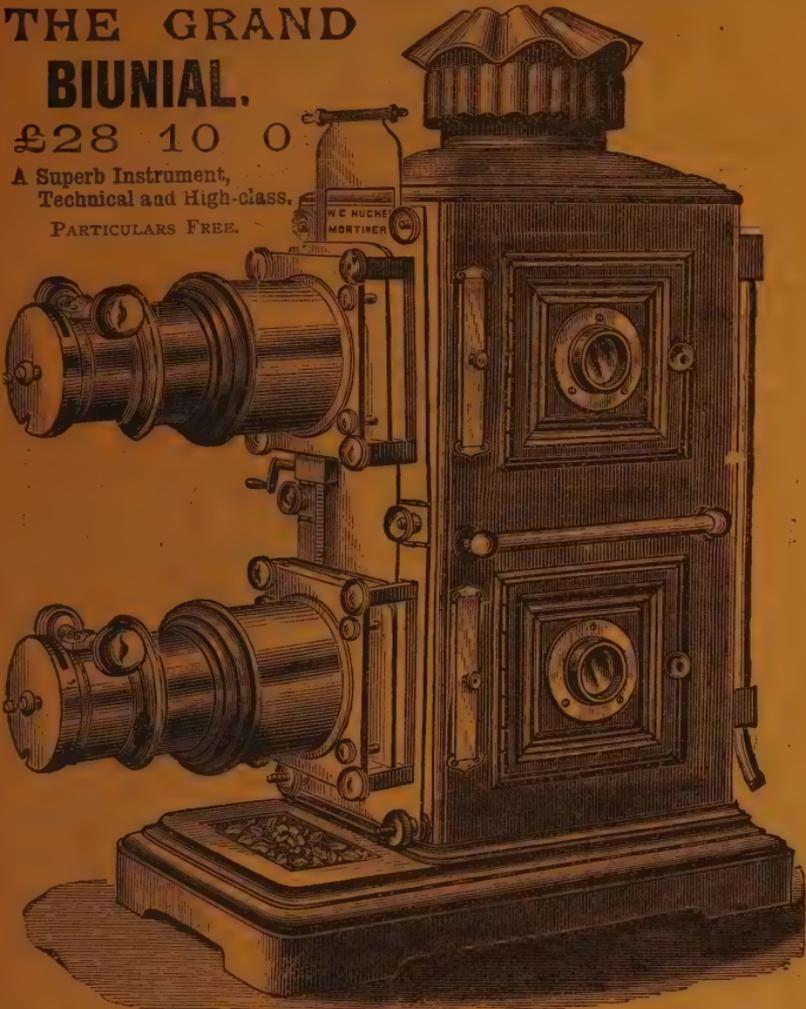
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| <b>STAR EXCELSIOR BIUNIAL</b> , elegant Brass Fronts  | ... £14 14 0 |
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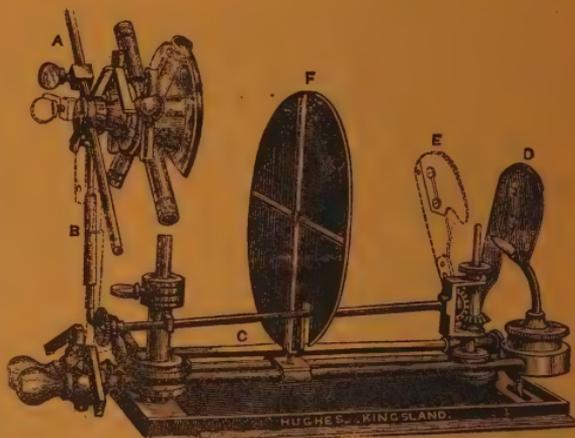
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[See following pages.]

# HUGHES' Patent Automatic MECHANICAL INCANDESCENT LIMELIGHT SHUTTERS.

Worked from the Dissolving Tap.

To prevent the incandescence showing on the Screen when one picture is taken off during Dissolving, which mars the beauty of the effect.



This adds to perfect Lantern Exhibitions, as beautiful pictures are often spoiled by the halo of light that is thrown from an Incandescent Lime.

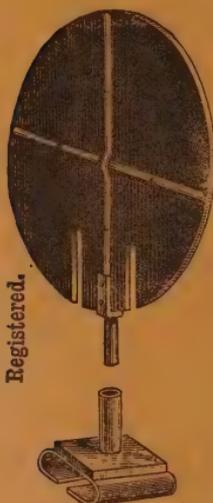
SIMPLE. PERFECT.

They will Fit any Lantern

And can be adapted by any Amateur to his Lantern.

**PRICE—Complete—17s. 6d. each.**

## THE INCANDESCENT ASBESTOS GLARE PREVENTING SHIELD.



Registered.

To prevent the rays of light passing through the back of Lantern and dazing by its glare the eyes of the audience, this arrangement does not in the least interfere with the proper manipulation of the jets, it works inside the Lantern, and the air draughts are quite free. It can be shifted or removed at will.

ADVANTAGES, SIMPLICITY, AND EFFECTIVENESS.

Only true Lanternists can appreciate the value of these inventions, therefore order at once and so enhance the beauty of a perfect Lantern Exhibition. Particulars free.

**Price 5s. 6d. each.** Suitable shape and sizes to all lanterns.

These innovations are protected, any one infringing or using them will be proceeded against.

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For Biunial or Triple Lanterns.

COMPENSATING FOR IRREGULARITIES THAT EXIST IN  
LANTERN STAGES.

*Every Picture put on a Dead Centre.*

**SIMPLE. PERFECT. EFFECTIVE.**



**BEAUTIFUL RESULTS ON THE SCREEN UNEQUALLED.**

With this Bevelled-edged Brass-fronted Mechanical Carrier pictures can be made to go on and off the screen with beautiful precision, clean as a knife cut, and charming to behold. Each slide is centred by a clip for holding the slide against the front plate of the carrier, insuring it always being in focus.

**ALL LANTERNISTS SHOULD HAVE THEM**  
*If they want simple and perfect registering.*

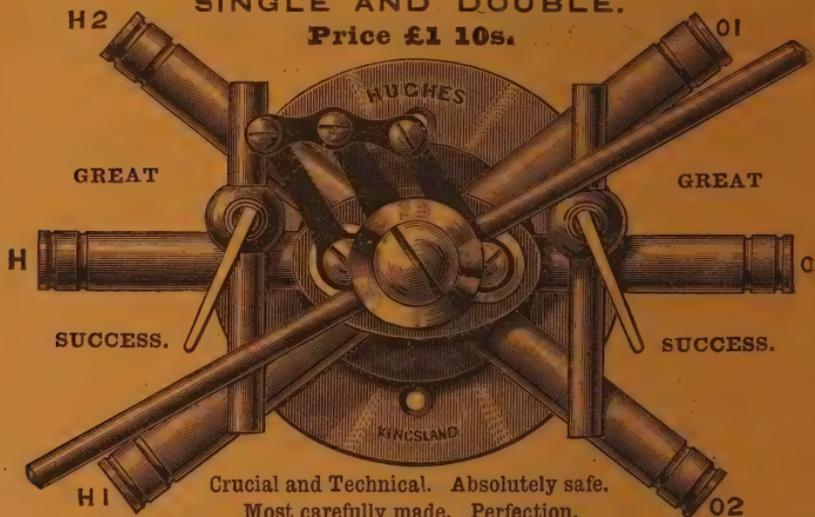
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**MOST CRUCIALLY and CAREFULLY MADE, and HIGHLY FINISHED.**

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[See following pages.]

**PATENT DOUBLE-PLUG  
STAR SAFETY DISSOLVING TAPS.  
SINGLE AND DOUBLE.**

Price £1 10s.



Crucial and Technical. Absolutely safe.  
Most carefully made. Perfection.

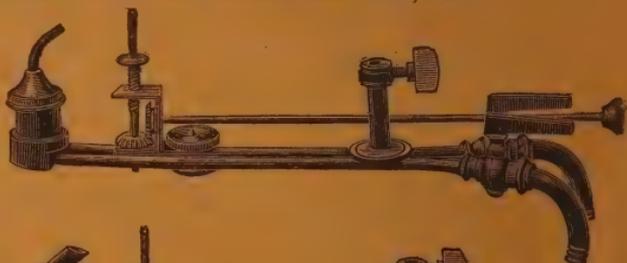
In consequence of the cheap dissolvers sold at such a price that crucial work cannot be relied on, the above has been constructed to prevent accidents now compressed gases are used. The two gases are brought into action by separate Plugs, instead of a single one, obviating all fear of explosions if Plugs become loose in their sockets.

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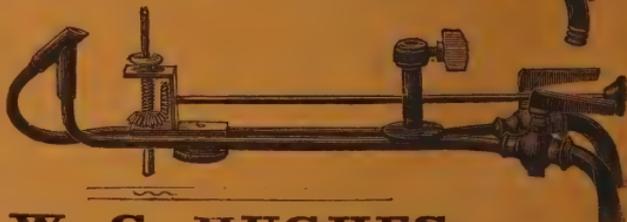
**THE MALDEN DISSOLVING, best make and quality, £1 2s. 6d.**

**CHEAP MALDEN DISSOLVING TAP, 12s.**

Cheap  
Chamber or  
Mixed Gas  
Jets, with  
Lime Turner,  
10s. 6d.



Cheap Blow  
Through  
Safety Jets,  
with Lime  
Turner, 7s. 6d.;  
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# THE ART OF PROJECTION; OR, COMPLETE LANTERN MANUAL.

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Beautifully Illustrated.

Over 100 Choice Engravings.

**STRICTLY PRACTICAL.**

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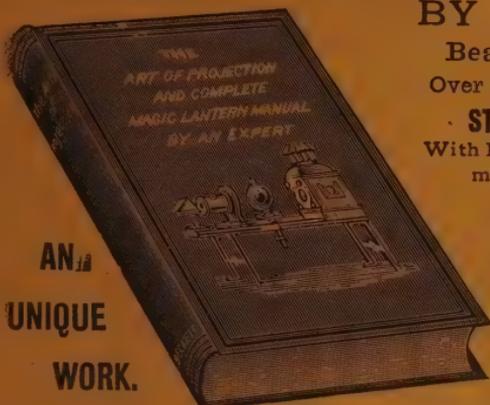
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HOW TO CHOOSE—WHAT TO AVOID—HOW TO USE OIL, LIMELIGHT, ELECTRIC, DISSOLVING, TRIPLE MICRO-

SCOPIC, POLARISCOPE, AND SCIENTIFIC LANTERNS—SLIDE MAKING, ENLARGING, &C.—SYSTEM OF PERFECT REGISTRATION OF EFFECTS—WORKING OF CYLINDERS, GAUGES, REGULATORS, & SATURATORS—GAS MAKING—OXYGEN, HYDROGEN, &c. &c.

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OTHER VOLUMES NOT PRINTED FOR WANT OF SPACE.

TO BE HAD OF

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[See following page.]

# HUGHES' PATENT BIJOU ENLARGING LANTERN

(New Pattern).

PORTABILITY, PERFECTION, AND RAPIDITY.

Rectangular  
Condensers.

The size of  
the  
Negative.

Superior  
Marginal  
Definition.



The only Perfect Enlarging Lantern for results. Fitted with Hughes' Special Lamp. Extends to suit any size Enlargement. The body and fronts run on brass telescope tubes, very rigid and firm.

Uniform  
in Action and  
Quality.

Scientifically Constructed. Not Commercial.

**NO PHOTOGRAPHER SHOULD BE WITHOUT ONE.**

*Particulars Free.*

Instead of Circular Condensers, Rectangular or Square, Reduces the Lantern considerably in size, and gives finer results than any other.

PRICES:— $8\frac{1}{2} \times 6\frac{1}{2}$ , £18 10s.;  $6\frac{1}{2} \times 4\frac{3}{4}$ , £14 14s.;  $4\frac{1}{4} \times 3\frac{1}{4}$ , £7 10s.

## SPECIAL BIJOU.

5x4 ... .. £8 15s.

Used by  
**VAN DER WEYDE,**

AND OTHERS.

PATENT  
**RECTANGULAR CONDENSERS.**

$8\frac{1}{2} \times 6\frac{1}{2}$ , £7 10s.;  $6\frac{1}{2} \times 4\frac{3}{4}$ , £5 5s.;  $4\frac{1}{4} \times 3\frac{1}{4}$ , £2 2s.

TESTIMONIALS FROM HIGHEST AUTHORITIES.

**CONDENSERS, BEST QUALITY.**

$4\frac{1}{2}$  in. 21s.; 5 in. 25s.;  $5\frac{1}{2}$  in. 35s.; 6 in. 42s.; 7 in. 60s.; 8 in. 75s.; 9 in. 100s.

GRANDLY ILLUSTRATED CATALOGUE of Magic Lanterns and Slides, with over 180 fine Wood blocks, 6d., postage 3d. List of 60,000 Slides and effects, 6d. Pamphlets free.

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Mortimer Rd., Kingsland Rd., **LONDON, N.**

[See preceding pages.]

# Edwin Osborne



## Red Lion Square, W.C.

High-Class Mounts a Specialite.

### OSBORNE'S MOUNTS

HAVE BEEN

FAVOURABLY KNOWN to the Profession for nearly FORTY YEARS PAST. They are UNRIVALLED FOR PURITY of Cardboard, and

Used exclusively by many of the leading Photographers throughout the world.

Originally being exclusively a STATIONERY & MOUNT HOUSE, I have facilities for producing SPECIAL GOODS in these lines of BETTER QUALITY and at LOWER PRICES than any Chemical, Drug or General House.

CARTE-DE-VISITE AND CABINET, Fine Ivory Surface, Bristol, and Enamelled in all the latest tints. New and Artistic Designs for Backs. Over 200 to select from. The Engraving and Printing cannot be excelled.

**NO CHARGE FOR PLATES.**

### Osborne's Special W.V. Mounts.

The Engraving and Printing is equal in every respect to the Superfine Mounts.

Bristol W.V.		Enamelled W.V.		Black or Olive W.V.	
Carte-de-Visite Mounts.		Carte-de-Visite Mounts.		Carte-de-Visite Mounts.	
(WHITE OR TINTED.)		(WHITE OR TINTED.)		(WHITE OR TINTED.)	
Printed One Side in Black or Colour.		Printed One Side in Black or Colour.		Printed One Side in Litho Gold.	
4 Sheet, 5000 ..	£1 18 3	4 Sheet, 5000 ..	£2 5 0	4 Sheet, 5000 ..	£2 14 0
10,000 ..	3 12 0	10,000 ..	4 5 6	10,000 ..	5 3 6
25,000 ..	8 8 9	25,000 ..	10 2 6	25,000 ..	12 7 6
50,000 ..	16 6 3	50,000 ..	19 13 9	50,000 ..	24 8 9
Printed Two sides in Black or Colour.		Printed Two Sides in Black or Colour.		Printed Two Sides in Litho Gold.	
4 Sheet, 5000 ..	£2 7 3	4 Sheet, 5000 ..	£2 14 0	4 Sheet, 5000 ..	£3 3 0
10,000 ..	4 1 0	10,000 ..	4 14 6	10,000 ..	5 12 6
25,000 ..	9 0 0	25,000 ..	10 13 9	25,000 ..	12 13 9
50,000 ..	17 8 9	50,000 ..	20 16 3	50,000 ..	25 6 3

No Extra Charge for Gold Bands on Gold Printed Cards. If Printed in Red Powder same Prices as Litho Gold.  
 5 Sheet Mounts 1/3 per 1000. 6 Sheet 2/3 per 1000 extra. For other Extras see Page 3 under the heading of Superfine C.D.V's.

(See following pages.)

**OBORNE'S SPECIAL W.V. MOUNTS****Bristol W.V.****CABINET MOUNTS.**

(WHITE OR TINTED).

Printed one side in Black or Colour.

5 Sheet, 1,000 ..	£1 4 3
" 2,500 ..	2 16 3
" 5,000 ..	5 8 0
" 10,000 ..	10 7 0
6 Sheet, 1,000 ..	1 6 6
" 2,500 ..	3 2 0
" 5,000 ..	5 19 3
" 10,000 ..	11 9 6

Printed Two sides in Black or Colour.

5 Sheet, 1,000 ..	£1 7 9
" 2,500 ..	3 5 3
" 5,000 ..	6 6 0
" 10,000 ..	12 3 0
6 Sheet, 1,000 ..	1 10 0
" 2,500 ..	3 11 0
" 5,000 ..	6 17 6
" 10,000 ..	13 5 6

**Enamelled W.V.****CABINET MOUNTS.**

(WHITE OR TINTED).

Printed One side in Black or Colour.

5 Sheet, 1,000 ..	£1 11 6
" 2,500 ..	3 12 0
" 5,000 ..	6 15 0
" 10,000 ..	13 1 6
6 Sheet, 1,000 ..	1 13 9
" 2,500 ..	3 17 6
" 5,000 ..	7 6 6
" 10,000 ..	14 2 6

Printed Two sides in Black or Colour.

5 Sheet, 1,000 ..	£1 17 0
" 2,500 ..	4 5 6
" 5,000 ..	8 2 0
" 10,000 ..	15 10 0
6 Sheet, 1,000 ..	1 19 3
" 2,500 ..	4 11 3
" 5,000 ..	8 13 6
" 10,000 ..	16 17 6

**Black or Olive****W.V.****CABINET MOUNTS.**

Printed one side in Litho. Gold.

5 Sheet, 1,000 ..	£1 11 6
" 2,500 ..	3 14 3
" 5,000 ..	7 4 0
" 10,000 ..	13 19 0
6 Sheet, 1,000 ..	1 13 9
" 2,500 ..	3 19 9
" 5,000 ..	7 15 3
" 10,000 ..	15 1 6

Printed Two sides in Litho. Gold.

5 Sheet, 1,000 ..	£1 17 0
" 2,500 ..	4 5 6
" 5,000 ..	8 2 0
" 10,000 ..	15 10 0
6 Sheet, 1,000 ..	1 19 3
" 2,500 ..	4 11 3
" 5,000 ..	8 13 6
" 10,000 ..	16 17 6

No Extra Charge for Gold Bands on Gold Printed Cards. If printed in Red Powder same price as Litho. Gold.

**OBORNE'S SUPERFINE CABINET MOUNTS.****Bristol****Superfine Cabinet Mounts**

(WHITE OR TINTED).

Printed One side in Black or Colour.

5 Sheet, 1,000 ..	£1 8 9
" 2,500 ..	3 7 6
" 5,000 ..	6 10 6
" 10,000 ..	12 12 0

Printed Two sides in Black or Colour.

5 Sheet, 1,000 ..	£1 12 3
" 2,500 ..	3 14 6
" 5,000 ..	6 19 6
" 10,000 ..	13 10 0

**Enamelled****Superfine Cabinet Mounts**

(WHITE OR TINTED).

Printed One side in Black or Colour.

5 Sheet, 1,000 ..	£1 12 6
" 2,500 ..	3 16 6
" 5,000 ..	7 8 6
" 10,000 ..	14 8 0

Printed Two sides in Black or Colour.

5 Sheet, 1,000 ..	£1 16 0
" 2,500 ..	4 3 6
" 5,000 ..	7 17 6
" 10,000 ..	15 6 0

**Black or Olive****Superfine Cabinet Mounts**

Printed One side in Litho. Gold.

5 Sheet, 1,000 ..	£1 16 0
" 2,500 ..	4 5 0
" 5,000 ..	8 8 6
" 10,000 ..	16 4 0

Printed Two sides in Litho. Gold.

5 Sheet, 1,000 ..	£2 1 6
" 2,500 ..	4 17 0
" 5,000 ..	9 4 6
" 10,000 ..	18 0 0

6 Sheet, 2/3 per 1,000 more than 5 Sheet.

No Extra Charge for Gold Bands on Gold Printed Cards. If printed in Red Powder same Prices as Litho. Gold.

**EXTRAS.**

Printing in Gold, One Side, 1/9 per 1,000; Two Sides, 3/6 per 1,000.

Gilt Edges to 5 Sheet Cabinet Mounts, 10/-; 6 Sheet, 11/- per 1,000. Coloured Edges to 5 Sheet Cabinet Mounts, 5/6; 6 Sheet, 6/3 per 1,000.

Waterproof Coloured Bands, 5/6 per 1,000.

Ornamental Backs, 5/6 per 1,000. Bevelled Edges with Real Gold Leaf, 6 Sheet 15/6 per 1,000.

## Oborne's Superfine Carte-de-Visite Mounts.

Bristol.		Enamelled.		Black or Olive.	
SUPERFINE.		SUPERFINE		SUPERFINE.	
Carte-de-Visite Mounts.		Carte-de-Visite Mounts.		Carte-de-Visite Mounts.	
(WHITE OR TINTED.)		(WHITE OR TINTED.)		(WHITE OR TINTED.)	
Printed One Side in Black or Colour.		Printed One Side in Black or Colour.		Printed One Side in Litho. Gold.	
4 Sheet, 5,000 ..	£2 7 3	4 Sheet, 5,000 ..	£2 14 0	4 Sheet, 5,000 ..	£3 3 0
" 10,000 ..	4 10 0	" 10,000 ..	5 3 6	" 10,000 ..	6 1 6
" 25,000 ..	10 18 9	" 25,000 ..	12 7 6	" 25,000 ..	14 12 6
" 50,000 ..	20 16 0	" 50,000 ..	24 3 6	" 50,000 ..	28 13 6
Printed Two Sides in Black or Colour.		Printed Two Sides in Black or Colour.		Printed Two Sides in Litho. Gold.	
4 Sheet, 5,000 ..	£2 16 3	4 Sheet, 5,000 ..	£3 3 0	4 Sheet, 5,000 ..	£3 16 6
" 10,000 ..	4 19 0	" 10,000 ..	5 12 6	" 10,000 ..	6 19 6
" 25,000 ..	11 5 0	" 25,000 ..	12 18 6	" 25,000 ..	16 6 6
" 50,000 ..	21 18 9	" 50,000 ..	25 6 6	" 50,000 ..	32 1 6

5 Sheet, 1/4 per 1,000 more than 4 Sheet.

No extra Charge for Gold Rands on Gold Printed Cards. If Printed in Red Powder, same Price as Litho. Gold.

**EXTRAS.**—Printing in Gold, One Side, 10d. per 1,000; Two Sides, 1/8 per 1,000 Gilt Edges to 4 Sheet C.-D.-V.'s, 4/6; 5 Sheet, 5/- per 1,000. Coloured Edges to 4 Sheet C.-D.-V.'s, 2/9; 5 Sheet, 3/3 per 1,000. Waterproof Coloured Rands, 2/3 per 1,000. Ornamental Backs, 1/8 per 1,000. Bevelling Edges, with Real Gold Leaf, 10/6 per 1,000.

## Oborne's Mounts for Platinotypes.

Tinted Bristol round corners and bevelled edges, suitable for the Highest Class of Portraiture in Platinotype, Bromide or Photogravure.

1. Cream with Grey Centres. 2. Grey and cream. 3. Grey and white. 4. Grey and light-grey. 5. Blue and mottled. 6. White and cream.

For Pictures.	Size of Board.	Tint.	Thickness.	Real Gold bevel.	Silver bevel.	White or Col. bevel.	Plain bevel.
<b>PRICE PER 100.</b>							
Carte-de-Visite.	6½ × 4½	4½ × 3	6 Sheet	6/9	6/8	6/-	5/9
Cabinet	9 × 6½	6½ × 4½	8 "	14/9	14/-	13/6	13/-
Boudoir	10½ × 7½	7½ × 5½	12 "	27/-	25/-	24/3	23/3
Imperial	12½ × 9½	9 × 6½	12 "	33/6	31/6	29/3	28/-
Panel	16½ × 10½	12½ × 7½	20 "	54/-	49/6	46/9	45/-
6½ × 4½	10 × 8	6½ × 4½	8 "	19/-	17/6	17/-	16/6
8½ × 6½	12 × 10	8½ × 6½	12 "	33/3	30/6	29/3	28/-
10 × 8	15 × 12	10 × 8	12 "	49/6	47/-	44/-	42/9
12 × 10	17 × 14	12 × 10	12 "	63/-	58/6	55/9	54/-
15 × 12	21 × 17	15 × 12	20 "	103/6	96/9	92/9	90/-
17 × 11	22½ × 16	17 × 11	20 "	114/9	106/8	100/9	96/9

Printing or Blocking Name and Address extra.

# REAL GOLD BEVELLED EDGE MOUNTS.

For Portraits or Views, Hand-Paintings, &c.

TINTS USUALLY KEPT IN STOCK.

BRISTOL.—Cream, Grey, Blue and Pink.

ENAMELLED.—Cream, Black, Chocolate and Olive.

SIZES.	THICKNESS.		SUPERFINE		WV. Quality.	
			PRICES PER	100	PRICES PER	1,000
Midget C.-D.-V.	$2\frac{1}{4} \times 1\frac{5}{8}$	6 sheet		1/10	16/-	
„ Victoria,	$2\frac{1}{8} \times 1\frac{3}{8}$	6 „	Bristol	2/-	17/-	
„ Cabinet,	$2\frac{1}{16} \times 1\frac{3}{8}$	6 „	Light Enamelled	2/3	18/-	
„ Promenade	$3\frac{1}{4} \times 1\frac{3}{8}$	6 „	Dark	2/3	18/-	
„ Boudoir	$3 \times 1\frac{5}{8}$	6 „	„	2/6	20/-	
C.-D.-V.	$4\frac{1}{8} \times 2\frac{1}{2}$	6 „	„ Bristol	2/6	19/-	17/3
„	„	6 „	„ Light Enamelled	2/8	20/3	18/6
„	„	6 „	„ Dark	2/9	21/6	19/9
Quarter Plate	$4\frac{1}{4} \times 3\frac{1}{4}$	6 „	„ Bristol	3/6	29/3	26/9
„	„	6 „	„ Light Enamelled	3/9	32/-	29/6
„	„	6 „	„ Dark	4/-	33/6	31/-
5 x 4	5 x 4	6 „	„ Bristol	4/3	38/6	35/-
„	„	6 „	„ Light Enamelled	4/6	42/-	38/6
„	„	6 „	„ Dark	4/9	43/9	40/3
$\frac{1}{2}$ -Plate	$6\frac{1}{2} \times 4\frac{3}{4}$	6 „	„ Bristol	5/9	49/6	41/6
„	„	6 „	„ Light Enamelled	6/3	52/3	47/-
„	„	6 „	„ Dark	6/9	55/-	49/6
Cabinet	$6\frac{5}{8} \times 4\frac{1}{4}$	6 „	„ Bristol	4/3	39/6	35/-
„	„	6 „	„ Light Enamelled	4/9	43/3	38/9
„	„	6 „	„ Dark	5/-	45/-	40/6
Boudoir	$8\frac{1}{2} \times 5\frac{1}{2}$	8 „	„ Bristol	8/-		7/-
„	„	8 „	„ Light Enamelled	9/-		8/-
„	„	8 „	„ Dark	9/6		8/6
Imperial	$10 \times 6\frac{7}{8}$	8 „	„ Bristol	12/3		10/9
„	„	8 „	„ Light Enamelled	13/6		12/-
„	„	8 „	„ Dark	14/3		12/9
$8\frac{1}{2} \times 6\frac{1}{2}$ Views,	„	8 „	„ Bristol	10/6		9/3
„	„	8 „	„ Light Enamelled	11/6		10/6
„	„	8 „	„ Dark	12/3		11/-
10 x 8	„	8 „	„ Bristol	14/6		13/-
„	„	8 „	„ Light Enamelled	15/9		14/3
„	„	8 „	„ Dark	16/6		15/-
12 x 10	„	12 „	„ Bristol	27/-		25/-
„	„	12 „	„ Light Enamelled	29/-		27/-
„	„	12 „	„ Dark	29/9		27/9
15 x 12	„	12 „	„ Bristol	38/9		36/3
„	„	12 „	„ Light Enamelled	41/6		39/-
„	„	12 „	„ Dark	42/9		40/3
Panel	$13 \times 7\frac{1}{2}$	12 „	„ Bristol	24/3		22/3
„	„	12 „	„ Light Enamelled	26/-		24/-
„	„	12 „	„ Dark	27/-		25/-

Printing or Blocking name and address extra.

## REVISED PRICES FOR STAMPING Carte-de-Visite and Cabinet Mounts.

**N**O charge for Dies with Orders of not less than 5,000 in Plain Colored, or Fancy Coloured Gilt Stamping, or with Orders of 1,000 Real Gold Leaf Stamping for smaller quantities, the Dies are charged at 3d. per letter (with the first Order only.) Monograms, Medals, Coat of Arms, also Palettes, and all designs with Scroll or indented ground are always charged for extra in every case.

### Style No. 1 A.—PLAIN STAMPING.

In Orders of	1,000	2,500	5,000	10,000	25,000
Per 1,000	3/8	3/2	2/9	2/3	1/10

### Style No. 2 D.—COLOURED STAMPING.

CHOCOLATE, DRAB, SEPIA, RED, OR BLUE.

In Orders of	1,000	2,500	5,000	10,000	25,000
Per 1,000	5/6	5/-	4/6	4/-	3/8

### Style No. 3 P.—WHITE STAMPING (Patented.)

This Style is very effective on Silver Grey Mounts.

In Orders of	1,000	2,500	5,000	10,000	25,000
Cabinets per 1,000	11/3	10/6	10/-	9/6	9/-
CDV's per 1,000	9/-	8/6	8/-	7/6	7/-

### Style No. 4 G.—FANCY COLOURED GILT STAMPING.

GREEN, BLUE, OR RED.

In Orders of	1,000	2,500	5,000	10,000	25,000
Per 1,000	9/-	8/6	8/2	7/8	7/3

### Style No. 5 E.—GILT METAL STAMPING.

In Orders of	1,000	2,500	5,000	10,000	25,000
Per 1,000	8/3	7/9	7/3	6/9	6/3

### Style No. 6 O.—SILVER LEAF STAMPING.

Plain or Scroll Designs.

In Orders of	1,000	2,500	5,000	10,000	25,000
Cabinets per 1,000	11/6	10/6	10/-	9/6	9/-
CDV's per 1,000	9/3	8/9	8/3	7/9	7/3

### REAL GOLD LEAF STAMPING.

In Orders of	1,000	2,500	5,000	10,000	25,000
Cabinets per 1,000	17/-	16/3	15/3	14/9	14/-
CDV's per 1,000	12/6	11/9	10/9	10/3	9/6

### REAL GOLD LEAF STAMPING ON SCROLL OR PALETTE.

In Orders of	1,000	2,500	5,000	10,000	25,000
Cabinets per 1,000	22/6	21/8	20/9	20/3	19/10
CDV's per 1,000	15/3	14/6	13/6	13/-	12/6

## PLAIN MOUNTS.

### Extra Superfine, Flat edges.—Round or Square Corners.

	Thickness	Bristol			
		White or Tinted per 1000.	Enamelled Light Colors.	Enamelled Dark Colors.	
CDV. Midget	$2\frac{1}{4} \times 1\frac{5}{16}$	5 Sheet ..	4/-	4/3	4/6
Cabinet ..	$2\frac{1}{8} \times 1\frac{3}{8}$	5 ..	5/6	6/-	6/6
Promenade Midget	$3\frac{1}{8} \times 1\frac{5}{8}$	5 ..	6/-	6/3	6/9
Carte de Visite	$4\frac{1}{8} \times 2\frac{1}{2}$	5 ..	8/-	9/6	10/6
View ..	$4\frac{1}{4} \times 3\frac{3}{4}$	5 ..	12/-	14/6	16/3
" ..	$5 \times 4$	5 ..	18/-	21/6	23/6
Half Plate	$6\frac{1}{2} \times 4\frac{3}{4}$	6 ..	28/-	33/3	36/-
Cabinet ..	$6\frac{3}{8} \times 4\frac{1}{4}$	6 ..	24/-	27/6	29/3
<b>Per 100.</b>					
Boudoir ..	$8\frac{1}{2} \times 5\frac{1}{2}$	8 Sheet	5/-	6/-	6/3
Imperial ..	$10 \times 6\frac{7}{8}$	8 ..	8/-	9/6	10/3
Whole Plate	$8\frac{1}{2} \times 6\frac{1}{2}$	6 ..	5/6	6/6	7/3
View ..	$10 \times 8$	6 ..	7/3	8/6	9/3
" ..	$12 \times 10$	8 ..	12/6	14/6	15/6
Panel ..	$13 \times 7\frac{1}{2}$	12 ..	16/3	18/-	19/-
View ..	$15 \times 12$	8 ..	19/-	21/9	23/-
" ..	$16 \times 12$	12 ..	27/6	30/9	32/-
" ..	$20 \times 16$	15 ..	52/3	57/9	60/3
" ..	$22 \times 18$	15 ..	70/3	79/3	83/9

## Oborne's Mounting Boards.

SUPERFINE, White or Tinted.

	Untrimmed Sizes.	3 Sheet.	4 Sheet.	6 Sheet.	8 Sheet.
Royal ..	$24 \times 19$	1/8	2/2	3/2	4/4 per doz.
Imperial ..	$30 \times 22$	2/6	3/3	4/9	6/6 ..
Atlas ..	$34 \times 27$	..	..	8/-	10/- ..
Double Elephant ..	$40 \times 27$	..	..	10/-	12/- ..
Double Imperial ..	$44 \times 30$	..	..	13/-	16/- ..
Antiquarian,	$54 \times 36$ white only	..	..	54/-	72/- ..

### Extra Superfine, White or Tinted.

	Untrimmed Sizes.	3 Sheet.	4 Sheet.	6 Sheet.	8 Sheet.
Royal ..	$24 \times 19$	2/-	2/6	3/8	5/- per doz.
Imperial ..	$30 \times 22$	3/-	3/9	5/6	7/6 ..
Atlas ..	$34 \times 27$	..	..	10/-	14/- ..
Double Elephant ..	$40 \times 27$	..	..	12/-	17/- ..
Double Imperial ..	$44 \times 20$	..	..	16/-	22/- ..

## SPECIAL LIST OF PLATE MARK MOUNTS

REAL PLATE PAPER, on Extra Superfine Boards and Centres of India Tinted Paper, with Plate Mark beyond.

These Mounts are specially suitable for the Highest Class of Portraiture in Platinotype Bromide, Photogravure, and other mechanical processes.

When mounted in this Style the Effect is Very Fine.

For Pictures.	No.	Thickness.	Size of Board	Size of Tint.	With Tinted Centres.	No Centres With Plate Mark only.
Carte de Visite	61	8 Sheet	8 x 6	5 x 3½	7/3	6/3
Cabinet	62	"	10 x 8	6½ x 4½	10/-	9/-
"	63	"	11 x 9	7 x 5	13/9	12/9
Bouddoir	64	"	12 x 9	8½ x 5½	16/-	15/-
8½ x 6½	65	10 Sheet	12 x 10	8½ x 6½	17/-	15/9
"	66	"	14 x 11	9 x 7	21/9	19/9
Imperial	67	"	15 x 11	10½ x 7½	26/-	23/6
10 x 8	68	"	15 x 12	10½ x 8½	27/3	24/9
12 x 10	69	12 Sheet	18 x 14	12 x 10	36/-	33/3
"	70	"	20 x 16	13 x 11	45/-	41/6
Panel	71	"	20 x 14	13 x 8	47/3	43/9
15 x 12	72	"	21 x 17	15 x 12	49/6	45/-
"	73	"	24 x 19	16 x 13	63/-	57/6
Large Panel	74	15 Sheet	26 x 19	17 x 11	85/6	78/9
18 x 14	75	"	28 x 23	18 x 15	112/6	101/6
20 x 16	76	"	30 x 24	21 x 17	157/6	144/-

The India Tint and Plate Mark can be made to suit all sizes of Photographs.

## EXTRA THICK ENLARGEMENT MOUNTS

Same as above, but on 24 Sheet Boards. Actual thickness 3-16 of an inch.

Outside size of Mount.	Tint.	For Pictures.	Price per dozens
24 x 19	16 x 13	14 x 11	11/6
26 x 21½	19½ x 16½	17 x 14	18/6
28 x 21½	21½ x 16½	19 x 14½	18/6
30 x 26	23 x 19	20 x 16½	24/-
32 x 26	26 x 20	23 x 17½	24/-
35 x 29	27½ x 22½	25 x 20	39/6

## W.V. PLATE MARK MOUNTS.

These are a much lower price Mount, suitable for Publishers and Cheap Work.

(a) White and Cream Centres. (c) Cream and Grey Centres. (e) Grey and Cream Centre.  
(b) White and Grey Centres. (d) Cream and White Centres. (f) Grey and White Centre.

Other Tints supplied specially to Order.

Outside size of board.	Tint.	Per 100.	1000.	Outside size of board.	Tint.	Per 100.	1000
8 x 6 5 sheet	5 x 4	5/3	47/-	16 x 12½ 6 sheet	10½ x 8½	17/3	156/-
8½ x 6½	6 x 4½	5/6	50/-	18 x 14½	12 x 10	22/6	203/-
10 x 8	7½ x 5½	6/9	61/-	20 x 15½	13 x 11	23/3	210/6
12 x 9	8 x 6	8/6	77/-	24 x 19	16 x 13	31/-	280/-
12 x 10	8½ x 6½	9/-	80/6	29 x 21	21 x 17	41/6	378/-
14½ x 10½ 6 sheet	9½ x 7½	12/6	112/6				

Not less than 500 of each size supplied at 1000 price.

These Mounts far excel any that have yet been offered at prices approaching the above.

## OBORNE'S SILVER GREY MOUNTS, WITH WHITE CENTRES, AND WHITE MARGINAL LINE.

These Mounts have a very chaste appearance and are much appreciated by  
High Class Photographers.

Extra Thick Superfine Boards, Choice quality, Smooth surface.					
For Pictures	No.	Thickness	Size of Board	Size of Centre	Price per 100.
C. de V.	51	6 Sheet	8 × 6	5 × 3½	5/6
5 × 4	53	"	9 × 7	5½ × 4½	6/3
Cabinet	54	"	10 × 8	6½ × 4½	8/9
"	55	"	11 × 9	7 × 5	9/-
Boudoir	57	8 Sheet	12 × 9	8½ × 5½	12/9
8½ × 6½	58	"	12 × 10	8½ × 6½	14/6
"	59	"	14 × 11	9 × 7	18/-
Imperial	60	"	15 × 11	10 × 7½	21/6
10 × 8	61	"	15 × 12	10½ × 8½	22/6
12 × 10	62	10 Sheet	18 × 14	12½ × 10½	28/9
Panel	64	"	20 × 14	13 × 8	36/-
15 × 12	65	"	21 × 17	15 × 12	45/-

Any size Board and Centre can be made.

Extra for Lithographic Printing Name and Address in Color.

No. 51 to 54 per 100, 2/6; 500 at 1/6; 1000 at 1/-

No. 59 to 62 per 100, 3/9; 500 at 2/9; 1000 at 2/6

No. 55 to 58 per 100, 3/-; 500 at 2/-; 1000 at 1/6

No. 64 & 65 per 100, 5/-; 500 at 4/-; 1000 at 3/-

## OXFORD LINE MOUNTS, EXTRA FINE QUALITY.

Cream Bristol Boards, printed with Red or Chocolate lines.

Four designs. Double Oxford line. Fancy Greek Corner, No. 1, ditto No. 2,  
and Key Pattern border.

No.	Thickness	Size of Board	Size of Line	Per 100	Per 1000.
20	5 Sheet	8 × 6	5¼ × 3¾	4/-	3/6
21	"	8½ × 6½	5 × 4		
22	"	8½ × 6½	6 × 4¼	4/9	4/-
23	"	9½ × 8	6½ × 5¼	5/9	5/-
24	"	10 × 8	7 × 5		
24½	"	10 × 8	7½ × 5½	6/3	5/6
25	6 Sheet	12 × 9	8 × 6	9/6	8/-
25½	"	12 × 10	8½ × 6½		
26	"	12 × 10	9 × 7	10/6	9/-
26½	"	12 × 10	9½ × 7½		
27	"	14 × 11½	10 × 8	13/9	11/9
28	8 Sheet	15 × 12	10½ × 8½	17/-	14/6
29	"	18 × 14	12 × 10	21/-	18/-
30	"	20 × 16	14 × 11	33/6	28/9
31	10 Sheet	21½ × 17¼	15 × 12	39/6	34/3
32	"	25 × 19	18 × 14	52/-	45/-

Any Size of Line can be made to order.

Extra printing Name and Address per **100, 500, 1000** and over,  
in the same color as line .. .. 2/-, 1/-, without charge.

## WV. Oxford Line Mounts.

Cream Tint, of good quality and fine surface, printed in Red in three designs—'Arrowhead,' 'Greek,' and 'Gothic.'

Outside size of boards		Size of line	Per 100	Per 1,000
7 x 5	5 sheet	4½ x 3½	2/9	25/-
8 x 6	"	5 x 4	3/4	30/-
8½ x 6½	"	6 x 4½	3/6	31/6
10 x 8	"	7 x 5	4/6	40/6
12 x 9	6 sheet	8 x 6	6/-	52/6
12 x 10	"	9½ x 7½	6/-	52/6
14½ x 10½	8 sheet	10 x 8	9/-	78/-
16 x 12	"	10½ x 8½	11/6	100/-
18 x 14	"	12 x 10	16/9	145/-
20 x 15½	"	13 x 11	18/6	160/-
24 x 19	"	16 x 13	23/6	210/-

Not less than 500 of each supplied at 1,000 price.

## Plain Bevelled Edge Mounts.

Sizes.	Thickness.	Tints.	Extra Superfine per 1,000
C.-D.-V.'s 4½ x 2½	6 sheet ..	Bristol—Cream, Grey, Blue, and Pink	14/-
Cabinet, 6½ x 4½	6 ..	" ..	30/6
			Per 100
Boudoir, 8½ x 5½	8 ..	" ..	7/-
Imperial, 10 x 6½	8 ..	" ..	10/3
8½ x 6½	8 ..	" ..	9/-
10 x 8	8 ..	" ..	12/3
12 x 10	8 ..	" ..	18/-
Panels, 18 x 7½	12 ..	" ..	19/9
" 12 ..	20 ..	" ..	28/-
15 x 12 ..	12 ..	" ..	33/9

## Osborne's Parchment Gardee Envelopes

Are very light in weight although exceedingly tough and transparent. They are made with thumb hole without flaps, and are a **Perfect Protection** to the Photograph and **Much Less Trouble** than the old way of gumming Tissues on at the back, in a very short time these get torn and eventually have to be removed leaving the back of the mount greatly disfigured, whereas the GARDEE Envelopes not only protect the print but also the back of the mount from finger marks.

### PRICES PER THOUSAND.

FOR CARTES DE VISITE.		FOR CABINETS.	
	Plain. Printed		Plain. Printed
1,000 ..	3/9 .. 5/9	1,000 ..	6/- .. 8/-
2,500 ..	3/7 .. 5/3	2,500 ..	5/9 .. 7/6
5,000 ..	3/5 .. 4/11	5,000 ..	5/6 .. 7/-
10,000 ..	3/3 .. 4/6	10,000 ..	5/3 .. 6/6

They are also supplied for larger size Photographs.

	Per 1,000		Per 1,000.
Boudoir Plain ..	11/6	Half Plate Plain ..	8/-
Imperial ..	15/-	Whole Plate ..	13/6
Panel ..	18/6	10 x 8 ..	17/-
		12 x 10 ..	19/6

Printing Name and Address in Color Extra.

250, 3/6; 500, 4/3; 1,000, 5/6; and subsequent thousands, 3/6 per 1,000.

## Osborne's Albumenized Papers.

All on Rives' Paper. Water-mark, 'B. F. K. Rives, No. 74.'

Trimmed Size, 17½ × 22½	Weight 8 Kilo.	10 Kilo.	12 Kilo.
Single Albumenized .. ..	£4 13 6 ..	£5 0 0 ..	£5 12 0 per ream.
Double Albumenized, extra Brilliant	5 9 0 ..	5 15 0 ..	6 6 0 ..
Salted or Matt Surface .. ..	4 16 0 ..	5 2 0 ..	5 14 0 ..
Job Throwouts, Trifling Imperfections, suitable for Cheap Work, Views and Patterns .. ..	.. ..	2 12 6 ..	.. ..

## Osborne's Sensitized Paper.

ALWAYS RELIABLE, and has an ever-increasing Sale. Is used by the best Professional Photographers, who all testify to its UNIFORM EXCELLENCE.

Pale Rose, Mauve or white	Per Quire.	½ Quire.	¼ Quire.
Double Albumenized, Rive Brilliant	13/6 ..	7/- ..	3/10 ..

In Boxes ready-cut for Mounting.

One Quire, containing 1032 C.-D.-V's., or 360 Cabinets	.. ..	14/6
Half-Quire .. ..	516 .. or 180 ..	7/9
Quarter-Quire .. ..	258 .. or 90 ..	4/-

All cut long way of the Sheet. Other sizes cut to order.

## PRINTING-OUT PAPERS.

### ILFORD P.O.P.

PINK, WHITE OR MAUVE.

IN SEALED TUBES.

	With Postage.
21 Sheets .. ..	15/- 15/8
12 .. ..	7/6 7/11
6 .. ..	4/- 4/3
2 .. ..	1/4 1/7
Each sheet measures	24½ × 17 in.

Inches.	IN PACKETS. Per Packet.	With Postage.
4½ × 3¼	96 pieces	1/2
5 × 4	24 "	1/2
6 × 4½	24 "	1/2
6½ × 4½	16 "	1/2
8½ × 6½	9 "	1/8

1/-

IN BOXES. Per Pieces. With Postage.

3½ × 2¾ No. 1 C.D.V.	500	8/-	8/5
3½ × 2¾ No. 2	500	7/6	7/11
5½ × 4 No. 1 Cabts.	500	18/9	19/5
5½ × 4 No. 2	500	18/-	18/8

Full Directions for Toning, &c., with each Package,

## EASTMAN'S SOLIO PAPERS.

WHITE, PINK AND MAUVE.

Can now be supplied cut to special sizes at the Quire Rates.

Quire, 15/-; Half-Quire, 7/6; Quarter-Quire, 4/- One-Twelfth Quire, 1/4.

The following Cut Sizes always in Stock.

C.-D.-V. 3½ × 2¾	One Gross Sheets ..	1/8	500 Sheets, Boxed ..	6/-
" 3½ × 2¾	" .. ..	1/10	" .. ..	6/6
Cabinets 5½ × 4	" .. ..	4/8	" .. ..	16/6
" 5½ × 4	" .. ..	5/-	" .. ..	17/3

Other sizes in Boxes of not less than 1 Gross Sheets cut to order.

## OSBORNE'S FERRO-PRUSSATE PAPERS.

BLUE PRINTING.

Used in the Drawing Departments of the Principal Ship Builders, Railways, Engineers, Contractors, Architects and others.

In Rolls 10 yards long by 30-inches wide. Price 6/- per roll.

Other widths of Paper, prepared specially to order. Also supplied in Cut Sizes.

Packets of 25 pieces .. ..	3½ × 4½	6/- per doz. packets.
" .. ..	4½ × 6½	10/6 ..
" .. ..	6½ × 8½	21/- ..

## PLATINOTYPE PAPERS.

The following qualities of Sensitized Papers are supplied. The C. paper can be had to order of larger dimensions at the rate of 8d. per square foot.

QUALITY.	DESCRIPTION.
A. For the Hot-Bath Process	Smooth Paper. Medium thickness. More used of this quality than of any other.
AA. For the Cold Development	
B. For the Hot-Bath Process	Smooth Paper. Thick and very strong, Suitable for large prints.
BB. For Cold Development	
C. For the Hot-Bath Process	Rough-surfaced Paper. Thick and very strong. Suitable for large work, where a rough surface is preferred.
CC. For Cold Development	
S. For the Hot-Bath Process	Smooth Paper. To give rich <i>Sepia</i> colour. Requires addition of Special Solution to the Developer
RS.	Rough-surface Paper for <i>Sepia</i> , same substance as C.

These Papers are supplied in Sealed Tin Tubes, either in whole sheets (measuring 26in. x 20in.) or cut to photographic sizes.

THE PRICES ARE AS FOLLOWS:	HOT AND COLD-BATH PROCESS. Quality A. and AA.	POSTAGE (One Tube.)
4½ in. x 3½ in., 24 pieces in tube	1/6	-/3 extra
5 in. x 4 in., " " "	2/3	-/3 "
6½ in. x 4½ in., " " "	3/6	-/3 "
7½ in. x 5 in., " " "	4/6	-/3 "
Quality A. B. C. S. or RS.		
8½ in. x 6½ in., " " "	6/-	-/5 "
10 in. x 8 in., " " "	8/6	-/5 "
12 in. x 10 in., 12 " " "	9/6	-/5 "
15 in. x 12 in., " " "	9/6	-/5 "
3 sheets, 26 in. x 20 in., in tube.	6/6	-/6 "
6 " " " " "	12/6	-/6 "
12 " " " " "	24/-	-/6 "
24 " " " " "	48/-	-/8 "

Special Neutral Oxalate of Potash 1/4 per lb., Special Solution for *Sepia* Papers, 1/6.  
 Calcium Tubes, Enamelled Iron Dishes, Vulcanized Rubber for Printing Frames,  
 Chemicals and all necessaries supplied.

## Dr. D. V. Monckhoven's Carbon Tissue.

### LIST OF COLOURS.

Engraving Black, Warm Black, Deep Brown, Brown, Chocolate, Purple Red, Red Chalk, Blue Chalk, Simile Platina, *Sepia* (bistre)

Per Roll, containing 31 Square feet, Ordinary Quality, (Blue Wrappers)	7/6	
Extra Quality, containing more Gelatine and Colouring matter, (Grey Wrapper)	10/-	
Special Tissue for Enlargements, twice as Sensitive as Ordinary Tissue, made only in Chocolate Red, and deep Brown, per Roll, 31 Square feet	10/-	
Special Tissue for Transparencies, manufactured with Indian Ink, per Roll.	10/-	
Special Tissue for Negatives, Thickly Coated and Extra Colouring matter, per Roll,	10/-	
SINGLE TRANSFER PAPER	Strong White, (on Saxe Paper) 32 square feet	2/6
	Enamel, Pink or White	per Roll 2/6
DOUBLE TRANSFER PAPER	Extra White, Saxe paper,	per Roll 2/6
	Enamel, (Pink or White)	per Roll 4/-

Sole London Depot: 26, RED LION SQUARE, LONDON, W.C.

HEADQUARTERS FOR FINEST AMERICAN BURNISHERS, THE BEST IN THE WORLD.  
REDUCTION IN PRICES OF THE LEADING SIZES.

## ENTREKIN'S EUREKA BURNISHER.

Gives a brilliant surface and unsurpassed finish to all kinds of Photographic Prints.  
**KNOWN AS THE BEST. IS THE CHEAPEST IN THE END.**



THE superiority of the 'EUREKA' BURNISHER over all others consists in its simplicity and effectiveness, and the impossibility of the machine getting out of order.

The Burnisher can be heated with any kind of lamp—alcohol, oil, or gas. During the process of heating the roll can be turned back from the burnishing tool, thereby preventing the condensation of moisture forming on the roll or tool.

The machine has also the Patent Removable Burnishing Tool, which is a decided advantage. If, by accident or otherwise, the burnishing tool becomes defaced, it can be replaced with a new tool at a merely nominal cost, and the machine is as good as new.

<b>Prices :</b>	6-inch Roll	£2 15 0	20-inch Roll	£10 0 0
	10-inch Roll	4 4 0	25-inch Roll	13 0 0
	14-inch Roll	5 5 0		

The **EUREKA BURNISHER** has doubtless superseded all other Bar Burnishers as the superior points in this machine are apparent. It is the best constructed machine ever offered for the purpose, and is beautifully finished, all bright parts being nickel-silvered.

## Entrekin's Rival Burnisher.

This is a lighter-made machine than the 'EUREKA' very suitable for Amateurs and Photographers who do not do a heavy trade.

Simplicity and durability combined.—The cheapest and best  
**10-INCH BURNISHER ever offered to the Photographic Fraternity.**  
Can be heated with alcohol, gas, or oil, in four minutes.

**MECHANISM FIRST-CLASS. ADJUSTMENT PERFECT. BEST RESULTS.**

This Pattern is made in one size only, 10-inch, PRICE, £2 5s.

## Osborne's Magic Lubricator.

TAKE five grains of the Lubricator scraped fine, add it to three ounces of 95 per cent. alcohol, and dissolve by warming the bottle. Apply this solution to the face of your mounted prints with a camel's-hair brush. Let dry from three to ten minutes, and then rub off the faces of the Photographs with a soft pad of cotton wool, and burnish. Run your cards through two or three times. By repeating the operation you can get any amount of finish you wish. Price 1s.

HEADQUARTERS FOR FINEST AMERICAN BURNISHERS.

**ENTREKIN'S PATENT IMPROVED ROTARY BURNISHER.**

WITH TURN-BACK ROLL AND SWING FIRE PAN.

WITHOUT EXCEPTION THE BEST ROTARY BURNISHER IN THE WORLD.

NO SPOILING OF PRINTS EASY TO WORK BEST RESULTS. NEW PRINCIPLE.  
HANDSOME DESIGN. FINEST FINISH.



THIS machine is superior to any other Rotary Burnisher ever offered to the Photographic fraternity. This Burnisher has our patented one wheel end adjustment which is the most perfect device ever applied to a Burnisher for securing uniform pressure and giving perfect accuracy of adjustment with one motion; also, our patented device for maintaining uniform pressure.

In case of uneven wear of the journals and boxes, by simply loosening the lock nut, adjusting the roll with the set-screw over the wedge, and tightening the lock-nut, perfect adjustment can be maintained at all times; but this is only to be done when by long and constant use of the machine the adjustment has become impaired. We furnish a two-end wrench for this purpose.

The improvement of this machine over all other Rotary Burnishers is that the upper roll can be turned back from the polishing roll while heating, so as to prevent the moisture from dropping on the polishing roll and defacing same, also giving better facilities for cleaning the polished or nickel-plated roll. Both rolls are nickel-plated, and every machine is guaranteed perfect. In the 10-inch size we build two styles; a light and a heavy machine.

PRICES.—10-inch Roll, Light Make £3 3s; 10-inch Roll, Heavy Make, £5 5s. 15-inch Roll ditto, £7 7s.; 20-inch Roll, £9 9s.; 25-inch Roll £12.

In comparing the above prices please note that they include Atmospheric Gas Burner or Oil Lamp, Lubricator, Crocus Cloth, Key for Nut Screws, and Boxed complete.

All Genuine Machines bear my Name and Address as follows:—

**Sole Agent for Europe:**

**EDWIN OBORNE, Red Lion Square, London.**

HEADQUARTERS FOR FINEST AMERICAN BURNISHERS, THE BEST IN THE WORLD

# THE GLOBE ENAMELER

PAT. JUNE 1.86 & AUG. 28.88.



Combines the best feature of the QUADRUPLEX ENAMELLERS and the HUMPHREY PATENT HOLLOW ROLL, the result being a burnisher, capable of producing the MOST PERFECT WORK at a MINIMUM of COST, TIME & LABOR.

## ADVANTAGES.

They heat in five minutes, and save 75 per cent. of Gas. Either gas or gasoline is used for heating; no smoke is possible.

Prints cannot be scratched with this machine.

Rolls never sweat a particle.

No lubricator is required; in fact, the best gloss is produced without it.

The pressure is always perfectly uniform, and is quickly adjusted by turning one hand wheel.

The heat from this machine causes the operator less discomfort than any other, as the surplus is carried upward through the chimney. The chimney also creates a circulation of air through the roll; which secures perfect combustion of the gas.

The burner inside the roll is perforated in zig-zag shape on the bottom. The flames thus furnish direct heat to the bottom of the roll; from this surface the heat is deflected and rises to the top, thus heating the entire surface uniformly, and the degree of heat is controlled perfectly by the lever at the left.

In perfection of mechanical construction it has no equal.

In beauty of design and elegance of finish it stands unrivalled.

It is full nickel-plated.

In an emergency this machine may be heated in five minutes, and a few prints burnished while a customer waits. This is wholly impracticable with solid roll machines, requiring from 30 to 60 minutes to heat.

Every Machine Warranted Perfect and Satisfactory.

PRICES.—10 inch, £6 6 0; 15 inch, £8 8 0; 20 inch, £10 10 0; 25 inch, £12 10 0.

## Glass Cutting Shapes.

$\frac{1}{4}$ -inch Plate with Square Polished Edges.

Carte-de-Visite	$3\frac{3}{8} \times 2\frac{3}{8}$	0 6	each	12 x 10	2 9	each.
Cabinet	$5\frac{3}{4} \times 4$	0 9	"	Boudoir	$7\frac{1}{2} \times 5\frac{1}{8}$	1 4
	$8 \times 6$	1 6	"	Imperial	$9 \times 6\frac{1}{2}$	2 0
	$10 \times 8$	2 3	"	Panel	$11\frac{1}{2} \times 7\frac{1}{8}$	2 9

## Porcelain Trays.

For Plates.	Shallow.	Deep	For Plates.	Shallow.	Deep
	s. d.	s. d.		s. d.	s. d.
$4\frac{1}{4} \times 3\frac{1}{4}$	0 6	0 7	$16 \times 12$	4 6	5 8
$5 \times 4$	0 7	0 8	$16 \times 14$	5 6	8 2
$6 \times 5$	0 8	0 10	$18 \times 16$	7 3	9 8
$7 \times 5$	0 8	0 10	$19 \times 12$	7 3	10 0
$8 \times 6$	0 9	0 11	$19 \times 15$	8 4	12 0
$9 \times 7$	0 11	1 2	$20 \times 16$	12 0	15 0
$10 \times 8$	1 2	1 4	$23 \times 19$	17 0	21 0
$11 \times 9$	1 5	1 7	$24 \times 19$	17 0	21 8
$12 \times 10$	1 10	2 3	$24 \times 22$	21 0	26 0
$13 \times 11$	2 6	3 2	$26 \times 22$	30 0	35 0
$14 \times 12$	3 3	4 2			

## Ebonite Trays (Bevelled Edges.)

STOUT, WITHOUT RIBS.

Size	s. d.	each.	Size	s. d.	each
$4\frac{1}{4} \times 3\frac{1}{4}$	0 6	each.	$12 \times 10$	3 6	each
$5 \times 4$	0 7	"	$13 \times 11$	4 8	"
$6\frac{1}{2} \times 4\frac{3}{4}$	0 9	"	$14 \times 12$	6 4	"
$7\frac{1}{2} \times 5$	1 3	"	$15 \times 13$	7 4	"
$8\frac{1}{2} \times 6\frac{1}{2}$	1 6	"	$16 \times 14$	8 9	"
$10 \times 8$	2 3	"			

## Paper Mache Trays.

Size	s. d.	each.	Size	s. d.	each
$4\frac{1}{4} \times 3\frac{1}{4}$	0 8	each.	$12 \times 10$	3 0	each
$5 \times 4$	0 10	"	$14 \times 12$	4 0	"
$6\frac{1}{2} \times 4\frac{3}{4}$	1 0	"	$16 \times 14$	5 6	"
$7\frac{1}{2} \times 5$	1 4	"	$20 \times 16$	7 6	"
$8\frac{1}{2} \times 6\frac{1}{2}$	1 6	"	$24 \times 20$	10 0	"
$10 \times 8$	2 6	"	$26 \times 22$	13 6	"

## Xylonite Trays.

Three Colours: Ivory White, Coral or Chocolate.

Size	s. d.	5 per doz.	s. d.	Size	s. d.	10 per doz.	s. d.
$4\frac{1}{4} \times 3\frac{1}{4}$	0 5	per doz.	4 3	$7\frac{1}{2} \times 5$	0 10	per doz.	8 0
$5 \times 4$	0 7	"	5 6	$8\frac{1}{2} \times 6\frac{1}{2}$	1 0	"	9 9
$6\frac{1}{2} \times 4\frac{3}{4}$	0 8	"	6 8	$10 \times 8$	1 4	"	12 6

## DRY PLATES (all Makers.)

Supplied Promptly at very Lowest Prices and Utmost Discount in Quantities for Cash.

### THE FOLLOWING KEPT IN STOCK:

WRATTEN'S.  
EDWARDS'.

ILFORD.  
THOMAS'S.

PAGET PRIZE.  
ELLIOTT & SON'S.

Pure Chemicals at Lowest Market Prices.

- ROLLING MACHINES.**—Single, Double, and Tripod Geared, by the best Makers
- HEADRESTS.**—Harrison's Emmerson's, and others; also Portable Headrests, to fit to any Chair Back; also Headrest and Curtain Rod combined.
- ARTISTIC BACKGROUNDS.**—New Patterns. American Styles, 35/-, 42/6, and 50/-
- GRADUATED WOOLLEN CLOTH BACKGROUNDS.**—5 feet wide, 7/6 per yard. Plain Without Graduation, 8 feet wide, 7/- per yard.
- EMPIRE OPAQUE CLOTH.**—37 to 104 inches wide, at 1/7 to 9/6 per yard.
- NEW OPAQUE CLOTH.**—96 inches wide, any length cut, at 3/- per yard.
- GRASS MATS.**—15/6, 19/6 and 23/6.
- SMALL FERNS** 4/-. Large Leaf Plants, 7/-, Palm Ferns 36in, 10/-.
- NEW POSING-CHAIRS and CARVED OAK ACCESSORIES.**—A large collection to select from. Photographs forwarded on application.
- PHOTOGRAPHIC FRAMES** of every description. An enormous Stock to select from, for all leading sizes of Photographs.
- ALBUMS, SCRAP BOOK, PORTFOLIOS, &c.**
- CAMERAS and APPARATUS** of the latest design, and specially manufactured for hot climates.
- LENSES** by Dallmeyer, Ross, Wray, Swift, Taylor, Laverne, Suter, and Voigtlander.
- SHUTTERS** for Studio or Field, with Patent Pneumatic Attachment.
- SUPERIOR TEAK OR MAHOGANY PRINTING-FRAMES.**— $\frac{1}{2}$ -plate, 4/6; 5 x 4, 5/6;  $\frac{1}{2}$ -plate, 8/-;  $\frac{1}{2}$ -plate oblong, 9/6;  $7\frac{1}{2}$  x  $4\frac{1}{2}$ , 12/-; whole-plate, 13/9; whole-plate oblong, 15/6; 10 x 8, 17/6; 12 x 10, 22/- per dozen.
- PADS FOR BACKING PRINTING-FRAMES.**—Double Faced White Rubber Sheeting, 4d. per Square foot, or 3/- per yard, 36 inches wide, Cut sizes, 5 x 4, 10d. per dozen,  $6\frac{1}{2}$  x  $4\frac{1}{2}$ , 1/6 per dozen,  $8\frac{1}{2}$  x  $6\frac{1}{2}$ , 3/- per dozen.
- BOOK-POST WRAPPERS.**—Stout and well-made, Printed with Name and Address—C.-D.-V., 16/- per 1000; 2000, 15/-; 5000, 14/-, Cabinets, 24/6 per 1000; 2000, 23/-; 5000, 22/-.
- POSTAL CYLINDERS,** for sending Unmounted Prints per post: 6-in 3/-; 8 in., 3/9; 11 in., 3/-, 13 in., 5/9; 18 in., 7/9; 30 in., 12/6 per 100.
- PAPIER BUYARD FOR DRYING PRINTS.**—No. 1, per Ream, 72/-; per Quire, 4/-; No. 2, per Ream, 45/-; per Quire, 2/6. Imperial size.
- CUT-OUT MOUNTS and SHOW MOUNTS.**—Novel patterns, with deep bevels.
- FABER'S and HARDTMUTH'S RETOUCHING PENCILS.**

CUSTOMERS ABROAD forwarding indents for my goods through merchants or agents here, are respectfully requested to MENTION MY NAME THEREON, and also to advise me direct of having done so by same mail, with any special instructions necessary to ensure the EXACT FULFILMENT of THEIR WISHES. I study PROMPTNESS in meeting all favours entrusted to me, and GUARANTEE EXACTNESS.

EDWIN OBORNE,  
26, RED LION SQUARE, LONDON, W.C.

See preceding pages.

TELEGRAPHIC ADDRESS:  
'BROMIDE, LONDON.'

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**GEO. HOUGHTON & SON,**

**89 HIGH HOLBORN,  
LONDON, W.C.**

**Photographic Dealers, Manufacturers,  
AND  
Paper Sensitizers.**

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WORKS:—TOOTING, SURREY.

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**PRICE LIST,**

INCLUDING

**Designs of Backgrounds and Studio  
Accessories,**

**FREE ON APPLICATION.**

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**Special Terms to Professional Photographers and  
Dealers on receipt of Business Card.**

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[See following pages.]

# USE ONLY OUR SENSITIZED PAPERS.



'Holborn'	(Double Brilliant)	Per $\frac{1}{4}$ -Quire.	Per $\frac{1}{2}$ -Quire.	Per Quire.
'Three Star'	"	3/9	7/-	13/6
'Crossed Swords'	"			
'Crossed Flags' (Extra Brilliant)	...	3/6	6/9	13/-
'Trapp's'	(Double Enamel)	4/-	7/6	14/6

POSTAGE EXTRA :— $\frac{1}{4}$  or  $\frac{1}{2}$ -Quire, 3d.; 1 Quire, 4 $\frac{1}{2}$ d.

## FOR CASH WITH ORDER.

'Holborn'	(Double Brilliant)	POST FREE.		
'Three Star'	"	Per $\frac{1}{4}$ -Quire.	Per $\frac{1}{2}$ -Quire.	Per 1 Quire.
'Crossed Swords'	"	3/9	6/9	13/-
'Crossed Flags' (Extra Brilliant)	...	3/6	6/6	12/6
'Trapp's'	(Double Enamel)	4/-	7/-	14/-

## CUT SIZES.

Packed in Envelopes containing 1 Sheet, cut into either of the following :—  
43 C.D.V.'s. 15 Cabinets. 25  $\frac{1}{4}$ -plates. 10  $\frac{1}{2}$  plates. 6 Whole-plates.

**1/6 Per Quire Extra.**

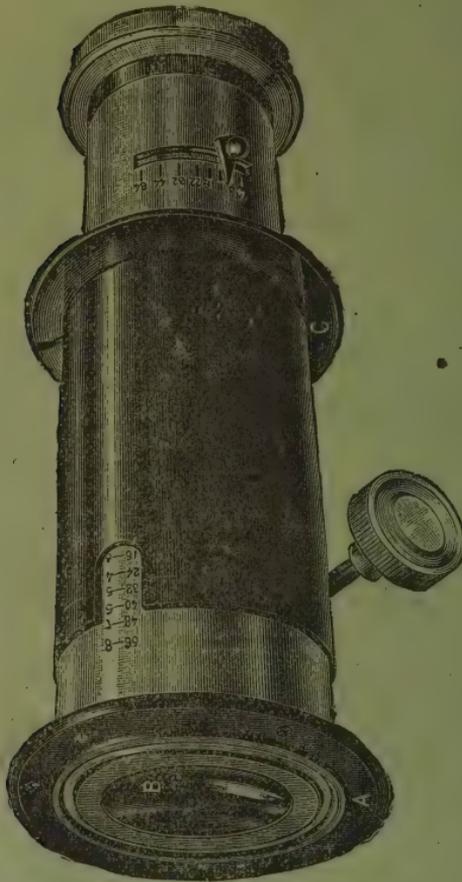
Can also be supplied packed in Envelopes, containing 50 pieces of any of above sizes, at the same prices.

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**GEORGE HOUGHTON & SON,**  
89 High Holborn, London. W.C.



— THE —  
**TELE-PHOTO LENS.**



PRICE OF THE TELE-PHOTO LENS, COMPLETE  
 WITH THE RAPID RECTILINEAR LENS.

(IN MOROCCO LEATHER CASE.)

Size.	Mounted in Brass.	Mounted in Aluminium.
Half-plate ...	£5 5 0	£7 7 0
Whole-plate...	6 10 0	9 0 0

PAMPHLET, giving Full Particulars, FREE ON APPLICATION.

**G. HOUGHTON & SON,**  
 89 HIGH HOLBORN, LONDON, W.C.

## THE 'HOLBORN' WALKING STICK TRIPOD STAND.

(PATENT APPLIED FOR.)

**T**HIS NEW TRIPOD STAND combines all the advantages of the ordinary Tripod, with extreme **Lightness, Rigidity, and Portability**. It is entirely **self-contained**, the Head and Camera Screw **folding within the legs** when the Tripod is closed, as shown in the illustration.



**The Extension Legs** are arranged on a new principle, and **can be fixed at any height** by simply giving them a half-turn to the right.

**The Tripod** can be extended to 4 ft. 3 in. in height, and will be found rigid enough to support a Half-plate Camera. Tripods can also be made on the same principle to take any size Camera, and to fit a Camera with turntable.

**A Special Form** is also made for **Hand Cameras** with a fixed screw, instead of Collapsible Head.

**The 'HOLBORN' Tripod** is thoroughly well made and finished, weighs only 2 lbs., and, when folded, measures 37½ in. in length, forming a very convenient size for carrying.

### PRICE COMPLETE.

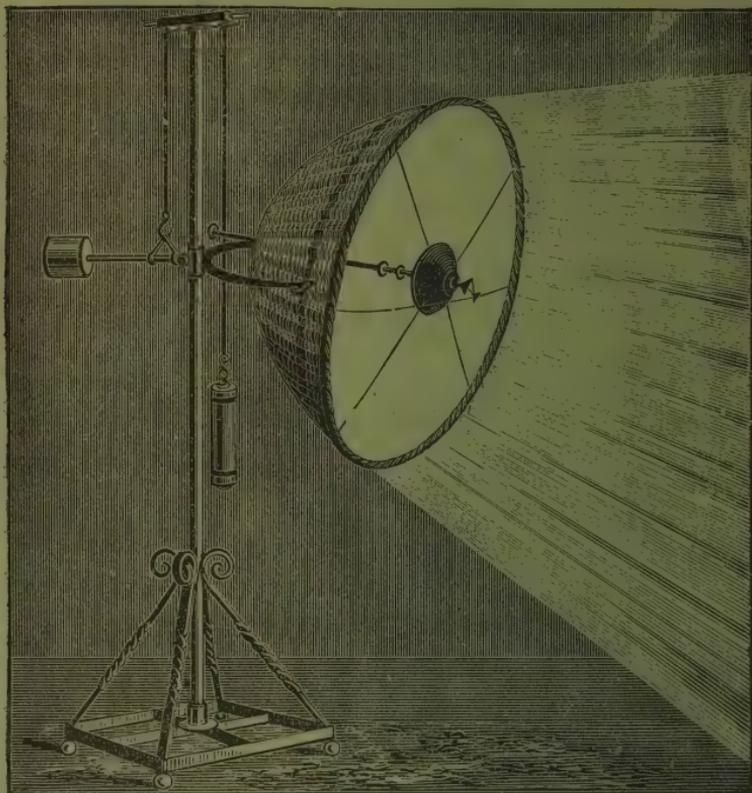
With Collapsible Triangular Head ... .. 22/6  
With Fixed Screw Head ... .. 18/-

**GEORGE HOUGHTON & SON,**  
89 High Holborn, London, W.C.

# ELECTRIC LIGHTING APPARATUS

For Photographic Studios, &c.

(Patent No. 21,352.)



Price of the Apparatus Complete, £25.

*Full Descriptive Pamphlet Free on Application.*

The Apparatus may be seen in our Showrooms.

**GEORGE HOUGHTON & SON,**  
89 High Holborn, London, W.C.

→\* THE \*←

# ‘HOLBORN’ PRECIPITATING JAR.



IN these cutting times it behoves every photographer to save all waste, and with the use of these Jars this may be done with the least possible trouble, and with the most satisfactory results. The great advantage possessed by them over casks, which are so generally used by photographers for this purpose, lies in the fact that the sides, slanting inwards, allow the Precipitate to fall direct to the bottom; this avoids the great waste which occurs when using casks, owing to the Precipitate clinging to the upright sides. The Jars are made of earthenware, with lift-off lids and earthenware taps.

## INSTRUCTIONS FOR USE.

**FOR PRECIPITATING WASHINGS FROM PRINTS.**—For this purpose two Jars are recommended. After the Prints are washed the turbid water is poured into Jar No. 1, and a teaspoonful of common salt added every day. When full, stir up well, and allow a day or two to settle, using Jar No. 2 meanwhile. When the solution in No. 1 is clear, test same by drawing off a little in a clean glass and shaking up with a little salt. If it remains clear the silver has all been precipitated below the tap, and the water may be allowed to run off. This treatment should be continued, using the Jars alternately, until the Precipitate is nearly up to the tap, when it can easily be removed by pouring into a dish, where it should be dried, and sent to the refiners to be reduced.

**FOR PRECIPITATING HYPO BATHS.**—Another Jar can be used for this purpose, using Liver of Sulphur (Potassium Sulphide) instead of salt for precipitating. It is well to keep this Jar in the open air, as Sulphuretted Hydrogen is given off.

**FOR PRECIPITATING GOLD TONING BATHS.**—A small Jar can be used for this purpose, using Sulphate of Iron to precipitate.

## PRICES OF JARS COMPLETE.

4 Gallon ... 10/6 each. | 8 Gallon ... 20/- each.

**GEORGE HOUGHTON & SON,**  
89 High Holborn, London, W.C.

# \* THE \*

## ‘EXCELSIOR’ MOUNTANT.

ALWAYS  
READY  
FOR USE.



REQUIRES  
NO  
HEATING.

This Mountant, while suitable for all purposes, is specially so for mounting Gelatino-Chloride Paper with highly-glazed or matt surface, without the use of Backing Paper. The best results will be obtained by carrying out the following instructions:—

Pass the brush round the edge of print, and allow the Mountant to get tacky; then brush Mountant over centre of card, place print on mount, and squeeze well.

Extract from an Article in THE AMATEUR PHOTOGRAPHER  
on ‘Mounting,’ by T. W. BACON, Esq.

‘The necessary qualifications for a good Mountant are the following:—

1. It must be of suitable consistency for being brushed on the print, must not be thin and runny, nor thick and treacley; it must not be lumpy, nor contain bits of foreign matter.
2. It must not require the application of heat before or during use.
3. It must not cockle the mount, whether it be of cardboard or only paper, nor must it necessitate the application of pressure to keep the print flat after being mounted.
4. It must not in any degree affect the glaze on prints which have dried on ferrotype plate, vulcanite, or glass, nor must it require the use of any backing for the prints.
5. It must keep well.
6. It must not injure the print.
7. It must be soluble in cold water, so as to be easily washed off the fingers, brushes, &c.

The writer is only acquainted with one which does so, namely, that known as ‘Excelsior Mounting Solution,’ manufactured by  
**GEORGE HOUGHTON & SON.**

PRICES.		Each.	Postage.
3-oz. Bottles	...	6d.	3d.
8-oz. Bottles	...	1/-	4½d.

**GEORGE HOUGHTON & SON,**  
89 High Holborn, London, W.C.

[See preceding pages.]

# TALBOT & EAMER

HAVE REMOVED TO

LARGER & MORE CONVENIENT PREMISES,

Richmond Works,

AINSWORTH ST., BLACKBURN.

We have now ample working space, fitted with the Latest and Best Appliances and Machinery for the production of High-class Photographic and Scientific Instruments.

IN FUTURE

THE 'TALMER,'

THE 'ECONOMIC,'

THE 'DERVAX'

AND OTHER CAMERAS

may be obtained without the delay which has hitherto been unavoidable.

**NOTE.**—All our Dark Slides and other Goods bear our name. Before purchasing Apparatus of any kind see our New Illustrated List and Supplement.

TALBOT & EAMER, Ainsworth St., BLACKBURN.

Telegraphic Address:—'EAMER, BLACKBURN.'

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 THE 'TALMER' DOES THE BEST.
 

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 THE 'TALMER.'
 

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**T**HE 'TALMER' is a hand camera embodying many novel and practical features, thereby being specially adapted for amateurs, who, even when ignorant of the most elementary principles of photography, can take with its aid satisfactory pictures.

## THE LENS.

By far the most important part of a hand camera is the lens. No one will be struck dumb at our originality when we say that good work cannot possibly be done with an inferior lens. We have fitted to our 'Talmer' the very best lens it is possible to obtain. It is made by Messrs. Taylor, Taylor, and Hobson (Leicester). This lens is a rapid rectilinear of the very highest excellence, and cannot be surpassed for the purpose.\*

## CAPACITY.

*Twelve* pictures on glass plates, or *twenty-four* pictures on cut celluloid films, or any less number may be made by one charging. The rapidity and high quality of the lens ensure results of the highest technical excellence. For each picture two operations only are necessary: 1—release the shutter; 2—change the plate.

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\* Notwithstanding the fact that a Rectilinear is the best type of lens for all-round work, a first-class single lens has recommendatory features peculiar to itself. The capabilities of a good single lens for hand camera work seem known to few, the negligent mounting and inferior quality of many single lenses have prejudiced many against their use. We have now, however, made many experiments with the assistance of a practical optician, and are now able to fit a single combination lens to our 'Talmer,' which will recommend itself to those who do not wish to go to the expense of one of the rectilinear type.

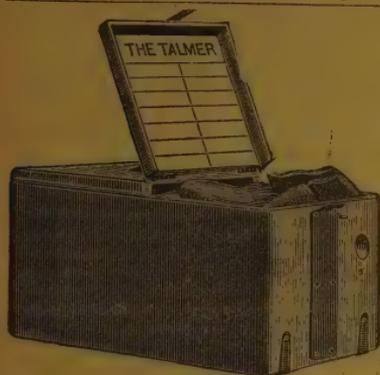
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 TALBOT & EAMER, BLACKBURN.

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## THE 'TALMER' DOES THE BEST.

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The 'TALMER' is a small light mahogany case, with handle for carrying. At one end of the case is the lens aperture, behind which is the shutter. By a novel device the duration of the exposure can be varied from 1-50th second to one second. Prolonged or time exposures of any duration may be made, no additional adjustment being necessary.

On the right hand side of the case, near the lower front corner is a small trigger or lever by which the shutter is set off. The position of this trigger falls conveniently for the finger when holding the camera, *so that there is no risk of shaking* the instrument when discharging the shutter. A couple of rails protect the trigger from accidental pressure.

There are two finders fitted in the camera, these are about one quarter the size of the plate, having glass screens about  $1\frac{1}{2}$  in. by 2 in., and are the largest finders ever fitted to a  $\frac{1}{4}$  plate hand camera, indeed, considerable difficulty has been experienced in adopting them without increasing the external dimensions of the instrument. The finders found in hand cameras are often ridiculously small, and very frequently the images are indiscernible, there being no provision for shading the ground glass from the light,

The finders of the 'TALMER' are shaded by large hoods, which fold down, protecting the glass from injury. There is no occasion to break the thumb nail when using them, for they have springs attached, which force them into position on releasing a small catch. The extraordinary large size of the 'Talmer' finders combined with the excellence of the lens, which works at fixed focus, *renders the use of a cumbersome and fragile focussing screen unnecessary.* The finders give exactly the same picture as that projected by the lens inside the

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**TALBOT & EAMER, BLACKBURN.**

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## THE 'TALMER' DOES THE BEST.

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camera, but about one quarter the full size. The operator thus sees exactly what he has on his plate at the moment of exposure, so that there is no danger of his leaving out of the picture the part he most wanted in it, as so frequently happens with small finders. Finders constructed without a glass screen should be avoided, as the centre and angle of view seen through the bi-concave lens varies with the position and distance from the eye.

There is no doubt that for ordinary hand camera work, a lens working at fixed focus is a great convenience, but the camera can be supplied with adjustable focus and scale when desired. In a fixed focus camera it is very essential that the lens be adjusted correctly in the first instance, which, in the 'Talmer,' is done by actual trial in each camera, and *not by measurement*. The lens, which is a rectilinear doublet, has a full aperture of F/9, has stops F/11, F/13, and F/16, provided by means of a rotating diaphragm, adjustable outside the camera.

Next to the lens the changing system is the most important part of a hand camera. Complicated magazines are not reliable, for, with that cussedness common to inanimate objects, they refuse to act at a critical moment. Dark slides are certainly the simplest, but can scarcely be classed as mechanical, besides, they are bulky and expensive, and occupy more space than can well be spared in a hand camera, and it is not convenient to carry them in one's pocket, so that a system that offers the compactness of the one with the certainty of the other, without their respective disadvantages, deserves more than a passing notice. In our opinion, and we speak from many years' experience, nothing has yet been invented, that, for ease and certainty in action, will compare with our improved bag and sheath system.

The storing and changing of the plates or films contained in the 'Talmer' is effected as follows:—

At the rear of the case is a compartment which holds 12 sheaths for plates, or 24 holders for films. At the end of the

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TALBOT & EAMER BLACKBURN.

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## THE 'TALMER' DOES THE BEST.

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camera, and at the back of the chamber is a sliding piece of metal, by which each sheath in turn is lifted into the leather bag or pocket on top of the chamber, the fingers grasp the sheath from the outside of the bag and press it down in front for exposure. The full number of sheaths remain in the camera all the time, there is no unequal tension, the pressure remains the same from start to finish. The lifter is self-replacing, and raises the plates from the back, so that it cannot possibly damage the sensitive surface.

Those persons who have not seen or used a 'Talmer' may possibly think that this system is slow and inconvenient. The most consummate waster of plates would not desire to change them more quickly than is possible with the 'Talmer.' The 12 plates may be readily changed in 45 seconds, and bearing in mind that the changing of the plates also sets the shutter, there would be no difficulty in making the 12 exposures within the minute; surely no one who wishes to obtain results worth looking at could wish to expose them quicker than this. One of the chief advantages of the system is this, you know when the plate *is* changed, and are not entirely dependent on mechanical contrivances, nor will the plates jamb or bind at a critical moment.

The form of the 'Talmer' bag is difficult to describe; it is shaped and folded in such a manner that the sheath touches the top of it immediately it is raised, and the sides of the bag fall away from the sheath, thus avoiding all scraping and entanglement.

By a modified mechanical and structural arrangement, we have been able to reduce the camera to the smallest possible size, the external dimensions being only  $5 \times 4\frac{1}{2} \times 9$ , equivalent to  $202\frac{1}{2}$  cubic inches. Indeed it would not be possible to make a  $\frac{1}{4}$ -plate hand camera less than the Talmer, as the case is only just large enough to take the  $4\frac{1}{2} \times 3\frac{1}{4}$  plate; its length being equivalent to the thickness of the 12 plates added to the focus of the lens and the length of its tube.

The distinguishing feature of the 'Talmer' is the arrange-

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**TALBOT & EAMER, BLACKBURN.**

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## THE 'TALMER' DOES THE BEST.

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ment by which the changing of the plate, however quickly performed, simultaneously sets the shutter for the next exposure. It follows, therefore, that *all the operator has to do is to change the plates one after the other without taking any notice of the shutter*, which is *always set* when there is an *unexposed* plate in front.

The counting indicator which is attached to the lifter keeps record of the number of exposures made.

The combination of these operations makes one less movement to look after. The more things to do, the easier to forget, is a common sense observation. If you have to go to six shops, you'll forget the penny packet of tacks, but if the number of places be reduced to three, the probability is you won't. So with hand camera movements, there is nothing to gain by having a lot to do, for, after all, the result pertains to the lens, and not to movement N or M, and if you forget, a plate is spoiled.

There is still another element of uncertainty to dispose of. Any user of a hand camera will tell you that it is easy to omit to change the plates after exposure, and it is just as easy to forget *whether or not it has been done*. It is not very satisfactory to be compelled to ask oneself 'Did I change that last exposure?' probably the efforts to remember only increase your perplexity. You have either to risk spoiling what, if already exposed, might have been a nice picture, or you may decide to change the plate, and possibly find on development that the plate had never been used. This difficulty does not present itself to the user of a 'Talmer,' there being an indicator attached to the shutter, which shows whether or not the plate facing the lens has been exposed. *Double exposures are therefore avoided*. This feature is not to be found in any other instrument, and with the assistance of the counting indicator, the number of the plate in position, and whether or not it has been exposed, can always be ascertained at a glance, whilst notes of each exposure may be made on the ivory tablet inside the lid.

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TALBOT & EAMER, BLACKBURN.

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## THE 'TALMER' DOES THE BEST.

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Now as to the shutter, it is really surprising that notwithstanding the amount of ingenuity that has been shown in the construction of photographic shutters, there seems to be an almost total disregard of fundamental principles. Hitherto the varied duration of exposure has been obtained by accelerating or retarding the movement of the shutter, so that when a comparatively long exposure be given, the lens is only *fully uncovered* for one-third or less of the entire time, in other words, two-thirds of the exposure are obtained through a lens more or less covered, a large portion of the light that would otherwise reach the plate being cut off. Now in the 'Talmer' the shutter can be regulated to give exposures varying from 1-50th to one second; but notice: the range of speed is *not* obtained by increasing or retarding the *movement* of the shutter, but by shortening or prolonging the *time* during which the lens is *actually uncovered*, thus ensuring the whole benefit of the entire aperture, allowing the entry of a maximum of light. This high co-efficiency facilitates the production of *fully exposed negatives*.

Any single exposure may be *withdrawn* for development without interfering with those in the camera. If films be used there is no cutting up or waste of the negative material involved by taking out the exposures one at a time, or the entire stock may be exposed consecutively and taken out when all have been used. In the event of any exposures being taken out of the camera, the store may be replenished by adding others, or it will suffice for the efficient working of the apparatus if the empty sheaths or holders be replaced. Furthermore, if only a few pictures are to be taken, the camera will work quite as well even if a number of the sheaths or holders be not loaded.

When travelling it is sometimes desirable that provision be made for taking a large number of pictures. By purchasing additional sheaths, supplied in light-tight boxes, and loading them before starting, it is a simple matter to reload the camera, which, when there is no dark room available, may be done at night, or with the assistance of a changing bag, in

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TALBOT & EAMER, BLACKBURN.

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## THE 'TALMER' DOES THE BEST.

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a few moments. The plates (or films) being thus protected against light and breakage, both before and after exposure.

Possibly one of the greatest enemies of the sensitive surface, whether it be contained in roll holder, dark slide or otherwise, is dust, and in a hand camera is all the more formidable, yet manufacturers have paid little or no attention to the matter. In most hand cameras the plates are contained in roughly blackened tin or zinc sheaths, which, during the operation of changing are shot up or down, or fall from the vertical to the horizontal, rubbing against each other, raising an incredible amount of dust, filling the interstices of the camera, and finally settling on the plate. Nor is the amount of dirt reduced by the continual scraping of the sheaths against the bare wood of the interior, nor by the wear and friction of other working parts inside the body of the camera.

Comprehending these drawbacks, and following the adage that prevention is better than cure, we have adopted sheaths of thin pen steel of smooth and dull surface. Being made by special tools, they are absolutely uniform in size, and hold plates of any thickness up to register. The inside of the chamber in which the sheaths are contained is faced with brass plates, the sheaths and other metal parts work metal against metal, ensuring absolute freedom from dust and uniformity and certainty in action, whilst negatives are obtained absolutely free from pinholes.

These details will recommend the camera for use in hot and trying climates.

It will be noticed that the lens represents two-fifths or nearly one-half the price of the camera.

The aperture of the lens can be closed independently of the shutter, which may be set, when desired, apart from the changing arrangement.

There is no complicated mechanism, and the lens, shutter, and all other parts are readily accessible.

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**TALBOT & EAMER, BLACKBURN.**

THE 'TALMER' DOES THE BEST.

PRICES.

	£	s.	d.
The 'Talmer,' $\frac{1}{4}$ -plate size, fitted with Rapid Single Combination Fixed Focus Lens F/11, giving marvellous definition ... ..	4	4	6
Ditto, but fitted with Taylor, Taylor & Hobson's R R Lens, fixed focus, F/9   ... ..	6	12	6
Ditto, Taylor's R R Lens, adjustable focus and scale	7	7	0
Ditto, 5 x 4 size, Taylor's R R Lens, Iris diaphragm, adjustable focus, &c. ... ..	10	10	0
Ditto, $\frac{1}{2}$ -plate size, Taylor's R R Lens, Iris diaphragm, adjustable focus ... ..	14	10	0
Ditto, $\frac{1}{4}$ -plate, extra sheaths, per doz. ... ..	0	4	6
Ditto, 24 film holders ... ..	0	10	6
Ditto, 12 5 x 4 plate sheaths ... ..	0	6	0
Ditto, 24 do. film holders... ..	0	15	6
Ditto, 12 $\frac{1}{2}$ -plate sheaths ... ..	0	10	0
Ditto, 24 do. film holders ... ..	1	0	0

Mahogany Light-tight Box for Sheaths :— $\frac{1}{4}$ -plate, 1s. 6d. ;  
5 x 4 plate, 2s. ;  $\frac{1}{2}$ -plate, 2s. 6d.

SUNDRIES.

	£	s.	d.
Leather Case for $\frac{1}{4}$ 'Talmer,' with sling strap ... ..	0	15	0
Ditto, 5 x 4 ... ..	1	0	0
Ditto, $\frac{1}{2}$ -plate ... ..	1	5	0
Waterproof Mail-Cloth Case, with sling strap, $\frac{1}{4}$ -plate	0	8	0
Ditto, 5 x 4 ... ..	0	12	0
Ditto, $\frac{1}{2}$ -plate ... ..	0	15	0
Adapting 'Talmer' for Tripod ... ..	0	2	6
Walking Stick Tripod ... ..	0	15	0
Albums for Mounting Prints ... ..	0	1	6
Most rapid Plates or Films, various makes, per doz. ...	0	1	6

Each camera is carefully tested before dispatch, and bears its registered number, and full instructions are enclosed.

Purchasers are strongly recommended to obtain cases, which conduce to the perfect working of the cameras, by excluding dust and damp, and protecting them against accidental injury.

TALBOT & EAMER, BLACKBURN.

# MAHOGANY DARK SLIDES.

FITTED TO ANY CAMERA.

**W**E fit these Slides to any Camera, irrespective of maker, and without extra cost, accurate fit and register guaranteed, and **no alteration** to camera or focussing screen required. We stock slides to fit all cameras by known makers, and can usually execute all orders within three days.

Our slides have of late years so greatly risen in the estimation of the public, that for the sake of extra profit some unscrupulous dealers have induced their customers to take hand-made slides of inferior quality, purporting to be of our make. **All our slides bear our name.**

All our slides are machine made on the interchangeable system by our own special Automatic Machinery. They have consequently an accuracy of fit and finish not found even in the most expensive dark slides made in the usual manner. We use only the best-seasoned Mahogany, and each slide is guaranteed absolutely light-tight.



## ORDINARY QUALITY.

Mahogany, Book Pattern, Hinged Shutters, each Slide holds Two Plates.

(See Illustration.)

OVER 25,000 HAVE BEEN SOLD.

### PRICES.

3½ × 3½	5/- ea.	14/6	set of three
4½ × 3½	5/-	12/6	„
5 × 4	6/6	19/-	„
6½ × 4½	9/3	27/-	„
7½ × 5	11/-	32/6	„
6½ × 8½	13/-	38/-	„
10 × 8	18/6	54/-	„
12 × 10	25/-	73/-	„
15 × 12	30/-	85/-	„

POSTAGE EXTRA.

Numbering with Ivory Tablets (any numbers), 1/- per set of three extra. Automatic Spring Fasteners can be fitted to the shutters of our own or other slides at 8d. per slide (two fasteners).

**NOTE.**—On receipt of value and postage we will be pleased to send a slide on approval for inspection.

**ALL OUR SLIDES BEAR OUR NAME.**

**TALBOT & EAMER, BLACKBURN.**



# STUDIO CAMERA

SPECIAL LINE.

Best Possible Workmanship.



**Universal Studio Camera**, made of best seasoned Spanish mahogany, with leather bellows, swing back, rising front, horizontal swing front, repeating back, screw focussing adjustment, hinged focussing screen, hinged inner frames, two fronts, full set of carriers and slide, long extension for copying, &c. Fully equal to those charged thirty per cent. more by London houses.

## PRICES.

	£	s.	d.
8½ × 8½ for two C.-D.-V.'s on ½ plate, two Cabinets on whole plate; whole sizes singly, 4¼ × 3¼ to 8½ × 6½, upright or horizontal ... ..	6	10	0
12 × 12 for two C.-D.-V.'s on ½ plate, two Cabinets on whole plate, two Boudoirs on 10 × 8; all sizes singly to 12 × 10 ... ..	9	10	0
15 × 15 for two C.-D.-V.'s on ½ plate, two Cabinets on whole plate, two Boudoirs on 10 × 8, and all sizes singly, 4¼ × 3½ to 15 × 12, upright or horizontal ... ..	12	0	0
The 15 × 15 has 40 inches extension. Others in proportion.			

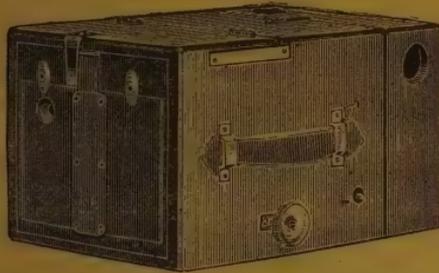
**FIVE PER CENT. DISCOUNT. CASH WITH ORDER.**

**TALBOT & EAMER, BLACKBURN.**

# THE 'ECONOMIC' HAND CAMERA

Takes Purchaser's own or any Lens.

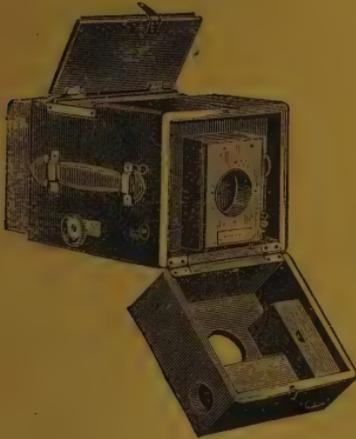
We will  
obtain  
and fit



any Lens  
to this  
instrument

This instrument carries 12 plates or 24 cut films, has two sunk finders and Thornton-Pickard time and instantaneous shutter. The body of the camera is telescopic, adjusted by a rack and pinion, and will, in the  $\frac{1}{4}$ -plate size, accommodate any lens from 5 to 7 inches focus, and can be supplied to take those of either longer or shorter focus.

The lens flange is screwed to the front of the shutter, which thus works behind the lens. The correct focus is obtained by taking out the back of the camera and inserting a piece of ground glass in the position occupied by the plate when exposed, the scale may then be marked with the desired distances.



Like the 'Talmer,' the plate chamber is lined with metal plates, ensuring ease and certainty in changing, and freedom from dust and pinholed negatives. When ordering, we prefer that the lens be sent to us for fitting.

Screw and bushes are provided for tripod.

- PRICES. -

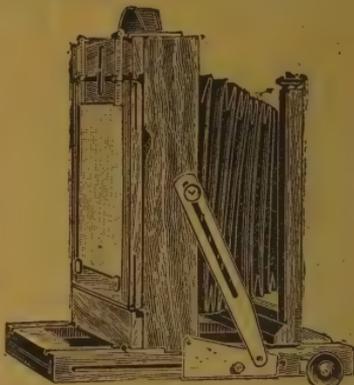
	£	s.	d.
$\frac{1}{4}$ -plate, complete with 12 plate sheaths	4	10	0
5 by 4 plate " " " "	5	15	0
$\frac{1}{2}$ -plate " " " "	8	0	0
24 $\frac{1}{4}$ -plate film sheaths, extra	0	10	6
24 5 by 4 " " " "	0	15	6

FIVE PER CENT. DISCOUNT FOR CASH WITH ORDER.

TALBOT & EAMER. BLACKBURN.

# THE 'DERVAX' FIELD CAMERA.

A New  
Field  
Camera.

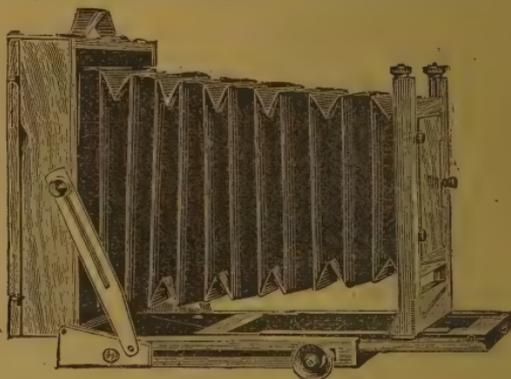


Light,  
Compact,  
Strong.

**All Movements.**

**T**HIS new Camera has all movements, vertical and horizontal swing back, rising front, loose lens panel, reversing frame, plumb level, back sets up for W. A. lenses, best cross-grained varnished leather bellows, very slightly conical, extra long extension  $\frac{1}{2}$ -plate size, racks out to 16 inches, closes to 2 inches. Each camera is sent out complete with three double slides, of our best quality. These slides are numbered with ivory tablets, are fitted with automatic spring fasteners and have metal division plates.

The Camera is made of the very best selected seasoned Mahogany, highly polished. The brass work is strong and finished in the best style. We supply this Camera, if desired, with double front for stereoscopic work. Price **£4 10s.**



Quarter plate, including three slides	.. .. .	..	£2 15 0
Half plate	.. .. .	..	4 4 0
Whole plate size	.. .. .	..	6 6 0
Additional slides, $\frac{1}{2}$ -plate, each	.. .. .	net	0 6 6
.. .. . $\frac{1}{4}$ -plate, each	.. .. .	..	0 12 6
.. .. . whole-plate, each	.. .. .	..	0 18 6

Ten per cent. Discount for Cash with order.

**TALBOT & EAMER, BLACKBURN.**

## THE 'DEXTER' HAND CAMERA.



**T**HIS hand Camera meets a demand for a high-class serviceable instrument at a moderate price.

It is fitted with two finders, which are sunk, enabling the view to be discerned in the strongest light. The lens is of selected and guaranteed quality, is fitted with rotating diaphragm, and works at fixed focus, giving marvellous definition.

The shutter is of new construction, self-setting. Time or prolonged exposures of any duration may be made.

The outer case is of mahogany, well-jointed and finished, either polished or ebonized.

The 12 sheaths are changed on the N. & A. patented changing bag system.

The lens and interior of the camera are readily accessible for cleaning, &c.

### PRICE.

Complete with single lens	...	...	...	...	...	50s.
" " Rectilinear lens	...	...	...	...	...	90s.

## SHEATHS FOR HAND CAMERAS.

Made of thin Oxidized Steel, with a dull black finish. No PIGMENT is applied to these, as we find that it always wears off, creating dust, and causing pinholes. These sheaths are guaranteed to be absolutely uniform in size and thickness, they are made by special machinery.

### PRICES per dozen.

3½ × 3½	...	4/6;	¼ plate	...	4/6;	5 × 4	...	6/-;	½ plate	...	10/-
Film Sheaths ¼ plate size 5/3 per dozen.											

Less 5 per cent. Discount for Cash with order.

**TALBOT & EAMER, BLACKBURN.**



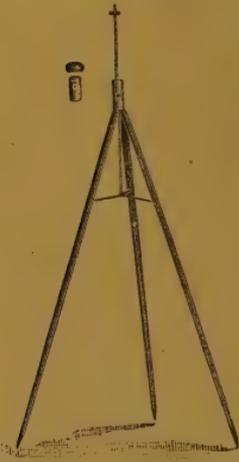
## THE 'VENTOR' CHANGING BOX.

THIS Changing Box has been introduced to meet a demand for an efficient and simple magazine which may be adapted to any Camera. The plates are contained in sheaths; by releasing a spring and holding the box bag downwards, a loaded sheath falls into the bag, when it may be placed into position for exposure. This Changing-box is certain in action, and may be relied upon absolutely.

The front is made of suitable size, and may be taken off and cut down or grooved to fit any Camera, which we will be pleased to do if a slide or frame be sent to work to.

### PRICES.

Quarter-plate	...	...	...	...	£1 5 0
5 x 4 plate	...	...	...	...	1 15 0
Half-plate	...	...	...	...	2 5 0



## Walking-stick Stands.

THE NEATEST STAND MADE.

Adjusted with the greatest ease and quickness.

Extremely rigid and very light.

Price, with Bushes for Camera ... .. 15/-



## TRIPOD STANDS.

Four-fold Stand for ordinary use, exceedingly light but withall very strong	...	...	...	...	£0 17 6
Ditto, but with sliding leg	...	...	...	...	1 0 0
Three-fold Stand with Sliding leg	...	...	...	...	0 15 0
Ditto, stronger, for 1/4-plate Cameras...	...	...	...	...	1 0 0
Ditto, very strong...	...	...	...	...	1 5 0

## FINDERS.

Pair Finders (horizontal and vertical), large size, as used in our 'Talmer' 1/4-plate Hand Camera	...	...	...	...	0 15 0
Separate Finders, each...	...	...	...	...	0 8 0

CIRCULAR LEVELS, as used in our 'Talmer' Hand Camera, 1/3 each.

TALBOT & EAMER, BLACKBURN.

[See preceding pages.]

1888, PRIZE MEDAL FOR EXCELLENCE OF APPARATUS.



# SHARP & HITCHMOUGH

Photographic Instrument Makers,

GOVERNMENT CONTRACTORS,

101 & 103 DALE STREET, LIVERPOOL.

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## Specialties for Home and Export.

CAMERAS, LENSES, STANDS,  
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 OPTICAL GOODS,  
 SCIENTIFIC APPARATUS FOR  
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MECHANICAL WORK UNDER-  
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 INVENTIONS WORKED OUT  
 FOR  
 AMATEUR MECHANICS.  
 PHOTOGRAPHIC PRINTING AND  
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Special Quotations to large buyers. Foreign Indents  
 should be addressed to

**SHARP & HITCHMOUGH, Liverpool.**

Telegraphic Address: 'Aptus Finder, Liverpool.'

Telephone: No. 2495.

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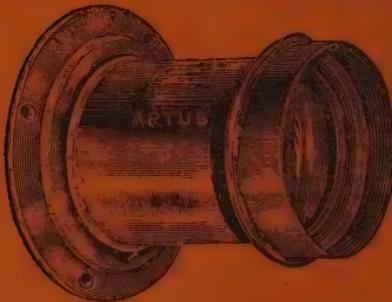
Not exceeding 1 lb. in weight ...	3d.	Exceeding 6 lbs. not exceeding 7 lbs.	1/
Exceeding 1 lb. not exceeding 2 lbs.	4½d.	" 7 lbs. "	8 lbs. 1/1½
" 2 lbs. "	3 lbs. 6d.	" 8 lbs. "	9 lbs. 1/3
" 3 lbs. "	4 lbs. 7½d.	" 9 lbs. "	10 lbs. 1/4½
" 4 lbs. "	5 lbs. 9d.	" 10 lbs. "	11 lbs. 1/6
" 5 lbs. "	6 lbs. 10½d.		



'APTUS'

APLANATIC DOUBLET.

Guaranteed Quality.



ADMIRABLY ADAPTED FOR  
GROUPS, LANDSCAPES,  
ARCHITECTURE, COPYING,  
ENLARGING, and  
INSTANTANEOUS WORK.

Diameter of Lens.	Approximate Equiv. Focus.	PRICES.	
		Waterhouse Diaphragm.	Iris Diaphragm.
1 inch	4¼ × 3¼ & 5 × 4	5½ in. ... ..	£1 1 0 ... £1 13 6
1½ "	6½ × 4¾	8½ in. ... ..	1 5 0 ... 2 2 0
1¾ "	8½ × 6½	12½ in. ... ..	2 2 0 ... 3 1 0
2½ "	10 × 8	15¾ in. ... ..	3 10 0 ... 4 12 0

BRASS WORK of Every Description to Order by our own Workmen. Screws, Plates, Hinges, Racks & Pinions, Flanges and Adapters, &c. (See pages 1218 and 1219).

IRIS DIAPHRAGMS FITTED TO EXISTING LENSES.

PRICES:—¼ and 5 × 4, 12s. 6d.; ½, 15s.; ¾, 16s. 6d.; 10 × 8, 21s.; 12 × 10, 25s.

# SHARP & HITCHMOUGH'S 'APTUS' LENSES

Are Unsurpassed for Fine Definition and General Excellence.

## 'APTUS' RAPID RECTILINEAR LENSES

From Mr. J. FINNIE, Callander, Photographer, With London-made Adjustable

April 11th, 1891:—

'I have given the Lens (Euryscope) fair trial, and find it just PERFECTION.'

Diaphragms.

From Mr. H. CONWAY, Rhyl, N.W.,

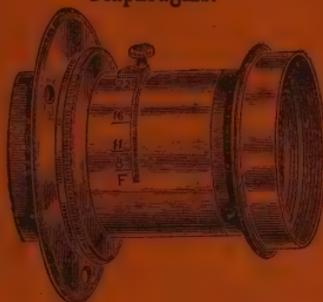
February 9th, 1891:—

'I like the Lens (Aplanatic Doublet) you sent me very well indeed. I will order large R. R. from you shortly.'

From Mr. J. BURGOYNE, Birmingham,

June 22nd, 1891:—

'I have one of your Lenses in regular use, and a better Lens could not be.'



We are constantly receiving letters expressing satisfaction at the quality of our Lenses.

### IRIS DIAPHRAGMS.

THE above Adjustable Diaphragm is commonly known in the Trade by the name of 'Iris.' Finding room for improved construction in some of those before the Public, we have carefully studied their construction, and now offer that which may be considered the most perfect Diaphragm in the Market, constructed of eleven, thirteen, fifteen, or more segments; truly adjusted, they give a perfect circle, from smallest to largest diameter formed, with the friction reduced to almost nil. These Mounts and Flanges will be made to the Society's Standard Gauge. The Lenses used in these London-made Mounts are of the highest quality procurable, specially made for us abroad; they are selected and tested before Mounting by a London Specialist, and we guarantee them equal to anything in the Market, either bearing an English or foreign name, it being well known in the Trade that for Photographic, Astronomical, and Microscopic purposes, Lenses are constructed to advantage with a combination of English and Foreign Crown and Flint Glass.

### RAPID RECTILINEAR.

Size covered.	Diameter.	Focus	PRICES.				TT
			Waterhouse.	Iris Dphrgms.	Aluminium.	Dphrgms.	
5 x 4	1 1/8	4 1/2 in.	£1 10 0	£2 5 0	£2 10 0	£3 5 0	
7 x 5	1 1/4	7 1/2 in.	2 5 0	3 0 0	3 7 6	4 5 0	
8 x 5	1 1/2	8 1/2 in.	2 15 0	3 10 0	4 0 0	5 0 0	
8 1/2 x 6 1/2	1 3/4	10 1/2 in.	3 10 0	4 10 0	5 0 0	6 0 0	
10 x 8	2 1/8	12 1/2 in.	4 12 0	5 16 0	6 10 0	7 10 0	
12 x 10	2 1/4	14 1/2 in.	6 0 0	7 10 0	7 10 0	9 0 0	
15 x 12	2 3/4	19 1/2 in.	7 5 0	8 15 0	—	—	

Comparative Weight of Lens in Aluminium and Brass—8x5 Lens in Brass, 1 1/2 oz.; same Lens mounted in Aluminium, 5/4 oz. A saving of over 50 per cent. in weight.

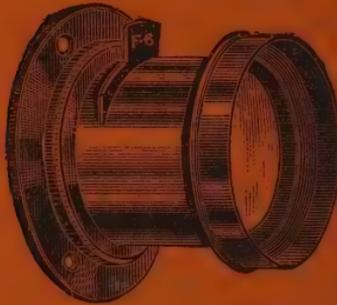
NOTE.—As per our usual custom we allow three days' trial of our Lenses, upon receipt of value, cash being returned in full if Lenses should prove unsatisfactory.

# SHARP & HITCHMOUGH'S

## 'APTUS'

### EURYSCOPE, OR R.R. PORTRAIT SERIES.

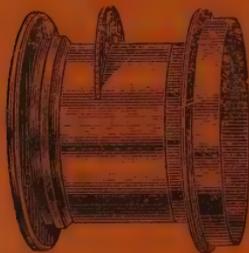
THE Lenses are of special optical glass, and have about twice the rapidity of the Rapid Rectilinear Series, working  $f/6$ , specially good Lenses for Portrait work in Studio, or Groups in the open air; they are equally good for Landscape or Architectural work with smaller stops. TT



Size covered.	Focus.	Diam.	£ s. d.	Aluminium £ s. d.
5×4 ...	4½ in. ...	1½ ...	2 10 0 ...	3 10 0
7×5 ...	8½ in. ...	1½ ...	3 5 0 ...	4 5 0
9×7 ...	10½ in. ...	2 ...	4 10 0 ...	5 15 0
10×8 ...	12½ in. ...	2½ ...	7 10 0 ...	8 15 0

### 'APTUS' WIDE-ANGLE DOUBLET'S RECTILINEAR, REVOLVING DIAPHRAGMS.

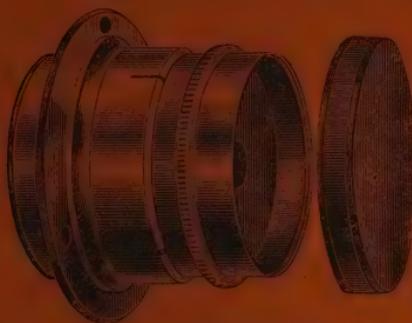
Specially adapted for Architecture; being of short focus and wide angular aperture, can be used to advantage when very close to the subject. It is also useful for landscapes as well as copying. The smaller ones give beautiful **Lantern Slides**, the definition being exceptionally crisp. TT



Size.	Focus.	Diam. of Lens	£ s. d.	Aluminium, £ s. d.
4½ × 3½ in. ...	2½ in. ...	1 in. ...	1 10 0 ...	2 10 0
6½ × 4½ in. ...	4⅞ in. ...	1⅞ in. ...	2 5 0 ...	3 5 0
8½ × 6½ in. ...	6¼ in. ...	1⅞ in. ...	3 5 0 ...	4 10 0
10 × 8 in. ...	7 in. ...	1½ in. ...	4 10 0 ...	5 15 0
12 × 10 in. ...	8 in. ...	1½ in. ...	5 15 0 ...	7 0 0

Will Clients abroad please address all Indents to

**SHARP & HITCHMOUGH, LIVERPOOL.**



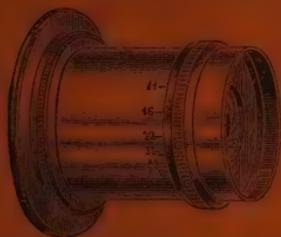
## 'APTUS' TT Snap-Shot Lens.

5 Focus Achromatic. Jena Glass.  
Exceptional Quality for  $\frac{1}{4}$ -plate Pictures.  
UNMOUNTED, 3s. 6d.  
IN SLIDING MOUNT, 6s. 6d.  
Wonderful definition, with large aperture.

Dist. Hoopstad O.F.S., S.A., Steenbokpan,  
To Messrs. Sharp & Hitchmough, 101 & 103 Dale Street, Liverpool.  
Dear Sirs, October 6th, 1891.

I have the pleasure to inform you of the arrival of Euryscope lens and shutter which reached in safety and good order. The new mount metal is a marvel of lightness, the lenses satisfactory in every way, whilst the Iris diaphragm works smoothly, without any perceptible friction. I am perfectly satisfied with the goods you have supplied.

I am, dear Sirs,  
Yours faithfully, F. Stow.



## 'Aptus' Rapid View Lenses

Iris Diaphragms.

Meniscus, Working Aperture, F/11. TT

Size.	Focus.	Diam.	Price.
$4\frac{1}{2} \times 3\frac{1}{2}$ & $5 \times 4$ in.	5 in. ... ..	$1\frac{1}{2}$ ... ..	15/-
$6\frac{1}{2} \times 4\frac{1}{2}$ in. ... ..	$7\frac{1}{2}$ in. ... ..	$1\frac{3}{4}$ ... ..	17/6
$8\frac{1}{2} \times 6\frac{1}{2}$ in. ... ..	$10\frac{1}{2}$ in. ... ..	$1\frac{1}{2}$ ... ..	25/0

Acknowledging the excellence of the Lenses manufactured in London, and being aware of their very high prices, we have been induced, owing to the unprecedented success we have had with our 'Aptus' R. R. and W. A. Lenses, to introduce a few

### 'APTUS' QUICK-ACTING PORTRAIT LENSES,

Specially adapted for Studio work, and at reasonable prices. These Lenses we thoroughly guarantee as being made of the finest English Glass, and are thoroughly tested before leaving our premises, notwithstanding which we give our customers the privilege of a three days' trial, and should the Lens be found to be unsatisfactory we undertake to return the money.

### PORTRAIT LENSES, 'Extra Rapid.' TT

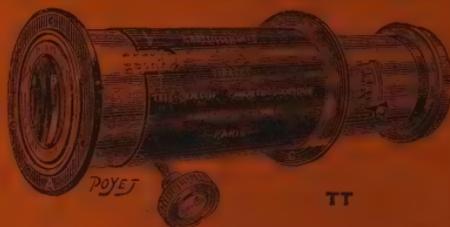
CARTE-DE-VISITE. Largest Aperture, F/3.

I B.—Diameter of Lens,  $1\frac{1}{2}$  in.; Focus,  $4\frac{1}{2}$  in.; size covered,  $4\frac{1}{2} \times 3\frac{1}{2}$  in. £2 0 0  
Distance from subject for full-length Carte-de-Visite, 12 ft.

I B Long.—Diam. of Lens,  $2\frac{1}{2}$  in.; Focus,  $4\frac{3}{4}$  in.; size covered,  $4\frac{3}{4} \times 3\frac{3}{4}$  in. 3 0 0  
Distance from subject for full-length Carte-de-Visite, 15 ft.

Trade Terms to Dealers on Application.

ASK TO SEE THE  
ADMIRABLE SPECIMEN  
PICTURE OBTAINED.



## THE TELE-OBJECTIF PANORTHOSCOPIQUE

Is light and small, adaptable to all Tourists' Cameras; gives rapid and perfectly rectilinear pictures of far-distant objects (often inaccessible) with considerable magnifying power. Invaluable for Military Explorations, Marine Views, Mountainous Sceneries and Architectural Subjects, in which the defect of perspective is entirely destroyed. Precise regulation of varying powers by means of micrometric rack motion and divided scale.

The T.O.P. Lens is unsurpassed for LARGE HEAD Portraits. NO RETOUCHING wanted. Marvellous relief.

		BRASS.	ALUMINIUM.
For $\frac{1}{2}$ -plate Cameras,	Prices including the 'Panorthoscopic' Extra Rapid R. R. Lens.		
" 1 " "	" 3 to 8 times	£5 5 0	£7 7 0
" 1 " "	" 5 to 10 times	£6 10 0	£9 0 0

## TAYLOR, TAYLOR, & HOBSON'S RAPID RECTILINEAR LENSES.

SHARP & HITCHMOUGH, Liverpool, AGENTS. TF

ANGLE OF VIEW, between 40 and 50 Degrees.

DOUBLE COMBINATION. The full working aperture of these Lenses is No. 4, f/8.

No.	Size of Plate.	Approximate Equivalent Focus.	Diameter of Standard Screw.	PRICES.	
				With Waterhouse Diaphragms.	Extra for Iris Diaphragm.
1	4½ × 3½	5 in.	1½ in.	£2 10 0	6/-
2	6½ × 4½	7 in.	1½ in.	3 0 0	7/-
3	8 × 5	9 in.	2 in.	3 10 0	8/-
4	8½ × 6½	11 in.	2 in.	4 10 0	9/-
5	10 × 8	13 in.	2½ in.	6 0 0	10/-
6	12 × 10	16 in.	3 in.	8 0 0	13/-

### FOR DETECTIVE & FIXED FOCUS CAMERAS.

THE power of Definition of these Lenses is most excellent. They are very Light and Compact, and their mounts are finished black. TF

Approximate Equivalent Focus.	PRICES.
5 in. or 5½ in.	£2 3 0
6 in.	2 8 0

### LENSES BY ROSS, DALLMEYER, &c.

Procured to order, subject to the usual Ten per cent. Discount for Cash.

Full List on Application to SHARP & HITCHMOUGH, Liverpool.

SHARP & HITCHMOUGH, 101 & 103 DALE ST., LIVERPOOL.

# WRAY'S LENSES

With Iris Diaphragm or ordinary Stops.

**SHARP & HITCHMOUGH,**  
Agents, LIVERPOOL.

Illustrated Catalogue of Optical Instruments One Stamp.

## PRICES OF RAPID RECTILINEAR LENSES, with Rigid Settings.

To cover Plate.	Equiv. focus.	Waterhouse Diaph.	Iris Diaph.
*5 × 4 ... ..	5½ inch ... ..	£2 10 0 ... ..	£3 5 0
6½ " 5 ... ..	8½ " " " " " " " "	3 10 0 ... ..	4 5 0
8 " 5 ... ..	9½ " " " " " " " "	4 0 0 ... ..	4 15 0
8½ " 6½ ... ..	11 " " " " " " " "	4 10 0 ... ..	5 5 0
10 " 8 ... ..	13 " " " " " " " "	6 0 0 ... ..	6 15 0
12 " 10 ... ..	16 " " " " " " " "	8 0 0 ... ..	9 0 0

TF

## PRICES OF WIDE-ANGLE RECTILINEAR LENSES.

Angle included, 90°.

Focus ... ..	5×4	7×5	9×7	10×8	1½	1½	1½
Price, with Rotating Stops	3½-in.	4-in.	6-in.	7-in.	8-in.	9-in.	10-in.
With Iris ... ..	£2 10/-	£2 15/-	£3	£3 15/-	£4 10/-	£5 5/-	£6
				£4 15/-	£5 15/-	£6 15/-	£7 15/-

TF

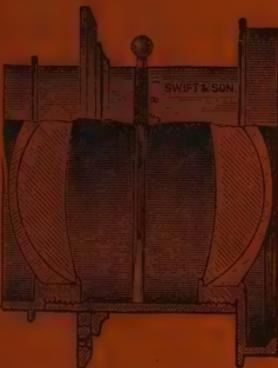
**STEREO LENSES, 5-in. focus, 45/- per pair.**

**NEW CASSET LENSES.**—Three Landscape Lenses, fitting one Mount, having Iris Diaphragms, with separate Scale of Apertures for each Lens.

## SWIFT'S PARAGON LENSES.

### RAPID PARAGON.

TT



To cover Plate.	Equiv. focus.	Watrhse. Dia.	Iris Diaph.
5 × 4 ... ..	6 inch ... ..	£3 16 0 ... ..	£4 11 0
6 " 5 ... ..	7½ " " " " " " " "	4 16 6 ... ..	5 9 6
8 " 5 ... ..	9 " " " " " " " "	5 3 6 ... ..	5 18 6
8½ " 6½ ... ..	11 " " " " " " " "	5 17 6 ... ..	6 6 0
10 " 8 ... ..	14 " " " " " " " "	7 12 0 ... ..	8 7 0
12 " 10 ... ..	16 " " " " " " " "	9 9 0 ... ..	10 9 0

### WIDE-ANGLE PARAGON.

To cover Plate.	Equiv. focus.	Rev. Diaph.	Iris Diaph.
5 × 4 ... ..	3 inch ... ..	£3 12 0 ... ..	£4 7 0
7½ " 4½ ... ..	4 " " " " " " " "	4 1 0 ... ..	4 16 0
8½ " 6½ ... ..	5½ " " " " " " " "	4 19 0 ... ..	5 14 0
12 " 10 ... ..	7 " " " " " " " "	6 19 0 ... ..	7 14 0

10 per cent. Cash Discount.

## SWIFT'S NEW DETECTIVE LENS.

Focus 5in. or 5½in., 45/-; 6in., 50/-  
Iris Diaphragms, 15/- extra.

AGENTS—

**SHARP & HITCHMOUGH, 101 & 103 DALE ST., LIVERPOOL.**

# ✧ CAMERAS. ✧

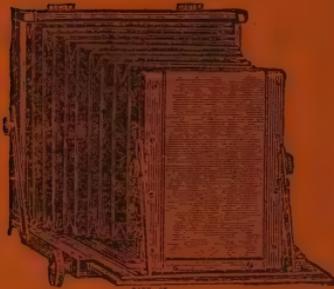
‘APTUS’

## UNIVERSAL STUDIO CAMERA FOR DRY PLATE PROCESS.

FINEST WORKMANSHIP. PRICES ON APPLICATION.

## NEW GRESHAM CAMERA.

For Plates  $6\frac{1}{2} \times 4\frac{3}{4}$ .



Modern Construction; Square, £ s. d.  
with Reversing Back for Vertical and Horizontal Pictures; Leather Bellows; Rack and Pinion Adjustment; Extension Body for Copying, &c.; one Double Slide, book form. Price **3 10 0**  
Extra Slides, 15s.

### APTUS' APLANATIC LENS.

For Landscapes, Groups, Portraits, Architecture, Copying, and Instantaneous Work, Half-plate ... .. Price **1 5 0**

‘APTUS’ PORTABLE TRIPOD STAND ... .. Price **0 12 6**

**£5 7 6**

Dark Slides, New Fronts, and Repairs, &c., promptly made by our own Workmen in Wood or Metal.

MECHANICAL CONTRIVANCES OF ANY DESCRIPTION MADE TO DRAWINGS.

Repairs in Photographic, Scientific, and Optical Branches a Speciality.

COMMISSION AND EXPORT.

*Special Terms to Wholesale Houses and Shippers.*

INDENTS SHOULD IN ALL CASES BE ADDRESSED TO

## SHARP & HITCHMOUGH, Liverpool.

Telegraphic Address: ‘APTUS FINDER,’ Liverpool. Telephone No. 2495.

You will find on Page 1191 a sample of our Washable Backgrounds.

# A NEW FEATURE! THE 'LADIES' CAMERA

1894.

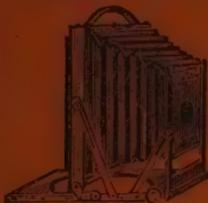
SPECIALLY DESIGNED AND CONSTRUCTED FOR THE  
USE OF LADIES.



EXCEPTIONALLY light (turning the scale at 2½ lbs.) and strong, extremely portable, having every possible movement, and all the advantages that are possible to embody in a modern Camera. In addition to possessing all the latest improvements up to the season of 1893, we now fit our New Double Pinion Movement, which has turned out an undoubted success;

this feature being quite new, we have protected it.

The additional improvement provides a means for fine adjustment of the body when used for copying and reducing, and is thereby specially adapted for Lantern Slide making. The apparatus is made of selected figured mahogany, well seasoned, and made by workmen formerly with some of the leading London houses. The brass work is highly finished, imparting great beauty to the Camera. It is our desire to make a leading feature of the above for the coming season 1894, and with this object we have decided that FANCY PRICES shall not stand in our light.



Our desire is always to give the best possible value. Being manufacturers of our specialities, we are in a position to supply direct to purchasers, Photographic Cabinet and Brass Work first hand, thus saving all intermediate profits.

## PRICES.

TF

½ 'Ladies' Camera, three best slides	...	...	...	...	£6 15 0
Recessed revolving turntable, Royalty paid...	...	...	...	...	0 10 0
New four-fold walnut tripod, highly finished and French polished, very light, 18 inches when folded	...	...	...	...	1 10 0
					<u>£8 15 0</u>
½ 'Ladies' Camera as above...	...	...	...	...	8 18 0
Tripod and turntable	...	...	...	...	2 0 0
					<u>£10 18 0</u>

SHARP & HITCHMOUGH, Photographic Instrument Makers,  
101 & 103 DALE STREET, LIVERPOOL.  
*Telegraphic Address 'APTUS FINDER,' Liverpool.*

## SHARP & HITCHMOUGH'S 'Aptus' Premier Tourist Camera.



**C**ONSTRUCTED on Scientific Principles and of highest possible quality of Workmanship, has many novel features which are not possessed by any other Camera.

The Shutter is attached to the Camera Front, and works behind the Lens, so that any ordinary size of lens may be mounted on the Front of the Shutter. It is always in position when required.

The Camera is remarkably compact and light, the following being a few particulars of the half-plate size :—

SIZE, when folded, including all projections, without Turntable and Shutter,  $9 \times 8\frac{1}{2} \times 2\frac{1}{2}$ .

WEIGHT, without Turntable and Shutter,  $2\frac{1}{2}$  lbs. LONGEST FOCUS, with Shutter, 16 ins

*THE LENS AND SHUTTER FOLD UP WITH THE CAMERA.*

The Back of the Camera can be moved close up to the Front for use with Short Focus Lenses.

There is every necessary movement, including Swing Back, Swing Front with independent rising and falling motion, Reversing Back for Vertical and Horizontal Pictures.

The TURNTABLE fitted, which is superior to a loose triangle, as it is always attached, ready when required. It is of light and elegant construction, but of large size, so that the legs have a good span, making the Camera very rigid.

The SLIDES are of Book Form, best quality, with double-hinged Folding Shutters and PATENT SNAPS.

Prices of the 'Premier' Camera.  $\frac{1}{2}$ -plate.  $\frac{1}{4}$ -plate.

	$\frac{1}{2}$ -plate.	$\frac{1}{4}$ -plate.
'Premier' Camera, complete, with Three Slides (book pattern) ... ..	£6 17 6	£9 10 0
4-fold Tripod Stand, with Top to fit above (see engraving)	1 5 0	1 10 0
Fitted with Turntable, extra ... ..	0 10 0	0 12 6
Fitted with 'Time' and 'Instantaneous' Shutter, attached to Camera Front, extra ... ..	1 0 6	1 8 6
Speed Indicator ... ..	0 3 6	0 3 6

SHARP & HITCHMOUGH, Photographic Instrument Makers, LIVERPOOL,  
WORKS—GRESHAM BUILDINGS.

# SHARP & HITCHMOUGH,

AGENTS FOR

+ LANCASTER'S APPARATUS. +

## THE 'INSTANTOGRAPH' PATENT.

Universal Opinion : ' Everything



an Amateur can Desire.'

WILL TAKE VERTICAL AND HORIZONTAL PHOTOS.

**T**HIS Apparatus is useful for all kinds of work—Instantaneous Pictures of Moving Objects, Portraits, Groups, Landscapes, Architectural and Engineering Subjects, &c. &c. The Lens is of a most rapid type, and has a patent Instantaneous Shutter working with the greatest rapidity; also our patent Adjustable Diaphragms, showing at a glance the precise aperture by a divided scale, and the relative times of exposure with different apertures. The Camera is beautifully made, and folds up into the smallest compass possible. The Tailboard opens out of Camera, and the Lens front slides out and clamps. Fine Adjustment is obtained by Rackwork. The Bellows in THE INSTANTOGRAPH are made of leather and the whole apparatus—of which, by the way, over 13,500 have been sold—is pronounced the *sine quâ non* of the Amateur Photographer. The Stand is of polished mahogany, with a brass top.

EACH SET CONSISTS OF CAMERA, SLIDE, LENS, AND STAND. T

Price complete, for $\frac{1}{2}$ plates ...	£2 2 0	Price complete, for $\frac{1}{2}$ plates ...	£6 6 0
" " 5 x 4 plates ...	3 5 0	" " 10 x 8 plates ...	8 8 0
" " $\frac{3}{4}$ plates ...	4 4 0	" " 12 x 10 " ...	10 10 0
" " $7\frac{1}{2}$ x 5 plates ...	5 10 0	" " 15 x 12 " ...	12 12 0

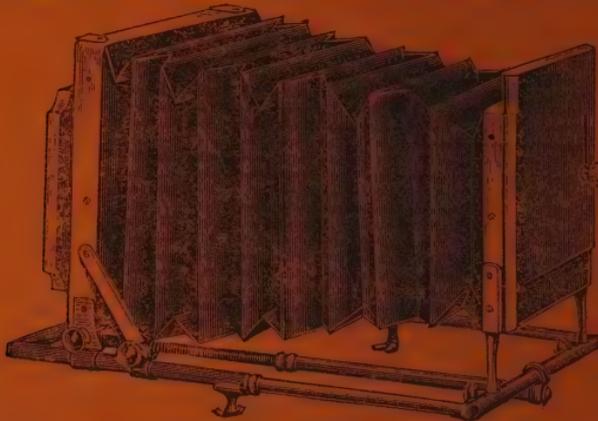
### EXTRA SLIDES.

Double Dry Slides ...	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{1}{2}$	10 x 8	12 x 10	15 x 12
Carriers... ..	7/8	12/8	20/-	28/-	40/-	45/-
	—	1/6	2/6	3/-	3/6	4/-

Telegraphic Address: 'APTUS FINDER,' LIVERPOOL.

# THE 'ZODIAC' CAMERA. PATENT.

should be observed that the reduced size of the slide enables us to make the  
**SMALLEST CAMERA ON THE MARKET**  
for its size of plate; while in appearance it is TRIM and ELEGANT



FRONT VIEW, showing rising front and extending base,

**O**RIGINALLY conceived for Foreign Markets and trying climates, it appeals with particular force to Merchants and Shippers, while the special nature of its construction makes it no less suitable and desirable to photographers at home.

Though metal in many parts, the form is chiefly tubular, and the Camera is actually lighter than the usual make.

The working parts being in metal and very simple, are certain, smooth, and rigid, and unaffected by use, damp, or heat.

The Bellows are of Leather, and the material throughout is of the best.

The Lens Front, and part of Reversing Back, are of Polished Mahogany.

The Tripod (ash) is attached direct to the Camera base, thus dispensing with head, screw, and loose parts.

So many of the parts being in metal, and in duplicate, the cost of production is reduced, enabling us to offer a superior instrument at a moderate price, while the repair of breakages or loss is greatly simplified.

These Cameras are made in all the standard sizes from  $\frac{1}{4}$ -plate to  $12 \times 10$ , and special sizes can be made to order (at increased prices unless in quantities).

The Movements of the Camera are :—Rising and falling front, double swing back, reversing back, extending base, back slides forward for wide-angle work, collapsible for packing.

## PRICES.

Complete, with Three Double Dark Slides, Focussing Screen, and Ash Stand.

$\frac{1}{4}$ -plate ... ..	£3 13 6	.....	$\frac{1}{4}$ -plate ... ..	£5 5 0	TTF
$5 \times 4$ -plate ... ..	4 4 0	.....	$\frac{1}{2}$ .. ..	6 16 6	
$10 \times 8$ -plate ... ..		.....		£8 8 0	

WHOLESALE FROM  
**SHARP & HITCHMOUGH LIVERPOOL**

# APTUS' MAHOGANY DOUBLE DARK SLIDES,



BOOK-FORM,  
HINGED SHUTTERS.

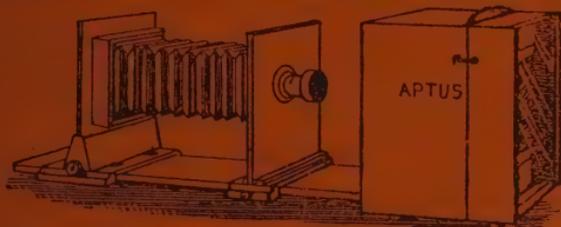
			T
$\frac{1}{2}$ -plate ...	} To fit	{	each 5/3
$5 \times 4$ ...			" 7/-
$\frac{1}{2}$ -plate ...			" 9/-
$\frac{1}{4}$ " ...	} Instantograph	{	" 14/-
$\frac{1}{2}$ " ...			" 6/6
$5 \times 4$ ...			" 8/6
$\frac{1}{2}$ -plate ...	} any Ordinary	{	" 10/6
$\frac{1}{4}$ " ...			" 15/6
$\frac{1}{4}$ " ...			" 15/6

## PORTABLE 'APTUS' LANTERN COPYING CAMERA, FOR REDUCTION. (Adjustable Focus.)

Including Double Slides for Plates,  $3\frac{1}{2} \times 3\frac{1}{2}$ , and  $4\frac{1}{2} \times 3\frac{1}{2}$ .

To copy from	Price in Mahogany.
$\frac{1}{2}$ , $5 \times 4$ , and $\frac{1}{4}$ ..	40/-
$10 \times 8$ and down to $\frac{1}{4}$ plate ...	45/-
Stereoscopic, 45/- Rack-and-Pinion Adjustment to any of above, 10/6 extra.	
Fitted with Lens complete, 10/6 and 21/- extra.	

From  
**25/-**



SHARP & HITCHMOUGH'S

## New 'Aptus' Stereoscopic Camera.

First quality. All modern improvements.

To take plates  $6\frac{1}{2} \times 4\frac{1}{2}$  or  $6\frac{1}{2} \times 4\frac{1}{2}$ . Price, with three Double Slides, £7 10s.

Pair Selected Stereo Lenses, £2 2s. Stereoscopes (American pattern), 3s. 6d.  
Stereoscopic Achromatic Eye Pieces, Rack Adjustment, 12s. 6d., 15s. to 30s.  
Revolving Stereoscopes, to hold 50 and 100 Slides, from 42s.

Stereoscopic Printing Frames, so constructed that it is unnecessary, when printing transparencies, to cut the negatives. In pine, price 4s. 6d. each. Ordinary Stereo Printing Frames, 2s. each. Stereoscopic Mats, assorted shapes, 1s. per box. Stereoscopic Obscured Cover Glasses, very thin, 3s. per dozen.

# SHARP & HITCHMOUGH'S 'APTUS PREMIER' ENLARGING AND REDUCING CAMERA.

AS MADE FOR THE PHOTOGRAPHIC SOCIETY  
OF INDIA, PAUL LANGE, ESQ., &c,



**C**AMERA of Mahogany, French polished, Rack and Pinion adjustment, the rear portion forming Studio Camera. Double Dark Slide with full set of Carriers, Focussing arms for adjustment of middle body carrying the Lens, and fitted with an entirely new arrangement for holding the negative in any position, which may be altered at will at the time of focussing. Working parts interchangeable, so that the whole length of body may be used for enlarging from Micro Slides. This Camera is adapted for use in daylight or by artificial light, and is acknowledged to be the most complete Enlarging apparatus ever made.

### PRICES:—TO ENLARGE OR REDUCE FROM

1/4-Plate to 12 x 10	... ..	£12 12 0	... ..	7 feet Extension.
1/4-Plate to 15 x 12	... ..	£13 13 0	... ..	9 " "
Vertical or Horizontal.				

ENLARGING TABLE (Portable) ... .. £4 0 0

This Camera has been copied extensively. The Original Apparatus can only be had from the Makers,

**SHARP & HITCHMOUGH, LIVERPOOL.**

# SHARP & HITCHMOUGH'S 'APTUS' UNIVERSAL HAND CAMERA.

The first and only Camera designed for Hand and Tripod work. This is not a recent production, but is a well tried piece of apparatus. All



Mr. Paul Lange's prize pictures of **NORWAY** and **ICELAND** were taken with a similar Camera made by us to his order.

International Exhibition, 1888, Prize Medal for Excellence of Apparatus.

## IMPROVED MODEL FOR 1894.

LIGHTER IN WEIGHT, MORE COMPACT, AND LESS EXPENSIVE.



FIG. 1.

Arranged for Instantaneous work.

The object in view in designing the 'APTUS' UNIVERSAL HAND CAMERA was at once to provide an instrument by which a photographic tourist might secure pictures of landscapes, portraits, architecture (interior and exterior), and, in fact, any object coming within the range of a most complete outfit.

We describe the apparatus as a Hand Camera, but the fact that it may be used, when desired, as a Detective (as shown in Fig. 1), does not interfere with its free use on the tripod stand, as in Fig. 4, when it is found necessary to use a long-focus landscape lens, or for architecture, when a wide-angle lens may be employed. The advantage of the swing-back is maintained under all circumstances, as also the rising and falling front, and rack and pinion adjustment. Our patent rack and pinion as fitted to our Major Pattern adds, if possible, to the

complete construction of the apparatus, whereby a fine adjustment is supplied to the body of the Camera when used for reducing and copying.

If so wished the Camera can be removed from the box and used in the ordinary way, entirely dispensing with the outer case.

In addition to which our Universal Hand Camera possesses many original novelties and improvements; for instance, when a Roll Holder is used, it is unnecessary to open the outer case, every operation being performed from the outside—i.e., setting—and release of shutter (pneumatic or by trigger), focussing, registration of progressive number of exposures, and by an automatic arrangement, which is entirely new, the apertures for front of lens and finder are closed until immediately previous to exposure.

By means of this automatic cut-off it is impossible to release the shutter for exposure until the image can be seen on the finder. The cut-off acts as a safeguard against exposing a plate by accident.

This Camera is acknowledged to be the most perfect Hand Camera made at the present day.

Mr. Paul Lange's fine pictures of Norway (see *Amateur Photographer* prize pictures, No. 2, 'Under the Midnight Sun') and those of Iceland, were taken by a similar apparatus.

# 'APTUS'

## UNIVERSAL HAND CAMERAS

ARE IN USE IN

THE BRITISH ISLES, FRANCE, SPAIN, PORTUGAL, GERMANY, RUSSIA,  
AUSTRIA, ITALY, TURKEY, GREECE, SWITZERLAND, ICELAND, NORWAY,  
SWEDEN, HOLLAND, BELGIUM, MALTA, GIBRALTAR, &c.

The woodcut, Fig. 1, represents the box containing the working parts of the UNIVERSAL' Hand Camera, as arranged for snap-shot work. With one exception it is without projecting parts. The setting and release of the shutter, and in the case of a roll-holder being used, all the manipulations are performed from the bottom, including the focussing, the winding of fresh tissue, and the indication of progressive number of exposures. The dimensions of a case containing a  $\frac{1}{4}$ -plate Camera, fitted with  $5\frac{1}{2}$  in. R. R. Lens and all the necessary attachments, are  $8\frac{1}{2}$  in.  $\times$  7 in.  $\times$   $6\frac{1}{2}$  in., weight  $4\frac{1}{2}$  lbs., short extension  $0\frac{1}{2}$  inches, extra extension 14 inches. The outside measurement of a case for

$5 \times 4$  Camera of a similar construction (which size is now the most popular) is 9 in.  $\times$   $7\frac{3}{4}$  in.  $\times$  7 in., turning the scale at 5 lbs., and extending 16 inches.

Fig. 2 shows the open case containing the Camera with lens and shutter complete attached to tripod. With the Camera in this position the swing back may be utilised. By opening the aperture at the rear it allows the operator to compose and focus a picture on the ground glass should, however, an interior picture be required, it is necessary to remove the ordinary R. R. Lens, replacing it by one of a wider angle, and by letting down the front of the box, as shown in Fig. 2, every advantage may be taken of the movements peculiar to this Camera, as shown in Fig. 3, the lens is attached to the swing front ready for work; it will be perceived that the



Fig. 2. Showing interior arrangements.

front of the Camera is elevated, and the swing back brought into a perpendicular position to gain the object in view.

# 'APTUS' UNIVERSAL HAND CAMERAS

ARE IN USE IN

INDIA, CHINA, JAPAN, CEYLON, PALESTINE, ARABIA, EGYPT,  
SIERRA LEONE, NIGER RIVER, CENTRAL AFRICA,  
NATAL, CAPE COLONY.

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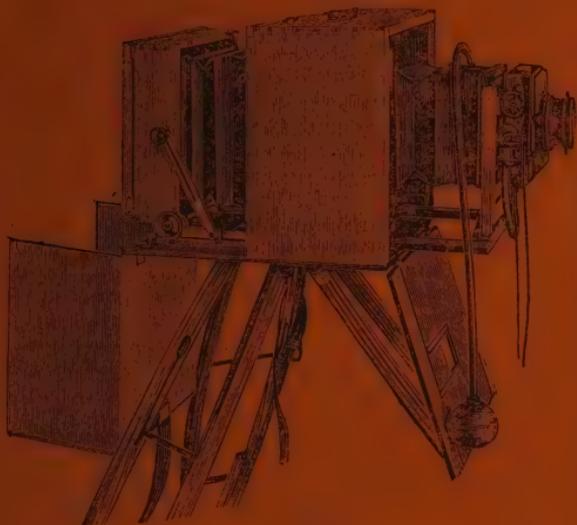


Fig 3.

Showing Camera extended for Time and Instantaneous Exposures, when using extra long focus lens.

Fig. 3 shows the Camera extended with triple extension (16 inches), for use with one combination of the R. R. or long focus Landscape Lens, for distant objects, such as mountainous scenery and marine subjects. It will be noticed by the wood-cut that the Instantaneous Shutter is fitted to work behind the Lens, by this, extra Lenses (being suitable) fit one flange, allowing the Shutter to remain securely fixed to the front of Camera. The Shutter is one of Thornton Pickard's latest patterns, with all their latest improvements for time

and instantaneous, speed indicator and safety cut-off. The latter is an addition of great importance, especially when using a Roll Holder, the shutter of which being always drawn, it is necessary under ordinary circumstances to use a cut-off when re-setting the shutter blind, but the safety blind working automatically with the shutter obviates the possibility of admitting light to the Camera by accident when re-setting the shutter. The exposure is made by pneumatic or trigger release. We will here point out the advantages of the Revolving Finder, the lens of which is of a bi-concave form, sufficiently deep in its curvature to produce a sharply defined and brilliantly illuminated reflected picture on a small mirror, placed at an angle behind the lens. The lens used for the finder is selected so as to produce the same angle of view as the R. R. will do on the plate. The finder revolves for vertical and horizontal positions, thus doing away with extra weight, and reducing the number of apertures in the box.

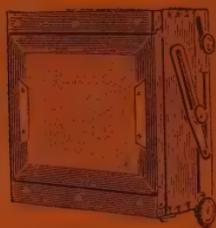
# 'APTUS' UNIVERSAL HAND CAMERAS

ARE IN USE IN

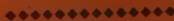
UNITED STATES, CANADA, MEXICO, BRAZILS, WEST INDIES, ARGENTINA,  
NEW SOUTH WALES, VICTORIA, SOUTH AUSTRALIA, &c.



In these woodcuts the Camera is shown, unencumbered by the outer case and base-board, so that it may be carried in a portable form, just as an ordinary Tourist Kinnear Camera. Deviating from the ordinary run of Camera work, we are now making our Cameras in Figured Mahogany or Figured Walnut; the latter are much admired for their great beauty and uncommon appearance.



A word about the Tripod, which we make specially in Walnut, beautifully French polished to match the Cameras. The Tripod is very strong and rigid, and fits into the recessed revolving head, let in flush with the baseboard. It is made in a portable form, having sliding legs, and folding into 18 or 20 inches as desired.



For Specifications, Testimonials and prices see following pages. All those who have used our Universal Camera speak in the highest possible terms.

**SHARP & HITCHMOUGH,**  
Designers, Patentees, and Manufacturers,  
LIVERPOOL.

# SHARP & HITCHMOUGH'S UNIVERSAL HAND CAMERA

## EXTRACTS FROM LETTERS.

'DOD'S BUILDINGS, 6 CHAPEL STREET, LIVERPOOL, May 5th, 1892.

'DEAR SIRS,—You know I am off for another trip to Norway the end of this month, and so as to be sure that my Camera will not fail me during the tour I send it to you, together with all the dark slides, so that you can thoroughly overhaul everything. I want the Camera to turn out the same grand successes it has done hitherto in Norway and Iceland since you made it for me in 1888. Another friend of mine is coming round to you to order a similar outfit, as I told him for travelling and all-round work none better has ever been turned out. Of course, see that he gets all the little useful improvements which you have added since my own Camera was made, and which add other charms to its working. Mr. H. P. Robinson saw me work it the other day, and was simply delighted with its results.

'Yours truly, PAUL LANGE.

'MESSRS. SHARP & HITCHMOUGH, LIVERPOOL.'

'24 THE TEMPLE, DALE STREET, LIVERPOOL, July 4th, 1892.

'DEAR SIRS,—I have pleasure in informing you that the "Universal" Hand Camera you made for me has proved entirely satisfactory. In spite of the rough usage and heat incidental to a tour in the East, it has been in every way reliable, and the results have quite surpassed my expectations, proving it to be both unusually strong and carefully fitted, and I have pleasure in recommending it as one of the most complete portable and safe Cameras I have seen.

'Yours faithfully, R. TALBOT KELLY.

'MESSRS. SHARP & HITCHMOUGH.'

'DINAS MAWDDY, May 18th, 1892.

'GENTLEMEN,—I am very well pleased with the "Universal" Hand Camera you made for me. It is a compact little instrument. I found it very convenient to handle on a walking tour in Derbyshire last month.

'Yours truly, EDMUND ROBERTS.

'MESSRS. SHARP & HITCHMOUGH.'

'FERN BANK, ROEHAMPTON PARK, SURREY, S.W., April 18th, 1892.

'DEAR SIRS,—I am very much pleased with my Camera indeed.

'Yours truly, N. H. PŔECH.

'MESSRS. SHARP & HITCHMOUGH.'

1 CREED LANE, LUDGATE HILL, LONDON, E.C., July 20th, 1892.

'DEAR SIRS,—A personal friend of the head of our firm has just come over from Australia, and wants a Hand Camera. I have suggested yours as being the most suited to his requirements, which, I need not say, are, as usual, "Universal."

'Yours truly, THE EDITOR, Amateur Photographer.

'MESSRS. SHARP & HITCHMOUGH.'

ALBANY, N.Y., Sept. 25th, 1893.

W. W. BYINGTON, Esq., writes—

'I like the Camera which you so kindly made for me very much, and everyone is extremely pleased with it. I need more dark slides; will you kindly provide me with dark slides to carry six more plates.'

SHARP & HITCHMOUGH, Sole Makers,  
LIVERPOOL.

## SHARP & HITCHMOUGH'S 'APTUS' UNIVERSAL HAND CAMERA MINOR.

### SPECIFICATION FOR $\frac{1}{4}$ -PLATE.

'APTUS' UNIVERSAL HAND CAMERA, 10 $\frac{1}{2}$  Extension Patent Rack Adjustment, rising and falling front, swing back, square for vertical and horizontal pictures, three double dark slides, focussing screen, and all necessary attachments.

Quarter-plate size, without case	£4 10 0	
Walnut Case, Finder, &c.	1 5 6	
Thornton-Pickard Instantaneous Shutter	0 12 6	
Swift's Detective Lens, 5 or 5 $\frac{1}{2}$ in. Focus	2 5 0	TT
Iris diaphragm, 15/- extra.	£8 13 0	

Cash with Order Ten Per Cent. Extras if required.

Slides, 12/6 each; Extra Long Extension, Swing front, Focussing Indicator, 25/-; Automatic cut-off to Lens and Finder, 12/6; Recessed Revolving Turntable and Patent Royalty, 12/-; Brass Binding Slides, top corners, 4/- each Slide, bottom corners, 3/- each Slide; Wood Caps and Safety Spring Snaps to Slides, 1/- each; Revolving Finder for vertical and horizontal, 5/6; Magazine Changing Boxes for 12 plates or films in sheaths and fitting, 55/-; Eastman Roll Holder, with Counting Indicator and other improvements, 50/- Nett; Speed Indicator to Shutter, 3/6; Time arrangement to Shutter, 7/6; Safety Blind to Shutter, 5/6; Spring Box to hold the Slide and Focus Frame always in position, 17/6; Waterproof Cover for Case, 8/6.

### SPECIFICATION for 5 × 4, same as above.

5 × 4 'Aptus' Universal Hand Camera Minor, 12 in. Focus	£5 5 0	
Walnut Case, Finder, &c.	1 15 0	TT
Thornton-Pickard Instantaneous Shutter	0 15 0	
Swift's Detective Lens, 6 in. Focus	2 10 0	
Iris diaphragm, 15/- extra.	£10 5 0	

Cash with Order Ten Per Cent. Extras if required.

Slides, 15/- each; Extra Long Extension, Swing front and Focussing Indicator, 30/-; Recessed Revolving Turntable and Patent Royalty, 13/6; Magazine Changing Box for 12 plates or films in sheaths and fitting, 65/-; Eastman Roll Holder, with improvements, 60/- Nett; Spring Box for the Slide and Focus Frame, always in position, 20/-; Waterproof Cover for Case, 9/6.

The Editor of PHOTOGRAPHY writes:—'In our opinion this Camera is a very clever thing, and one with which not only the best, but also all varieties of work can be done. It will certainly meet with approbation at the hands of the man who wants a good article.'

See Extracts from Letters received on previous Page.

**SHARP & HITCHMOUGH,**  
Inventors, Patentees, and Manufacturers,  
101 & 103 DALE STREET, LIVERPOOL.

# 'APTUS' 1894 MAGAZINE DETECTIVE CAMERA.

A Wonderful Success.



Carries 12 Quarter-plates,  
automatically changed.  
Time and Instantaneous  
Shutter.

Size, 9 x 6 x 5.

Weight, 2½ pounds.

'Aptus' Snap Shot Jena  
Glass Lens, working with  
large aperture.

Covered in nice grained  
Leather.

30/-

TT

5 x 4 size, 40 -

If covered in real Morocco Leather,

½-plate, 10/- extra; 5 x 4, 12/6 extra

'Aptus' R.R. Lenses, 21/- extra;

Automatic Indicators, 5/- extra.

## 'APTUS' 1894

# Magazine Twin Lens Detective Camera.

On the same correct principle as above, but fitted with a pair of Lenses of identical focus, one Lens acting as Finder, thus giving a full-sized image. Fitted with 'Aptus' Snap Shot Jena Glass Lenses, £3 10s., covered in real Morocco Leather.

TT

'Aptus' R.R. Lenses, 42/- extra.

Focussing Scale by Rack and Pinion, 15/- extra.

These Cameras being our own make, we Guarantee every one Tested and in Perfect Working Order.

# EASTMAN'S ROLL HOLDER.

PRICES OF ROLL HOLDERS—CAPACITY 48 EXPOSURES.

Size of pictures in English inches.	Approximate size of Negative in centimètres.	Weight of Holder in pounds before fitting.	Prices in Liverpool
3½ x 4½ ... ..	8 x 10½ ... ..	1½ ... ..	£2 0 0
4 x 5 ... ..	10 x 12 ... ..	1½ ... ..	2 5 0
6½ x 4½ ... ..	16½ x 12 ... ..	1½ ... ..	2 12

## 'APTUS' SPECIALITIES

obtainable from all Wholesale Houses,

# MAGAZINE AUTOMATIC CHANGING BOX.

Improved Construction. Easy to manipulate. Economy in size and weight. Less expensive than Slides. Fitted with Sheaths for plates or cut films. Each exposure registered automatically.

	Size.	Outside Measurements.	Price.
For 12 .. .. .	$4\frac{1}{2} \times 3\frac{1}{2}$	$4\frac{1}{2} \times 4\frac{1}{2} \times 2\frac{1}{2}$	45/-
" .. .. .	$5 \times 4$	$5\frac{1}{2} \times 5\frac{1}{2} \times 2\frac{1}{2}$	55/-
" .. .. .	$6\frac{1}{2} \times 4\frac{1}{2}$	$7\frac{1}{2} \times 6 \times 2\frac{1}{2}$	65/-

Can be fitted to ordinary Cameras or to our UNIVERSAL HAND CAMERA.

## THORNTON-PICKARD TIME & INSTANTANEOUS SHUTTERS.



### TIME AND INSTANTANEOUS

(Ordinary Standard Pattern). TTT

For 'Time' and 'Instantaneous'

Inches	$1\frac{1}{2}$	2	$2\frac{1}{2}$	$2\frac{1}{2}$	$2\frac{1}{2}$ dia.
	18/6	20/6	22/6	23/6	25/-
"	8	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5
"	27/6	32/6	37/6	42/6	47/6

When ordering please send a narrow strip of paper, just long enough to meet round the Lens Hood or Tube. Whenever possible we prefer to have the Hood itself to be fitted accurately.

### IMPORTANT NOTICE.

We are often asked by Amateur and Professional Photographers which pattern Shutter is the best.

We may say that for general all-round work we always recommend the Time and Instantaneous Shutter,

Standard Pattern,

as described above.

The Foreground, Extra Rapid, Stereoscopic, and other patterns, are for special kinds of work.

## NEW SPEED INDICATOR.

VERY SIMPLE.  
DOES NOT RETARD  
THE SPEED  
OF THE SHUTTER.



SHOWS AT A GLANCE  
AT WHAT  
SPEED THE SHUTTER  
IS SET.

This can be fitted to any of the Shutters described, price 3/6, or fitted to Shutters previously supplied without it, price 5/-.

When ordering Shutters please state if it is required.

WHOLESALE FROM  
**SHARP & HITCHMOUGH, LIVERPOOL.**

## The THORNTON-PICKARD Patent STEREOSCOPIC SHUTTER. 'Time' and 'Instantaneous.'

Gives exactly equal exposure to each lens. No vibration. TTT

PRICES—To Fit a Pair of Lenses having Hoods up to:

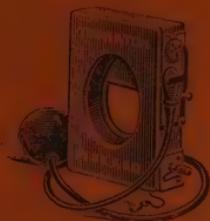
Inches ..	1½	2	2½ diam.
To give 'Time' and 'Instantaneous' exposures }	26/-	28/-	31/-

The above prices are up to 3¼ in. centres.

For 3½ in. centres .. .. . 2/- extra.

For 3¾ in. centres .. .. . 4/- extra.

When ordering please give exact size of Hoods and the exact distance apart of the lenses from centre to centre.



### INSTANTANEOUS only. Prices reduced 2/-, now stand as below:—

Inches	1½	2	2½	2½	2½ diam.
	11/6	13/6	15/6	16/6	18/-
"	3	3½	4	4½	5 "
	20/6	25/6	30/6	35/6	40/6

Indicator 3/6 extra.

Long Tubing for { 5d. per foot.  
Large Ball for do., with Stopcock,  
Self-portraiture { including Teat and Cementing up  
of Joints, &c. 4/-

## 'SPECIAL' SHUTTER.

High-speed Instantaneous only. Speed up to  $\frac{1}{250}$  of a second.



This is the fastest Roller-blind Shutter it possible to make. It has a double blind which passes across the Lens in opposite directions at the same time, opening and closing from the centre. It is suitable for such special work as athletes running, jumping, or leaping, animals in motion, and similar subjects requiring MAXIMUM SPEED.

This Shutter can be fitted to work between the Lenses when desired.

PRICES, for Lens having hood up to:

Inches...1½	2	2½	2½	2½	3	3½	4	4½	5 diameter
23/6	25/6	27/6	28/6	30/-	32/6	37/6	42/6	47/6	52/6

Speed Indicator, 3/6 extra.

WHOLESALE FROM SHARP & HITCHMOUGH, LIVERPOOL.

# THE THORNTON-PICKARD



NEW  
'SNAP  
SHOT'  
SHUTTER.

FOR ALL KINDS OF INSTANTANEOUS SUBJECTS.  
IT IS THE SIMPLEST. IT IS THE CHEAPEST AND MOST EFFICIENT.  
IT IS WELL MADE AND BEAUTIFULLY FINISHED.

PRICES.

To fit a Lens Hood or Tube up to inches diameter  $1\frac{1}{2}$  2  $2\frac{1}{2}$  TTT  
Complete with Pneumatic Release ... .. 10/- 12/- 15/-  
Speed Indicator 3/6 extra.

## SAFETY BLIND.

Patent Safety Blind fitted to either the 'TIME AND INST.' (Standard Pattern) or the  
'SNAP SHOT' Shutter up to  $2\frac{1}{2}$  in. size, 5/-

## 'FOCAL PLANE' SHUTTER.



EXTRAORDINARY RAPIDITY!

REMARKABLE RESULTS!

PRICES OF FOCAL PLANE SHUTTER (Includes fitting to Camera.)

Inches.	£ s. d.	Inches	£ s. d.
$4\frac{1}{2} \times 3\frac{1}{4}$ (1-plate) ... ..	1 15 0	$8\frac{1}{2} \times 6\frac{1}{2}$ (whole plate) ... ..	3 0 0
5 x 4 ... ..	2 0 0	10 x 8 ... ..	3 10 0
$6\frac{1}{2} \times 4\frac{1}{2}$ (1-plate) ... ..	2 5 0	12 x 10 ... ..	4 10
$7\frac{1}{2} \times 5$ ... ..	2 12 6	15 x 12 ... ..	5 10

Speed Indicator (strongly recommended) 3/6 extra.

TTT

SHARP & HITCHMOUGH, Wholesale Agents.

# The THORNTON-PICKARD Patent RUBBER MOULDING

FOR FITTING SHUTTERS TO LENSES,

TT

And for  
ADAPTING ONE SHUTTER to  
TWO or more LENSES.



### THE MOULDING

Is made of the thicknesses shown.

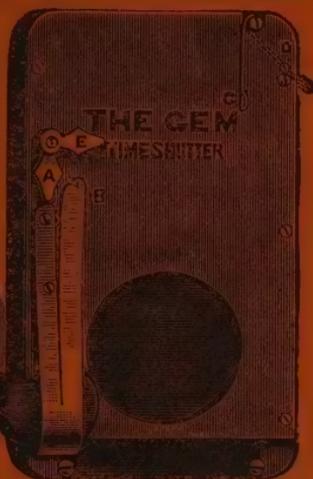
PRICE 8d. per Foot.

No.	1	2	3	4	5	6	7
Thickness	1/8"	3/32"	1/4"	5/32"	1/6"	7/32"	1/4"

## PLAIN DROP INSTANTANEOUS.

PRICES.

1 1/2 in.	1 7/8 in.	2 in.	2 1/4 in.	2 7/8 in.	3 in.
5/-	5/6	6/-	6/6	7/-	7/6 8/-



## TIME AND INSTANTANEOUS.

TT	PRICES.			
1 1/2 in.	1 7/8 in.	2 in.	2 1/4 in.	3 in.
7/6	8/4	9/-	9/9	
2 1/2 in.	2 7/8 in.	3 in.		
10/6	11/3	12/-		



## THE 'SKY SHADE' SHUTTER.

PRICES. TT

No. 1 1/2-Pl., to fit Hoods ...	1 in. to 1 1/4 in.	4/-
" 2 "	1 1/2 in. "	4/6
" 3 1/2 "	1 3/4 in. "	5/-
" 4 1/2 "	2 in. "	6/-
" 5 10 x 8 "	2 1/4 in. "	7/-
" 6 12 x 10 "	2 7/8 in. "	8/-

Pneumatic Release to any of above, 2/- extra.

For Rapid or Slow Exposures.

Mahogany base, bound in Brass, Ebonite Flap, Steel Spring, Brass Action. Made in four sizes, with variations to fit hoods, from 1 inch in eights up to 3 1/4 inch.

Larger Sizes to Order.

WHOLESALE AGENTS AND SHIPPERS,  
**SHARP & HITCHMOUGH, LIVERPOOL.**

# NEW CAMERA STAND.

FIG. 1. PLAN. 'S.B.' PATENT. FIG. 2 SECTION.

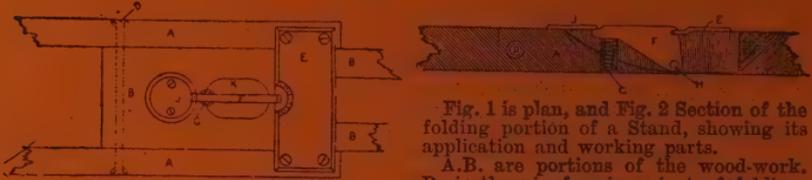


Fig. 1 is plan, and Fig. 2 Section of the folding portion of a Stand, showing its application and working parts.

A.B. are portions of the wood-work. D. is the pin forming pivot of folding-joint. E. Metal plate fixed to A.A. and forming catch plate with which F. is engaged. F. is spring catch actuated by spring C. and engaging with plate E. when opened for use.

It will be at once evident that a great gain is hereby obtained in the speed and ease with which the tripod can be erected, for the one act of opening the stand for use brings the catch into position and instantly locks the joint. It is, however, constructed upon such principles as render it quite rigid and secure.

The points of advantage hereby gained will at once commend the stand to every photographer, whether professional or amateur.

We intend applying this patent to our Nos. 1, 2, 3, & 4, and the price will not be increased, but by giving the benefit of this improvement we hope for a large future demand.

No. 1.	Threefold Tripod Stand, with Sliding Leg	TT	15/9 each.
" 2.	" " " Heavier		15/9 "
" 3.	" " " "		18/9 "
" 4.	" " " "		21/9 "

The above stands are all quoted for without tops, as so many Cameras are now made with Turntables; we have, however, prepared suitable Mahogany, cloth-covered Tops, of light pattern and thin construction, Warranted not to Warp. 5-in. diameter, 3/-; 6-in. diameter, 3/6; 8-in. diameter, 4/6 each. Larger sizes can be supplied in a few days, to order only.

No. 5.	Fourfold Stand, 52 in. when set up, and folding into 16 in., with Stitched Leather Covered Brass Triangular Top		15/9 each.
" 6.	with Sliding Leg of Special construction		18/6 "
" 7.	Fourfold as No. 5, but 6 in. taller, and Larger Top		18/- "
" 8.	Threefold, " Rule Joint and " Sliding Leg, " very compact and superior, without top		21/- "
" 9.	Threefold, cheap form, First Joint button and Sliding Leg, including Ash Top		18/9 "
" 10.	Twofold, folding Bayonet Joint, with Ash Top		12/9 "
" 11.	Twofold Ash Stand, Light, with Brass Leather Covered Top		8/8 "
" 12.	" " " " " Medium		13/6 "
" 13.	" " " " " Heavy		15/- "
" 14.	Threefold, same as No. 9, but Lighter		18/9 "

**REMARKS.**—We have every confidence in bringing our Stands before your notice as we believe them to be the very best in the market. They are all made from carefully selected Ash. The Sliding length of our Threefold Stands are made from one solid piece, and not of several pieces glued together, as is usual in other makes; consequently, they can be stood in water without fear of them coming to pieces. All parts are flush wherever practicable, i.e., Bolt Heads and Pin Plates. The whole of the work is done by a systematic application of machinery. The range of Threefold Stands, from No. 1 to No. 4, will take any size Camera up to 22x20, thus giving a uniform pattern throughout, while the fourfold stands are eminently fitted for Cyclists and for packing into short Travelling Cases. No. 9 is very suitable for Turntables, and will fit any size from 2½ in. to 4 in. opening, making an excellent Stand.

**THE TRADE CANNOT DO BETTER.**

WHOLESALE TERMS FROM  
**SHARP AND HITCHMOUGH.**

→\* **CAMERA CASES.** \*←



LEATHER BOUND CASE.

**LEATHER BOUND CASES.**

Well made and durable; lined with Green Baize. Will carry Camera, Lens, three Slides, Top of Stand, &c., &c.

TT				
1/4	1/2	3/4	10x8	12x10
8/-	9/9	12/-	15/-	18/-

**LEATHER CASES**

These are made out of the best hide, lined, partitions to carry Camera, Lens, three Slides, &c. Lock and Key, Hand and Shoulder Strap.



LEATHER CASE. TT

1/4	1/2	3/4	10x8
14/6	21/-	25/-	33/-
	12x10	...	37/-

**WATERPROOF CANVAS CASES,**  
as above, 1/4, 9/- TT

1/2 ...	...	12/-		1/4 ...	...	15/-
10x8 ...	...	18/-		12x10 ...	...	20/-

Lock and Key, 2/6 extra.

Other Sizes made to Order.

**COLLAPSIBLE CANVAS CASES**  
(Waterproof). TT

1/4 ...	...	4/6		1/2 ...	...	6/4
		1/4 ...	...	7/6		

To hold Camera, three Slides, Lens, &c.



**SHARP & HITCHMOUGH, LIVERPOOL.**  
Will Dealers apply for Terms.



### 'APTUS' RETOUCHING DESKS.

10x8 AND ABOVE, WITH DRAWER.		1T
5 x 4 ... ..	6/6 Mahogany ...	10/6
6½ x 4½ ... ..	10/6 " ...	15/-
8½ x 6½ ... ..	14/6 " ...	21/-
10 x 8 ... ..	18/- " ...	25/-
12 x 10 ... ..	21/- " ...	30/-
15 x 12 .. ...	25/- " ...	42/-

### A New Retouching Desk

For the Professional Photographer.  
Very handsomely made in Walnut and Mahogany. TT

Prices:—†, 31/6. 10x8, 42/- 12x10, 63/-  
The negative is held under the spring disc any desired position, and all light being blocked out except that passing through the portion being worked, a tinter is provided to ascertain the colour and density of pigment before applying to negative. It is pronounced the most perfect common sense Retouching Desk made.

### PORCELAIN WARE.

#### SHALLOW DISHES.

4½ x 3½ ... ..	-/6 each	9 x 7 ... ..	1/- each	12 x 10 ... ..	2/- each
5 x 4 ... ..	-/7 "	10 x 8 ... ..	1/2 "	13 x 11 ... ..	2/6 "
7 x 5 ... ..	-/9 "	11 x 9 ... ..	1/6 "	14 x 12 ... ..	3/6 "
		16 x 14 ... ..	...	6/10	

#### DEEP DISHES.

4½ x 3½ ... ..	-/7 each	10 x 8 ... ..	1/4 each	18 x 16 ... ..	9/8 each
5 x 4 ... ..	-/8 "	12 x 10 ... ..	2/3 "	19 x 15 ... ..	12/- "
7 x 5 ... ..	-/10 "	14 x 12 ... ..	4/2 "	20 x 16 ... ..	15/6 "
9 x 7 ... ..	1/3 "	16 x 14 ... ..	8/2 "		

### GRANITINE DISHES (English make).

TF

SHALLOW.	
½	... -/7
5 x 4	... -/8
½	... -/10
½	... 1/2
10 x 8	... 1/4
12 x 10	... 1/9



DEEP.	
½	... -/8
5 x 4	... -/9
½	... 1/-
½	... 1/6
10 x 8	... 1/8
12 x 10	... 2/6

WOODEN TRAYS, with Plain or Fluted Glass Bottoms, for Bromide Work.

12½ x 10½ ...	4/6		15½ x 12½ ...	5/6		18½ x 15½ ...	7/6		24½ x 18½ ...	10/-
			31 x 23 ...	12/6		33 x 28 ...	15/-			TT

SHARP & HITCHMOUGH, Manufacturers of Photographic Specialities.

**EBONITE DEVELOPING TRAYS, Best Quality.** TTF

4½ × 3½ and 3½ × 3½ ... .. 7d. each	11½ × 9½, 1 in. deep ... .. 2/9 each
5½ × 4½ ... .. 8d. "	12½ × 10½, 1½ in. " ... .. 3/6 "
7 × 5½ ... .. 11d. "	15 × 13, 1½ in. " ... .. 6/6 "
8 × 6 ... .. 1/6 "	
9 × 7 ... .. 1/8 "	Special quotations per dozen.

**CELLULOID TRAYS. Unbreakable.** TTF

VARIOUS COLOURS.

4½ × 3½ ... .. 7d. each	7 × 5½ ... .. 1/- each
5½ × 4½ ... .. 10d. "	9 × 7 ... .. 2/- "
10 × 8 ... .. 2/6 each.	

**LIGHT-TIGHT BOXES, for Dry Plates.**

For the Systematic Storage of Negatives.

FITTED WITH PAPER-COVERED METALLIC GROOVING, occupying smallest possible space. The Plates can be stored close together, and yet sufficient space to avoid contact.

TTF



**PRICES.**

12 grooves, for 12 plts.  
2½ inside measure.  
Cloth, covered.

Size.	doz.	each
4½ × 3½ ...	5/6 ...	-/6
5 × 4 ...	6/4 ...	-/7
6½ × 4½ ...	7/2 ...	-/8
7½ × 5 ...	7/10 ...	-/9
8½ × 6½ ...	9/8 ...	-/10
10 × 8 ...	12/- ...	1/1
12 × 10 ...	17/- ...	1/6

**DEAL PLATE BOXES FOR NEGATIVES.**

BEST QUALITY ONLY.

TT

Size.	For 12	24	50	100	Size.	12	24	50
4½ × 3½ ...	1/- ...	1/4 ...	1/10 ...	3/8 ...	7½ × 5 ...	1/8 ...	2/2 ...	2/8 ...
5 × 4 ...	1/3 ...	1/6 ...	2/1 ...	4/- ...	8½ × 6½ ...	2/4 ...	3/- ...	3/8 ...
6½ × 4½ ...	1/6 ...	1/10 ...	2/6 ...	5/- ...	10 × 8 ...	3/4 ...	4/6 ...	6/- ...
7½ × 4½ ...	1/7 ...	2/- ...	2/6 ...	5/- ...	12 × 10 ...	4/3 ...	5/6 ...	7/- ...

**PRINTING FRAMES.**

	4½ × 3½	5 × 4	6½ × 4½	8½ × 6½	10 × 8	12 × 10
	ea. doz.					
Common ...	-/5	4/6 ...	-/6	5/6 ...	-/10	8/6 ...
Best Common ...	-/6	-/6 ...	-/8	6/9 ...	1/-	10/- ...
Pine Varnished ...	1/-	10/- ...	1/3	12/- ...	1/8	18/- ...
Mahogany Polished ...	1/4	12/- ...	1/9	16/- ...	2/3	24/- ...

**DEEP PRINTING FRAMES WITH PLATE GLASS.** TT

8½ × 6½, 8/6; 10 × 8, 10/6; 12 × 10, 13/-; 15 × 12, 15/-; 23 × 17, 24/-;  
28 × 20, 33/-; 32 × 24, 42/-; 42 × 29, 75/-; 54 × 33, 105/- each.

**DROPPING BOTTLES:** -/8, 1/-, 1/3 each. TT

**SHARP & HITCHMOUGH, LIVERPOOL,**

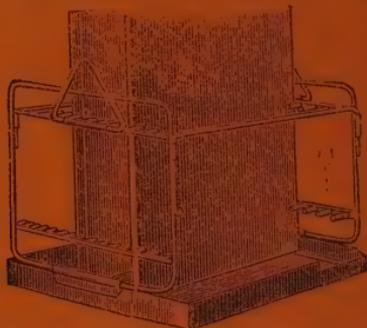
Will procure on best terms any Goods not mentioned in this List.

**FOCUSSING CLOTHS.**

Rubber Cloth, 36x30, 2/6. Ditto, Velvet Cloth, 36x30, 7/6.

TF

**FOCUSSING CLOTHS AND CHANGING BAGS COMBINED.**  
7/6 and 10/6 each.



**FOLDING, WASHING & DRYING RACKS.**

(PATENT APPLIED FOR.)

These are invaluable to Tourists or wherever space is an object.

3½ x 3½ } ... .. 1/6 each
½-plates } ... .. 2/- "
5 x 4 ... .. 2/6 "
½-plate ... .. 3/- "
7½ x 5 ... .. 3/6 "
8½ x 6½ ... .. 4/6 "
10 x 8 ... .. 4/6 "



TANKS to hold above, strongly made and japanned, with outlet at bottom. Supply Tap can be regulated so as to keep water at any desired level.

CLOSED.

**PRICE FOR TANKS TO HOLD RACKS.**

3½ x 3½ } ... .. -/9 each	½-plates ... .. 1/3 each	8½ x 6½ ... .. 2/- each
½-plates } ... .. 1/- "	7½ x 5 ... .. 1/6 "	10 x 8 ... .. 3/- "

With Stop Cock, 6d. each extra.

**'APTUS' FOLDING, WASHING, AND DRYING RACKS.**



Size.	Plain Zinc.	Enamelled White.
¼ to ½	1/6	2/9
½ to ¾	2/-	3/6
¾ to 12x10	3/-	5/6

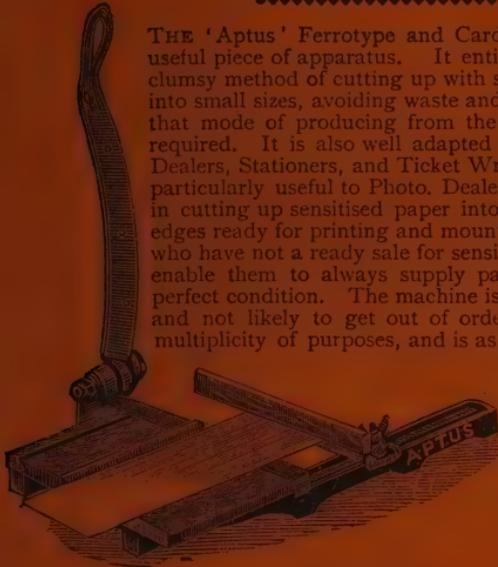
To hold 24 plates.

These Racks adapt themselves to various sizes at the same time, and the grooves being V-shaped, will not cause the Film to frill.

SEE  
'APTUS' SPECIALTIES,  
Page 1202.

# SHARP & HITCHMOUGH'S 'APTUS' NEW Ferrotypes & Card-cutting Machine.

.....



THE 'Aptus' Ferrotypes and Card-cutting Machine is a most useful piece of apparatus. It entirely supersedes the ordinary clumsy method of cutting up with scissors the cards or ferrotypes into small sizes, avoiding waste and loss of time attendant upon that mode of producing from the large plates the various sizes required. It is also well adapted for the use of Photographic Dealers, Stationers, and Ticket Writers, &c. This machine is particularly useful to Photo. Dealers, as it effects a great saving in cutting up sensitised paper into sizes, with cleanly trimmed edges ready for printing and mounting. To those small dealers who have not a ready sale for sensitised paper in packets, it will enable them to always supply packets of cut up paper in a perfect condition. The machine is very simple in manipulation, and not likely to get out of order. It can be applied to a multiplicity of purposes, and is as useful in the counting-house as in the photographic studio. They are now largely used by our leading Cardboard Makers, Sensitised Paper Manufacturers, &c. The machine is small, light, and inexpensive.

TT  
Price ... .. 31/6

With Automatic Treadle Clamp, for firmly holding the Paper or other material, 21/- extra.

We are now making a New Series for the  
Use of Amateurs.

TTF



For Trimming Prints up to  
10x8 ... .. 21/-  
With Extending Gauge ... .. 25/-

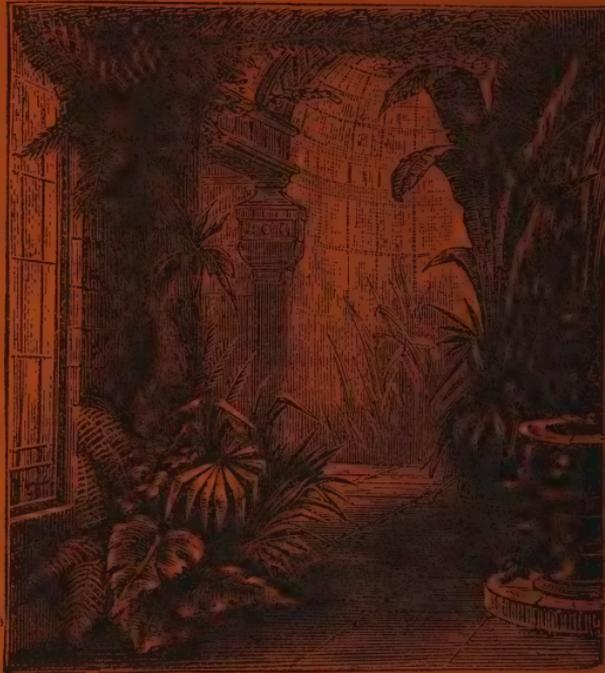
To be had Wholesale from the Sole Makers,

## SHARP & HITCHMOUGH LIVERPOOL.

Ask your Dealer for Particulars.]

# 'APTUS' PAINTED BACKGROUNDS

**MOUNTED ON ROLLERS,  
TOP AND BOTTOM.**



**ANY DESIGN PAINTED  
TO ORDER.**

8 ft. x 6 ft. ... ..	31/6 flatted oil.
8 ft. x 7 ft. ... ..	40/- " TTF
8 ft. x 8 ft. ... ..	50/- "

Other sizes in proportion.

Unlike other backgrounds of this class, 'Aptus' Backgrounds answer a double purpose, as they may be had plain or graduated on the reverse side.

**PHOTOS SENT ON APPROVAL.**

## OUR NEW FLORAL VIGNETTE BACKGROUND

7x5 feet in Flatted Oil, Price 17/6.

**MOST ARTISTIC AND EFFECTIVE.**

## 'APTUS' GRASS MATS.

Any size to Order at 5d. per square foot.

TTF

Wholesale from  
**SHARP & HITCHMOUGH, LIVERPOOL.**

# 'APTUS' WASHABLE CLOTH BACKGROUNDS

To be obtained through all Wholesale Houses and Dealers  
in Europe, Asia, Africa, and America,

OR FROM

✦ **SHARP & HITCHMOUGH** ✦  
**LIVERPOOL.**

VARIOUS COLOURS.



GRADUATED & PLAIN.

EVERY BACKGROUND  
SHOULD BEAR OUR TRADE MARK,

**'APTUS'**  
ACCEPT NONE WITHOUT.

IN FLATTED OIL, PLAIN AND GRADUATED. TTT

Slate, Blue, Grey, and Cream. Always clean, flat, and free from creases  
Mounted on rollers top and bottom. Samples on application.

Size.	Same colour			2 colours or			Size.	Same colour			2 colours or		
	Plain.	graduated in distemper.	graduated in oils.	Plain.	graduated in distemper.	graduated in oils.		Plain.	graduated in distemper.	graduated in oils.	Plain.	graduated in distemper.	graduated in oils.
50 x 40	2/6	5/-	5/9	72 x 72	5/6	9/9	10/9	90 x 72	6/9	12/-	13/-		
60 x 40	3/-	5/6	6/3	96 x 96	15/-	21/-	23/-	108 x 72	7/9	14/-	15/-		
70 x 40	3/3	6/-	6/9										
70 x 60	4/9	8/9	9/6										

The graduated series are plain on one side, or may be had plain both sides but of different colours, being so, they answer the purpose of two backgrounds. Samples on application. Will Dealers and Shippers please write for wholesale terms?

G G G



**'APTUS' IMPROVED  
PLUMB INDICATOR  
FOR ATTACHING TO CAMERA.**

**Cannot get Lost. No Skill required to Fix. TTT**

For all subjects in which there are vertical lines, such as Buildings, &c., the Sensitive Plate must hang plumb, and it is necessary to have some means of judging when such is the case. This neat device shown is remarkably simple and effective, and shows at a glance when the back is vertical. It consists of a Swinging Pointer attached to a Plate, which may be screwed permanently to the swing back of Camera, and therefore cannot get lost.

Price 1/- each. Postage 2d.

Have you a 'Reliable' Burnisher? They are really first-rate, and cost but a few shillings. To convince you that they are the best, send a C.-D.-V. or Cabinet to be Burnished.

**APTUS 'RELIABLE.'**

PRICES:—5 in., 7/6; 6½ in., 11/-; 8 in., 12/6; 9 in., 14/6; 11 in., 20/-; 13 in., 30/-; 15 in., 40/-

Castings and finished parts, including polished bar for Amateurs desirous of making their own Burnishers. Prices on application.



**APTUS 'GRESHAM.'**

Roller.	Bunsen Burner	Spirit Lamp.
5 in. ... ..	7/6	1/3
6 in. ... ..	12/9	1/3
8 in. ... ..	16/-	1/6
9 in. ... ..	20/-	1/8
11 in. ... ..	26/-	2/-
13 in. ... ..	33/-	2/3
15 in. ... ..	40/-	2/6

Packing Case, from -/4 TTT



**'APTUS' BYE-PASS  
GAS BURNERS.**

This Burner should be used in every dark-room. It is attached to any gas bracket the same as an ordinary burner; by shutting the tap the gas is rendered quite invisible but not extinguished, and can at any moment be relit without the use of matches. This Tap is simply invaluable for the rapid printing processes, lantern-slide making, &c.

Will Dealers please apply for Wholesale Terms to

**SHARP &  
HITCHCOUGH,  
LIVERPOOL P**



Price 2/6 each, post free 2/6.

Price 1/-, post free 1/2.

# REGISTERED MITRE-CUTTING MACHINE.

INVALUABLE TO JOINERS, PICTURE-FRAME MAKERS, & AMATEURS.



## No. 1.—TO CUT 2-INCH MOULDINGS. TT

Mitre-Cutting Machine ..	15/-
Extra Cutter .. .. .	3/-
Spanner .. .. .	9d.
Packing Case .. .. .	6d.

Weight, complete, 18 lbs.

## No. 2.—TO CUT 4-INCH MOULDINGS.

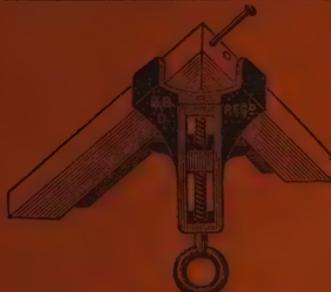
Mitre-Cutting Machine ..	30/-
Extra Cutter .. .. .	6/-
Spanner .. .. .	1/-
Packing Case .. .. .	9d.

Weight, complete, 42 lbs.

This Machine supplies Joiners, Picture-frame Makers, and Amateurs with a tool which for general utility, handiness, accuracy, and expedition cannot be excelled. It cuts a clean mitre joint with unfailing accuracy, dispensing with the use of the saw and the plane, and also the usual mitre-cutting and shooting board. It is the only mitre-cutting machine which will cut ordinary gilt mouldings without injury to the gilt surface or composition. No special skill is required to use it;

in fact, with this instrument Picture Frames can be easily made and put together without the aid of a skilled mechanic.

# REGISTERED CORNER CRAMP.



No. 1.	No. 2.	No. 3.
Will take 1½ in.	2 in. to 2½ in.	3 in. to 4 in.
Price 2/-	3/-	5/- per pair.
Postage 3d.	6d.	1/-

The Registered Corner Cramp is intended for gripping securely two sides of a Picture Frame during the process of nailing together.

# ORIGINAL 'APTUS' ROLLER SQUEEGEE.

3 in. to 5 in. ... ..	4d. per inch.
6 in. to 12 in. ... ..	5d. ..



SHARP & HITCHMOUGH,  
Manufacturers, LIVERPOOL.

# 'APTUS' CAMERA LEVELS.

In Wood, 1s. Post Free, 1s. 2d.

TTF



No 1., Finished Brass, 1/6.

TT



Dead Black or Finished Brass, 2/6.

Taylor's make, 3/-

TTF

## WOOD'S WASHER.

PRIZE MEDAL. TT

For Half-Plate ... ..	10/-
" Whole " ... ..	12/6
" 12x10 " ... ..	22/6
" 15x12 " ... ..	42/-

Will wash 300 to 400 Cabinets at a time.

RACKS adjustable for 6 sizes ...	3/3
" " " 9 " ...	4/6
" " " 12 " ...	8/-

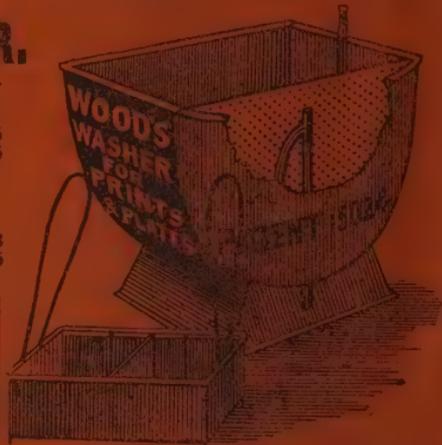
### TRIMMING WHEELS.

Will Cut Prints Wet and Dry.

Nickel-plated, 1/6 each. T

Trimming Wheels, from 1/- each.

Trimming Knives, 1/- each.



## 'APTUS' FILM WASHERS.

SPECIALLY CONSTRUCTED.

COMPLETE WITH TANK.

For 12 Films. ... ..	4/6 each TT
3/4 or 5x4 ... ..	6/6 "
3 or 1 ... ..	10/6 "
10x8 or 12x10 ... ..	

## 'APTUS' RUBY AND CANARY FABRIC.

FOR DARK-ROOM WINDOWS, 1/- per yard. TTT

MASKS AND DISCS, C.-D.-Y. and Cabinet, Assorted in Boxes, 1s.

SHARP & HITCHMOUGH, Government Contractors,

101 & 103, DALE STREET, LIVERPOOL.

Telephone No.—2495.

Telegrams—'APTUS FINDER,' Liverpool.

## SPECIALITIES.

### SHARP AND HITCHMOUGH.

#### ‘APTUS’ MOUNTANT.

4oz. Bottles, 6d. each.

Mawson's Rubber Solution, for P.O.P. Prints, 1/-. TTT

Brushes for do. in Quill or Copper, 2d., 4d., and 6d. each.

#### APTUS' FLASH LAMP.

TTT



1/6.

1/6.

50 PER CENT. MORE LIGHT.

THE NEWEST. THE BEST.  
THE CHEAPEST.

#### ‘APTUS’ RETOUCHING SETS.

CONTAIN:—

Holder for Leads,  
Case of extra Leads,  
Retouching Me-  
dium, Spotting Me-  
dium, Two Spotting  
Brushes.

Price 2/6. Postage 2d.

#### SHOW CARDS FOR DEALERS.

Real Gold Blocked and Bevelled. Size, 12 x 3½ inches.

In 30 different Wordings, as

Amateurs' Negatives Developed, Retouched, and Printed.

Dark Room for the use of Amateurs.

Amateurs supplied with Photo Apparatus, Chemicals, &c., at Lowest Prices.

Price 1/3 each.

TTT

#### ‘APTUS’ BROMIDE PENCILS.

For Working up Enlargements.

In pretty cloth-covered box, with gilt clasp, containing four pencils,  
three grades in black, and one white. Price 1/6. TTF

**DEALERS SHOULD WRITE FOR DISCOUNTS  
ON OUR SPECIALITIES.**

**SHARP AND HITCHMOUGH, LIVERPOOL.**  
TELEPHONE No. 2495.

## STILL THE BEST.

### SHARP & HITCHMOUGH'S 'APTUS' VIEW FINDER.

OVER 40,000 NOW IN USE. 5T



THIS Finder is constructed on an entirely new principle, being simple in use and very convenient in form, as it can be carried in the waistcoat pocket, and is suitable for any kind of Lens.

It certainly possesses many advantages over the old style of finder; the focussing cloth or shade is entirely dispensed with. The reduced reproduction of the object may be seen perfectly well defined in full sunlight—always in focus; adjustment not necessary. For instantaneous work and ascertaining the angle of view, this instrument is without a rival. Thousands of these Finders are now in constant use, in the hands of experienced photographers, and are pronounced perfect. Price 3/6. Flattering testimonials from all parts of the world.

From the AMATEUR PHOTOGRAPHER, March 30th, 1888.

'An ingenious and useful apparatus. The little instrument is beautifully made, and is well worth the price asked for it. We shall certainly make it our constant companion this season.'

To be obtained through all Wholesale Houses. See that each Finder bears the word 'APTUS,' our Trade Mark.



### 'APTUS' REFLECTING FINDERS

Taylor's, 5/- each; 'Aptus,' 4/6 each.

Finders for Detective Cameras in Metal, 2s. each.

Finders Mounted in Wood, 2s. TTT

Important Notice. A New Exposure Meter.

### THE 'JUNIOR' WATKINS (Patent).

Simplest. Smallest. Cheapest. Best. TT

Devised to meet the want of a cheap, portable, yet thoroughly reliable Exposure Meter.

It can be conveniently carried in the waistcoat pocket, and it requires no further adjustment for varying lights when once set for plate and stop. To facilitate the matching of the sensitive paper to the standard tint, a blue glass (patented) has been added to the 'Junior' and 'Standard' Watkins Meter. Users of the instrument can have this valuable addition, price 6d.

Price of 'The Junior,' with full printed instructions, 15/3; with extra divided ring, to facilitate enlarging and copying, 18/3; Exposure Notes (new edition), with ruled lines and much valuable information, 1/7, post free. From all Dealers.



IN ALL CASES FOREIGN INDENTS SHOULD BE ADDRESSED TO

**SHARP & HITCHMOUGH, LIVERPOOL.**



## PHOTOGRAPHER'S BRUSH RACK. TTF

Price 5s. 6d.; post free, 6s.

This is an ornamental varnished board, arranged for hanging on the wall of the dark room, holding all the necessary brushes, forceps, matches, &c., which are required by the photographer and are a source of annoyance to those who have not a proper place for them. Labels are fixed over the pegs, so that after use the brush can be returned to its definite position.

Price 5s. 6d. complete with BRUSHES FOR DUSTING PLATES, CLEANING BOTTLES, CLEANING DISHES, DEVELOPING, MOUNTING, ALSO PLATE LIFTER, FORCEPS, AND MATCHES.



Gas Lamps, from 7/6.

## 'APTUS' RUBY LAMPS.

Japan Tin Ruby Glass Lamps at	...	...	9
" " " " " "	"	"	1/-
" " " " " "	"	"	2/6
" " " " " "	"	"	4/0

And at all Prices up to 21/- each.

PORTABLE FOLDING FABRIC LAMPS,  
At 1/-, 1/6, 2/-, and 2/6 each.

**BOTTLE LAMPS from 1/6.**

### PHOTOGRAPHIC BRUSHES, FLAT CAMEL-HAIR DUSTING BRUSHES.

1 in. ...	-/4	2 in. ...	-/8	2½ in. ...	-/9	3 in. ...	-/10
4 in. ...	1/3	5 in. ...	1/6				

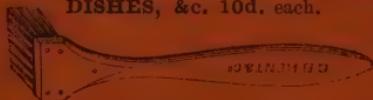
SPOTTING BRUSHES, WOOD HANDLE IN TIN.—1/6 per dozen, 2d. each.

SABLE BRUSHES IN TIN AND WOOD HANDLES.

Nos. 0,	3/6	1,	3/6	2,	4/6	3,	5/6	4,	6/9
	-/4		-/4		-/5		-/6		-/8

Nos. 5,	9/6	6,	12/6	7,	15/6
	-/11		1/3		1/6

BRUSHES FOR CLEANING DEVELOPING DISHES, &c. 10d. each. TTT



LAMPS  
OF ALL  
SORTS & SIZES.

SHARP & HITCHMOUGH LIVERPOOL.



**GRADUATED MEASURES. TTF**

1dr.	2dr.	1oz.	2oz.	4oz.	6oz.	8oz.	10oz.	12oz.	16oz.	20oz.
d.	8d.	8d.	9d.	1/1	1/3	1/4	1/5	1/8	2/1	2/4
Best Quality }		10d.	1/-	1/3	1/6	1/8	1/9	2/1	2/6	3/-

**EBONITE PLIERS,**

10d. per pair. T

**PAPIER MACHÉ FUNNELS, TT**

1/-, 1/6, 2/- each.

GLASS, 2 in., 3d.; 3 in., 4d.; 4 in., 6d.; 5 in., 9d.; 6 in., 1/-

**FOCUSSEING GLASSES. Finely obscured. TTT**

	each.	doz.		each.	doz.		each.	doz.
4½ × 3½	2d.	1/6	6½ × 4½	4d.	3/6	10 × 8	1/-	10/-
5 × 4	3d.	2/6	8½ × 6½	8d.	7/-	12 × 10	1/9	18/-

**VIGNETTING GLASSES. T**

4½ × 3½	8d.	each	7½ × 5	1/8	each	10 × 8	2/3	each
5 × 4	10d.	"	8½ × 6½	1/9	"	12 × 10	2/9	"
6½ × 4½	1/4	"						

**GLASS CUTTING SHAPES. TT**

Stereo, 3½ × 2½	6d.	each	5 × 4, 4½ × 3½	8d.	each	7½ × 5, 7 × 4½	1/3	each
C.-D.-V. 3½ × 2½	6d.	"	Cabinet, 5½ × 3½	9d.	"	½-plate, 8 × 6	1/6	"
3½ × 2½	6d.	"	5½ × 4	8d.	"	10 × 8, 9½ × 7½	2/3	"
½-plate, 3½ × 2½	6d.	"	½-plate, 6 × 4½	1/-	"	12 × 10, 11½ × 9½	3/-	"
" 4 × 3	6d.	"	" 6½ × 4½	1/-	"			

**'APTUS' PLATE CLIP. TTT**

For holding the Plate during development, thus preventing the fingers becoming stained by the Chemicals. ½-plate and under, 1/- each; ½-plate and under, 1/6 each.

**'APTUS' CLOUD NEGATIVES.**

From Cabinet size to 30 × 22. PRICES: Cabinet, 1/6 each; Whole Plate, 2/3 each; 10 × 8, 2/9 each; 12 × 10, 3/6 each. Postage extra.

**WHITE ENAMELLED COPPER LETTERS.**

For fixing on Plate Glass Windows. Lists and Prices on Application.



**PLUSH BLOCKS FOR OPALS**

IN BLUE, CRIMSON, and GOLD,  
WITH STRUTS.

	Each.	Dos.
½-plate	6d.	4/6
¾-plate	10d.	8/6
1-plate	1/6	15/6
10 × 8	2/-	21/-

RULE JOINT VERY RIGID



5/6 and 7/6.  
APTUS HEAD AND  
BODY RESTS.

**PORTABLE HEAD-RESTS.** T

Adjustable to all Positions. Well made in Brass and Bronze. Fit on any Chair-Back. Most useful in Portraiture.

HARRISON'S Highly Finished—every adjustment for Youths or Adults, sitting or standing, from 3 ft. 6 in. to 6 ft. high, with 6 brass engine wheel screws, 27/6, 36/- 42/-, and 45/-.

**STUDIO STANDS** in Teak, 25/- each.

**STUDIO STANDS** in Mahogany, with Rack and Screw Adjustment, 50/- each.

**JAPANESE ART TISSUES.**—New Designs. TT

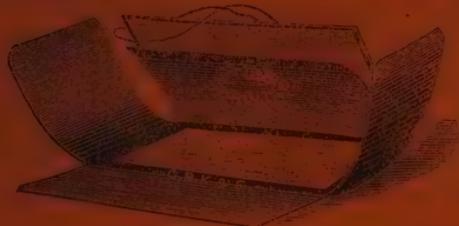
FOR COVERING PHOTOS. 1000 in box, C.-D.-V., 1/6; 1000 in box, Cabinet, 3/6.

**SPECIAL CHEAP BLOTTING BOOKS.**

To take any size print up to whole-plate, containing 36 leaves of superfine stout white blotting paper, strongly bound and neatly finished, plain thick dark red covers". This paper is very absorbent, and warranted chemically pure.

Size of Books, 11 x 9. 3d. each, 7/6 per doz. net. TTT

\*A very cheap useful book, made of extra strong paper that does not come to pieces when damp.



**UNTONED PRINT CASES.**

Lined Ruby Fabric for Storing Prints before Toning and Fixing. 4T

1/2-plate, 9d. each; Whole-plate, 1/- each.

TTF

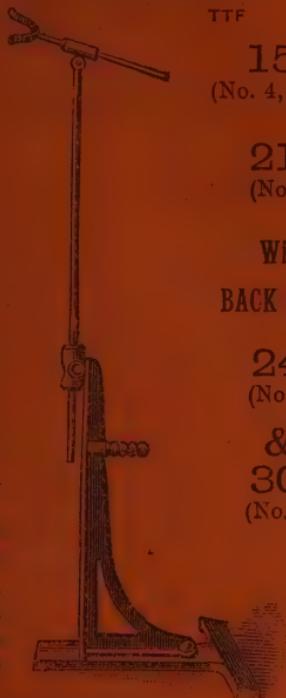
15/-  
(No. 4, Plain.)

21/-  
(No. 3.)

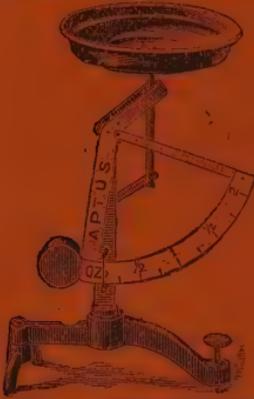
With  
BACK REST,

24/-  
(No. 3.)

&  
30/-  
(No. 2.)



# 'APTUS' NEW CHEMICAL BALANCE.



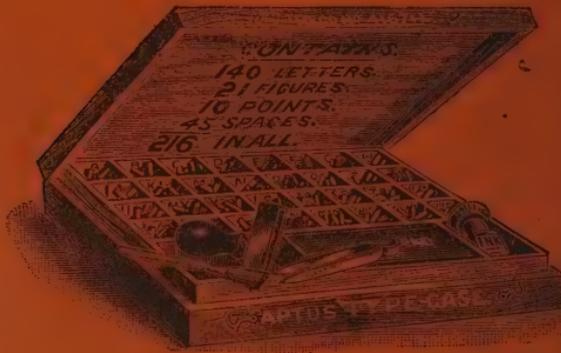
*A Sensitive Balance for  
Photographic Chemicals,  
accurately weighing up  
to 2½ ozs.*

TTT

Price 2/-; postage, 3d.

# 'APTUS' Negative Naming Outfit.

CONSISTING OF DIVISIONED CASE CONTAINING



140 Letters, in Patent  
dovetailed rubber  
metal-bodied type.

21 Figures.

10 Points.

45 Spaces.

1 Holder.

1 Tin of Ink, *extra.*

1 Pair Tweezers, and

all necessary Sundries,

with full directions for

Numbering and Nam-

ing Negatives. TTF

10/6

6d.

*extra.*

## PLEASE NOTE

THAT our type is non-reversed, consequently it may be used for any kind of Printing on Paper, Wood, Cloth, and for endorsing Negatives.

MOREOVER the Type can be obtained in many sizes.

OWING to the Type being non-reversed it is not only cheaper but adapts itself for various purposes.

**SHARP & HITCHMOUGH, LIVERPOOL.**

# 'APTUS' SCRAP ALBUMS.

Specially arranged for Unmounted Prints.



The most Artistic Album in the Market. TF

Description.	Number of Photos that can be placed in Album.	Price each.	Price per doz.
<b>FOR QUARTER-PLATE PRINTS:</b>			
Cloth Bound, Gold Blocked on Cover ... ..	12 ...	1/- ...	12/-
Do. Do. ... ..	24 ...	1/9 ...	18/-
Half Roan, Gilt finished ... ..	24 ...	2/9 ...	30/-
Full Roan Leather, Gold Edges, Handsomely Finished ... ..	36 ...	5/- ...	54/-
<b>FOR CABINET PRINTS:</b>			
Cloth Bound, Gold Blocked on Cover ... ..	12 ...	2/- ...	24/-
Do. Do. ... ..	24 ...	3/- ...	33/-
Half Roan, Gilt finished ... ..	24 ...	3/9 ...	42/-
Full Roan Leather, Gold Edges, Handsomely Finished ... ..	48 ...	10/- ...	108/-
<b>FOR HALF-PLATE PRINTS:</b>			
Cloth Bound, Gold Blocked on Cover ... ..	12 ...	2/- ...	24/-
Do. Do. ... ..	24 ...	3/- ...	33/-
Do. Do. ... ..	36 ...	3/9 ...	42/-
Half Roan, Gilt finished ... ..	24 ...	3/9 ...	42/-

**FOR WHOLE-PLATE PRINTS.** This size will be ready shortly.

The above Albums are supplied to take the prints oblong way, unless specially ordered.

## SNAP-SHOT SERIES.

1/2-plate, 1s., 1/2-plate, 2s., 1/2-plate, 3s. Well bound in cloth, with Red Lines and Slit Corners. TTT

## 'APTUS' '94 SERIES.

The leaves of these are cut out to receive P.O.P. Prints, glazed and unmounted. Each Album holds 48 Pictures. The leaves are of best Bristol Boards, and the Binding is of superior style, endorsed in Real Gold on the outside, "PHOTOGRAPHS."

1/2-plate, 1s. 6d., 1/2-plate, 2s. 6d., 1/2-plate, 6s. TT



*Bottles may be sent by Parcels Post when packed in our new Safety Cases.*

- APTUS' NEGATIVE RETOUCHING MEDIUM**, in 1-oz. bots., 1/-. post 1/3.
- APTUS' FERROUS-OXALATE DEVELOPER**. Always ready, will keep indefinitely. 10-oz. bottle, 1/-. by post 1/6; 20-oz. bottle, 1/10, by post 2/6.
- APTUS' SULPHO-PYROGALLOL DEVELOPER**. Brilliant and clean. Negatives always obtainable by this developer. Great latitude in exposures. Results cannot be equalled by any other formula. Sold in 5-oz. bottles, 1/-. by post 1/4; 10-oz., 1/10, by post 2/4; 20-oz., 3/6, by post 4/2.
- APTUS' HYDROKINONE DEVELOPER**. A new and improved formula. Two solutions. 10-oz., 1/-. by post 1/6; 20-oz., 1/10, by post 2/6; 40-oz., 3/-. by post 4/2. Enough for 100 to 200 plates. Very quick in action. Specially suitable for Lantern transparencies.
- APTUS' INFALLIBLE DEVELOPER (Eikonogen)**. May be used repeatedly. 10-oz. bot., 1/-. by post 1/6; 20-oz., 1/10, by post 2/6; 40-oz., 3/-. post 4/2.
- APTUS' GOLD TONING** for Emulsion Papers. Two Tubes, in neat box, to make 10-oz., 6d., by post 8d.
- APTUS' NEGATIVE REDUCER**. Perfectly under control, 1/-. by post 1/3.
- APTUS' HYPO-ELIMINATOR**. Whatever you do have a bottle of the Hypo-Eliminator at once. It saves valuable time.
- WHAT IT WILL DO.—It will eliminate every trace of Hyposulphite of Soda from your prints and plates in five minutes. It will disinfect the dark-room, &c. A bottle of this should be in the hands of every amateur and professional photographer. 10-oz. bot., 1/-. by post 1/6; 20-oz., 1/10, post 2/6; 40-oz. 3/6, post 4/4.
- APTUS' DEAD BLACK** for Inside of Cameras, Lenses, &c., in bottles, 1/-. by post 1/4. Dries without heat on wood, brass, leather, &c.
- APTUS' NEGATIVE VARNISH**, 2-oz., 6d., by post 9d.; 5-oz., 1/-. by post 1/4; 10-oz., 1/6, by post 2/-; 20-oz., 2/6, by post 3/3.
- APTUS' TRANSPARENCY VARNISH**, as clear as water, as hard as flint. 5-oz., 1/-. by post 1/4; 10-oz., 1/10, by post 2/6; 20-oz., 2/6, by post 3/3.
- APTUS' CELLULOID VARNISH—Cold Drying**. May be applied with a brush. This Varnish is very suitable for Negatives, Opals, Transparencies, and for all kinds of Metal-work; it will not interfere with the brilliancy of highly-polished or burnished surfaces, and effectually protects articles from tarnish, as silver plate, &c. Absolutely colourless. 5-oz. bottles, 2/-. by post 2/4; 10-oz. bottles, 3/6, by post 4/-

SHARP & HITCHMOUGH, Exporters, LIVERPOOL,

# DRY PLATES.

WE are regularly receiving consignments of all the Plates mentioned in the following List; and always have stock of the commoner sizes—viz.  $\frac{1}{2}$ ,  $\frac{1}{4}$ , and  $\frac{1}{8}$ -plate.

We can supply any quantity, large or small, of any make of Plates to order in one week.

	$\frac{1}{8}$ -pl. $4\frac{1}{2} \times 3\frac{1}{2}$	$5 \times 4$	Ster'o $6\frac{1}{2} \times 5\frac{1}{2}$	Dbl. $6\frac{1}{2} \times 4\frac{1}{2}$	$\frac{1}{4}$ -pl. $6\frac{1}{2} \times 4\frac{1}{2}$	$7\frac{1}{2} \times 5$	$\frac{1}{4}$ -pl. $8\frac{1}{2} \times 6\frac{1}{2}$	$10 \times 8$	$12 \times 10$	$15 \times 12$ T
Paget's Phoenix; Ilford and Iso.; Thomas' Ex. Rapid; Imperial; Cadett Ordinary ...	1/-	1/7	2/2	2/2	2/3	3/5	4/3	7/3	10/6	18/-
Mawson's 'Castle' ...	1/-	1/7	2/2	2/2	2/3	3/3	4/3	7/3	10/-	15/-
Ilford Rapid; Imperial Thomas' thickly-coated Landscape and T. O. extra rapid ...	1/3	2/-	2/9	2/9	3/-	4/6	5/6	9/6	13/-	23/-
Imperial and Ilford Red Label & Iso. ...	1/6	2/4	2/6	—	3/6	—	6/6	10/-	14/6	23/-
Paget Prize, 30 times ...	1/3	2/-	2/9	2/9	3/-	4/6	5/6	9/6	13/-	23/-
Edwards' XL and Iso-chromatic and Films ...	1/6	2/6	—	—	3/3	3/8	5/3	6/6	10/-	16/-
Paget Prize, 50 times ...	1/6	2/6	—	—	3/8	5/3	6/6	10/-	16/-	28/-
The Mawson ...	1/6	2/3	2/6	3/-	3/6	5/-	6/6	12/-	16/-	24/-
Cadett Lightning ...	1/6	2/6	—	—	3/3	3/8	5/3	6/6	10/-	16/-

## LANTERN PLATES.

For Lantern Slides, Transparencies, &c.

Edwards' XL ...	$3\frac{1}{2} \times 3\frac{1}{2}$	1/-	$4\frac{1}{2} \times 3\frac{1}{2}$	1/6	$6\frac{1}{2} \times 4\frac{1}{2}$	3/8	$8\frac{1}{2} \times 6\frac{1}{2}$	6/6
Imperial ...	"	1/-	"	"	"	2/3	"	4/3
Mawson ...	"	1/-	"	"	"	2/3	"	5/-
Thomas' New Plates ...	"	1/-	"	"	"	2/3	"	4/3
Alpha Plates & Black Tones	"	1/-	"	"	"	2/3	"	4/3
Cadett ...	"	1/-	"	"	"	"	"	"
Paget Prize Rapid or Slow	"	1/-	"	1/-	"	2/3	"	4/3
England's Rapid or Slow	"	1/-	"	"	"	"	"	"

## FITCH'S FILMS. Cut Sizes.

$4\frac{1}{2} \times 3\frac{1}{2}$ , 1/9 ...  $5 \times 4$ , 3/- ...  $6\frac{1}{2} \times 4\frac{1}{2}$ , 4/- ...  $7\frac{1}{2} \times 5$ , 6/- ...  $8\frac{1}{2} \times 6\frac{1}{2}$ , 7/- per dozen.

## 'APTUS' METAL SHEATHS FOR PLATES.

### 'APTUS' METAL-BOUND SHEATHS FOR FILMS. TTT

Quarter-plate, 4/6 per dozen.  $5 \times 4$ , 6/6 per dozen. Half-plate, 9/- per dozen.

Special Terms to Dealers and Wholesale Houses.

ANY KIND OF SHEATH MADE TO ORDER.

## BROMIDE OPALS. Glazed and Matt Surface.

	$\frac{1}{8}$	$5 \times 4$	$\frac{1}{4}$	$\frac{1}{2}$	$10 \times 8$	$12 \times 10$	
Ilford, Imperial, Paget Prize	1/6	2/6	3/8	6/6	11/-	16/-	per doz.
Paget Print-out (glazed)	2/3	3/9	5/-	9/6	15/-	22/-	"
" " (matt)	1/8	3/-	4/-	7/6	12/6	20/-	"

PLEASE SEND TRADE CARD FOR DISCOUNTS.

\*\*\*\*\*

**SHARP & HITCHMOUGH,**  
 PHOTOGRAPHIC INSTRUMENT MAKERS,  
**LIVERPOOL.**

# ILFORD PRINTING-OUT PAPER.

THE PRINTING PAPER OF THE FUTURE.

**THIS** is a Gelatino-Chloride Paper, to be used as a substitute for Albumenized. It has many advantages over the latter. It can be finished with either an ordinary, matt, or enamelled surface, or burnished in the ordinary way. Prints can be made either of warm or cold tones. There is a considerable saving in time of both printing and toning, and it is the

**CHEAPEST PHOTOGRAPHIC PRINTING PAPER**  
**IN THE WORLD.**

**GREATEST PERMANENCY. IN SEALED TUBES.**  
**PINK. WHITE. MAUVE.**

**PRICES:**

2 Sheets 1/4, postage 3d. ... 6 Sheets 4/-, postage 3d. ... 12 Sheets 7/6, postage 5d.  
 1 Quire 15/-, postage 8d.

Size.	In packets.	Size.	In packets.	} 1/- per packet; postage 2d. extra.
4½ × 3½	36 pieces	6½ × 4½	16 pieces	
6 × 4½	24 "	8½ × 6½	9 "	

Full Directions for Toning, &c., on each package, or sufficient Gold and Sulphocyanide to make 16 ounces for 6d.; post free, 8d.

## PAGET PRIZE PRINTING-OUT PAPER.

4½ × 3½	...	Packet containing 36 sheets	} 1/- per packet. Postage 2d. extra up to ½, 3d. extra on 10×8 & 12×10.
5 × 4	...	24 "	
6 × 4½	...	24 "	
6½ × 4½	...	16 "	
7½ × 5	...	18 "	
8½ × 6½	...	9 "	
10 × 8	...	6 "	
12 × 10	...	4 "	
Cabinet Box, 500 sheets, 5½ × 4	...	18/9	
C.-D.-V. Box, 3½ × 2½	...	8/-	
Sheets 24½ × 17, packed in sealed tubes, per quire	...	15/-	
" 24½ × 17, per half-quire	...	7/6	
" 24½ × 17, per quarter-quire	...	4/-	
" 24½ × 17, per one-twelfth	...	1/4	

## ⚡ PLATINUM PAPER. ⚡

FOR DIRECT CONTACT PRINTING.

REQUIRING NEITHER DEVELOPMENT NOR TONING.

Pictures made on this Paper do not fade, and are absolutely permanent.

**PRICES:**

Quarter-plate ... 1/- per doz; postage 2d.	10 × 8 ... 6/6 per doz; postage 3d.
Cabinets ... 1/6 " "	12 × 10 ... 10/- " "
Half-plate ... 2/- " "	15 × 12 ... 12/- " "
Whole-plate ... 3/6 " "	Full Sheets 18 × 25 ... 2/6 each.

**SHARP & HITCHMOUGH, LIVERPOOL.**



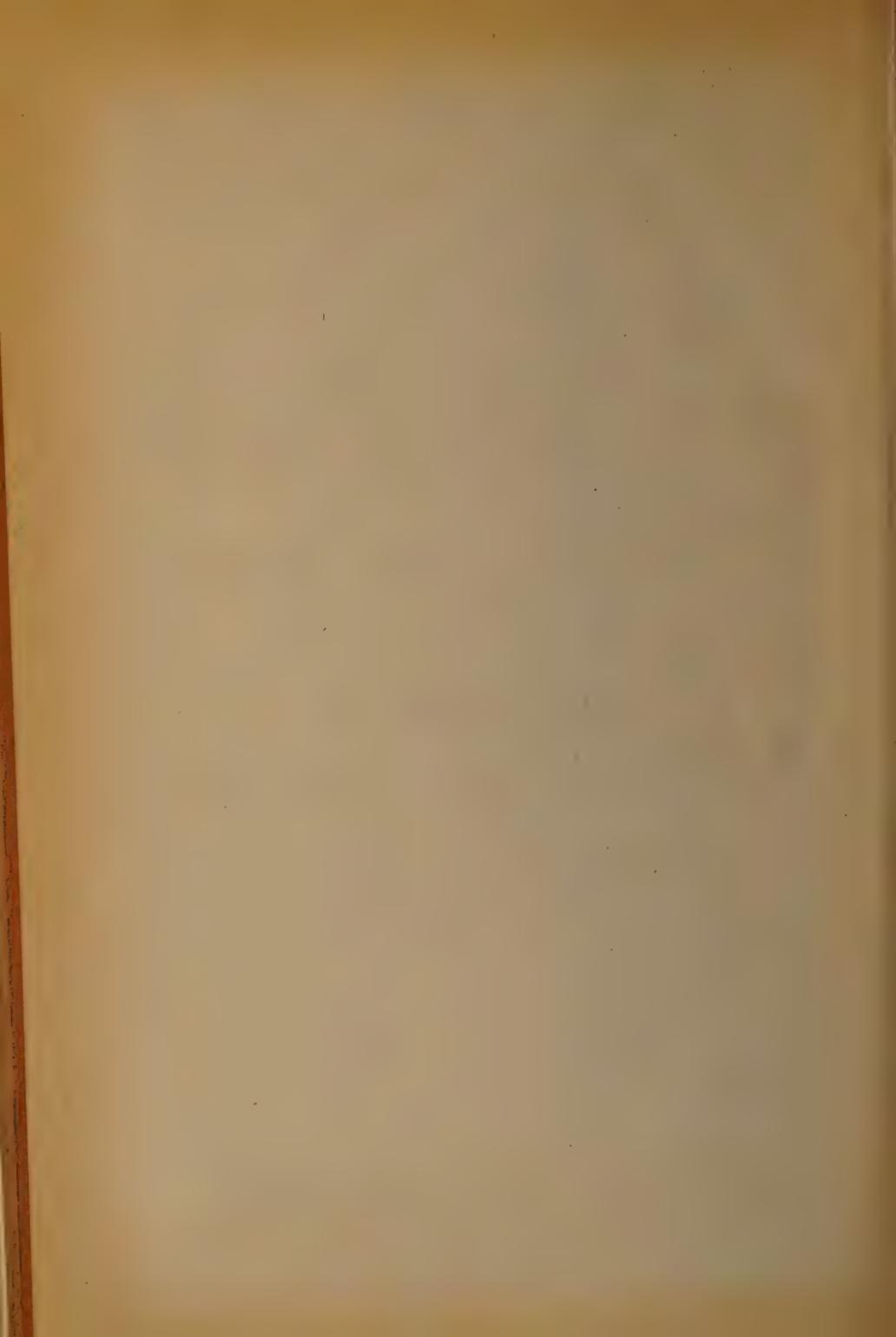


THE BRITISH JOURNAL ALMANACK ADVERTISEMENTS.

J. HALDEN & CO.'S  
FERRO-PRUSSIATE PAPERS.



SHARP & HITCHMOUGH, 101 and 103, Dale Street, LIVERPOOL.



## ENGINEERING PHOTOGRAPHY,

By which correct copies of Architects' and Engineers' tracings can be produced in **BLACK** lines on **PURE WHITE** ground.

Special care taken of Plans, &c., entrusted to us, but we do not hold ourselves responsible for accidental damage or loss in transit; perfect secrecy guaranteed with respect to drawings and plans.

**LARGE PRINTING FRAMES** for above see page 1187.

## HALDEN'S NEW B.W. 1 BATH PAPER, NO ACID.

Giving Black Lines on White Ground by washing in water bath only.

### NEW B. W. 1 BATH PAPER,

In 32 feet rolls.

	30 in.	40 in.
Medium ... ..	9/6	12/6 per roll.

## HALDEN'S B. W. PROCESS, BLACK LINE, WHITE GROUND.

Developing in acid bath.

### SENSITIZED PAPER,

In 32 feet rolls.

	30 in.	40 in.
Medium ... ..	7/-	10/- per roll.
Thick ... ..	8/6	11/- "

### COPIES OF TRACINGS BY ABOVE PROCESSES.

Imperial ... ..	30 + 22	per copy 2/-
D. Elephant ... ..	40 + 27	" 3/-
Antiquarian ... ..	53 + 31	" 4/-

WHOLESALE FROM

**SHARP & HITCHMOUGH,**  
101 & 103, DALE STREET, LIVERPOOL.

# 'APTUS' DEVELOPING SINK

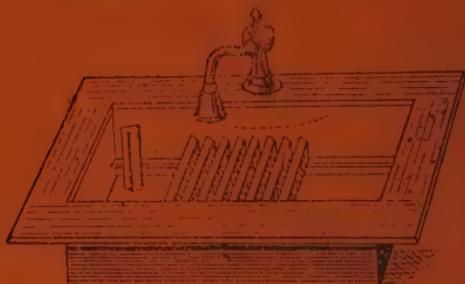


No. 1 Size for developing Plates up to 10 x 8, complete with Rose tap for cistern

**37/6**

No. 2 Size for developing Plates up to 12 x 10, and Rose tap for the main. Each table is fitted with rack for dishes.

**45/-**



COMPLETE

TT  
❖ **21/-** ❖

19" x 13" x 5"

Enamelled White inside, Black Japan outside, fitted with waste pipe and syphon, draining rack, swan-neck rose tap.

The fittings may be had separately as under:—

Developing Sink .. .. .	7/6	Swan-neck rose tap, tested for	
Draining Rack .. .. .	2/6	main .. .. .	8/6
Syphon .. .. .	2/6	Ditto, lighter make for cistern	5/6

SHARP & HITCHMOUGH'S Demonstration Tables and Portable Dark Rooms for Photographic Societies, Lecturers, and Private Houses.

DARK ROOMS FITTED UP.

'Young Men's Christian Association, Birkenhead, January 17th, 1891.

We are very well satisfied with the way you have executed your contract.

'Yours faithfully, (signed) J. FORSYTH, Secretary.'

**SHARP & HITCHMOUGH**

Have all the latest Novelties appertaining to Photography.

## APTUS 'EVEREADY' PORTABLE DARK ROOMS.

PRICE £2 2s. (Size : 6 ft. 6 in. x 3 ft. 6 in. x 3 feet.) TF

LARGER SIZES at £2 10s. 6d. and £2 18s. 6d.

**T**HE illustration below is one of our now well-known 'EVEREADY' Dark Rooms. These Dark Rooms are made in sections, so that in travelling they can be packed flat. The sections—six in number, consisting of four sides, a roof, and a



floor—can be easily put together in about five minutes. The roof is provided with a ventilator, while the floor is raised some two inches from the ground, so that a current of air is always circulating. Every board is tongued into its fellow. The fittings consist of two shelves, a lead-lined sink, 12 x 9 ins. (this size is suitable for developing up to half-plate), with a pipe to conduct the waste into a pail. A bench is provided on which to stand the odds and ends required. The window, glazed with ruby or orange glass, works in a groove, so that it can be opened at any moment for

making exposures by contact, as Lantern Slides, Bromides, Opals, &c. Just below the window is a bracket on which to stand a lamp, thus dispensing with the necessity of having the heat and smell of the lamp inside.

If required for erection out-of-doors, a sloping roof is advised the prices of which are 17/6, 20/-, 22/6 respectively extra.

## ARTISTIC BORDER NEGATIVES.

(CELLULOID.)

Set of 4, half-plate	... ..	5/-
Each	,, ... ..	1/6
Set of 4, whole-plate	... ..	10/-
Each	,, ... ..	2/9

ASSORTED DESIGNS.



**SHARP & HITCHMOUGH,**  
LIVERPOOL.

## SUNDRIES.

Adapters for fitting various Lenses to same Flange TT	... 2/6 ... 3/6 ... 4/-
Argentometers, or Bath Testers, with Glass Cell TT	... .. 2/6
Blotting Paper, per quire	... .. 1/-
Blotting Boards, per quire	... .. 4/-
Cleaning and Lacquering Lenses, $\frac{1}{4}$ -plate, 4/6; $\frac{1}{2}$ -plate, 7/6; $\frac{3}{4}$ -plate, TT	... .. 12/6
Clips of Wood, per gross, 9/6, T	... .. per doz. 1/-
Cutting Wheels for glass, each T	... .. -/6 and 1/-
Diamonds, Glaziers', ...	... .. from 12/6 to 25/-
Filtering Papers, French circular, in packets of 100, 6 in., -/10; 8 in., 1/-; 10 in., 1/4; 13 in., 2/-	... ..
Filtering and Refert Stand, iron, three rings	... .. 3/6 and 4/-
Leather Caps for Lenses, $\frac{1}{4}$ , 1/-; $\frac{1}{2}$ , 1/3; $\frac{3}{4}$ , 1/6; 10x8, 1/9; 12x10	T ... 2/-
Pestles and Mortars, 2 oz., 1/-; 4 oz., 1/6; 8 oz.	... .. 2/-
Retouching Pencils, each	... .. -/8, -/4, and -/6
Scales and Weights in oak box, brass pans complete, with weights T	... .. 2/6
" " superior, glass " " T	... .. 3/6
" " large size, with adjustable Standard	... .. each 6/6
Silver Wire, stout, for corners of carriers, per foot T	... .. 1/-
Wood grooving, 11 in. wide, per foot	... .. 1/-
Stirring Rods of Glass, each	... .. -/1, -/2, and -/4
Tube and Cake Colours, Chinese White, &c., each	... .. T... -/2

*Prices quoted in this Catalogue are for Cash with Order only.*

## \* PURE CHEMICALS, \*

	1 oz.	1-lb.	1-lb.	1 lb.
Acid, Acetic Glacial, Solid, 50°	... -/2	... -/5	... -/8	... 1/-
" ditto, in Winchester Quarts	... -	... -	... -	... -/11
" Citric, Cryst.	... -/2	... -/10	... 1/6	... 2/6
" Hydrochloric, pure	... -/1	... -/8	... -/6	... -/10
" Nitric, pure	... -/2	... -/6	... -/8	... 1/-
" Pyrogallic (Sohering's)	... 1/-	... -	... -	... -
" Sulphuric, pure	... -/1	... -/3	... -/6	... -/9
" Sulphurous	... -/2	... -/4	... -/7	... 1/-
Alum, Powdered	... 7 lbs. 1/3	... -	... -	... -/3
" Chrome, Crystal	... -/2	... -/5	... -/8	... 1/-
Ammonia, Liquid, 890°	... -/1	... -/3	... -/4	... -/7
Ammonium, Bromide	... -/3	... -/10	... 1/6	... 2/6
" Carb., pure	... -/2	... -/6	... 1/-	... 1/9
" Chloride, pure	... -/2	... -/6	... -/8	... 1/-
" Sulphocyanide	... -/4	... 1/3	... 2/0	... 3/4
Borax, Pulv.	... -/1	... -/3	... -/4	... -/6
Collodion, Mawson's Negative	... -/6	... 2/-	... 3/8	... 6/8
" 4 lbs., Winchester Quarts, 20/-	... -	... -	... -	... -
" Mawson's Enamel	... -/4	... 1/3	... 1/9	... 3/-
Calcium, Chloride, Cryst.	... -/1	... -/3	... -/6	... 1/-
Chalk, Prepared	... -/1	... -/4	... -/3	... -/4
Copper, Sulphate	... -/1	... -/3	... -/4	... -/6

*Special quotations for large quantities, from*

# SHARP & HITCHMOUGH.

## LIVERPOOL.





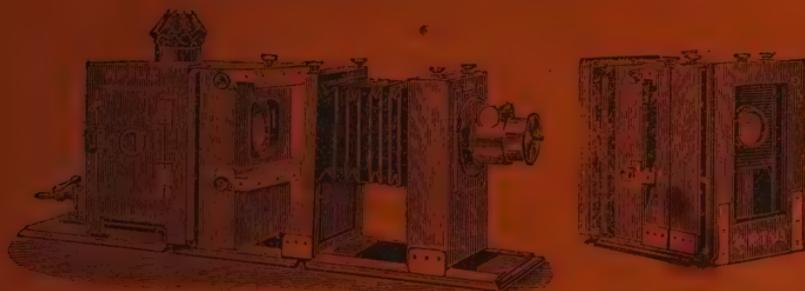
# SHARP & HITCHMOUGH'S

## NEW

# OPTICAL LANTERNS.

SPECIALY CONSTRUCTED FOR LAWSON'S PATENT  
SATURATOR OR OXY-HYDROGEN.

Our Aptus Science Lantern possesses several features which are not to be found in any other Lantern as yet introduced.



The Lantern is made of walnut or best polished mahogany, two panelled and moulded doors, moulded base, brass-bound sight holes with revolving shutters, japanned dome, and rose top, bellows front, long extension for lenses of all foci up to 12 in., taking lenses of various diameters, 4½ in. plano-convex and meniscus compound condenser, &c. This Lantern is specially designed for public and private exhibitions of the highest class. The objective is a double combination achromatic 2 in. diam. in loose cylinder, and fitted with flasher and slot for tinters. The body or jacket has double pinion to rack adjustment. The extra cost for lens and mount is 30s. Extra lenses of varying foci to fit the above mount 15s. each.

The outside measurement of Lantern as shown when closed with objective is only 9¼ × 9½ × 6½.

The Lantern is fitted with our new adjustable stage for centering carriers of all sizes.

The base board, when opened out, is self-locking and very rigid.

Our Science Lantern weighs, with Lens and Condenser, 11 lbs.

Other Lanterns weigh 21 lbs., nearly double.

Other Lanterns measure 19 × 8½ × 11.

Without Objective, Price £6 10s. net.

**SHARP & HITCHMOUGH,**  
Designers and Manufacturers, Liverpool.

# SHARP & HITCHMOUGH'S SCHOOL SCIENCE LANTERN.



Very handsomely made in mahogany with brass triple Extension front, 4½ in. Condensers; Objective of the very best quality, with large aperture, the Lens Tubes are made interchangeable to fit the jacket, with Double Pinion Adjustment. The price of Lantern complete, with improved blow-through jet, and fitted with our recently introduced system of centering the light, £6 15s.

About three years ago we experienced the want of a really convenient way of erecting the Lantern in a sufficiently high position as to make the rays unobstructed when showing over the heads of the audience, so we designed the case, as shown, to contain the Lantern and everything belonging to it, besides having such tools and small articles which are necessary when preparing for an exhibition.

The price of case properly made in mahogany, with drawers for tools, &c., and made to open at both sides, so that the slides may be passed through, £4 10s.

Strong and folding Tripod and Suspender for Cylinder, £1 10s.

Extra Lenses, 15s. each.

## APTUS NEW SLIDE BOX.

Every Lanternist experiences the steaming of slides in damp weather when put into the Lantern; our new Slide Box is so arranged that the Slides are thoroughly warmed previous to inserting them in the carrier.

Price, to hold 50 Slides, 10/6.

SHARP & HITCHMOUGH, 101 & 103 DALE STREET, LIVERPOOL.  
WORKS AND WAREHOUSE—GRESHAM BUILDINGS.

# LAWSON'S NEW PATENT SATURATOR.

For producing the Lime-light with Benzoline or Ether, together with Oxygen.

The Simplest, Safest, most Economical, and most Powerful Lime-light Apparatus ever introduced, and costing the least money.



Saturator and Jet Combined.

Price, complete, 50/- net.

Can be fitted to any Single Lantern.

Is so simple in construction that any person with a few hours' practice can easily work it. It is the simplest form of Lime-light known.

It can be charged with either Benzoline or Ether, as the customer may desire, and is so safe that an accident cannot occur with it.

The heat thrown off is so small that the risk of cracking Condensers is reduced to a minimum.

## OPTICAL LANTERNS.



### SUPERIOR LANTERNS.

Russian Iron Bodies, Brass Fittings, 3, and 4 Wick Lamps, 50/-, 70/-, and 90/-

### 'APTUS' LANTERNS

FOR SCHOOLS, EXHIBITIONS, PHOTOGRAPHIC AND SCIENTIFIC PURPOSES,

'APTUS' LECTURERS' FOLDING READING LAMP AND SIGNALLER, 4/6.

## WELDLESS STEEL CYLINDERS FOR COMPRESSED GASES,

Tested up to 2 tons to the square inch, fitted with Improved Valves.

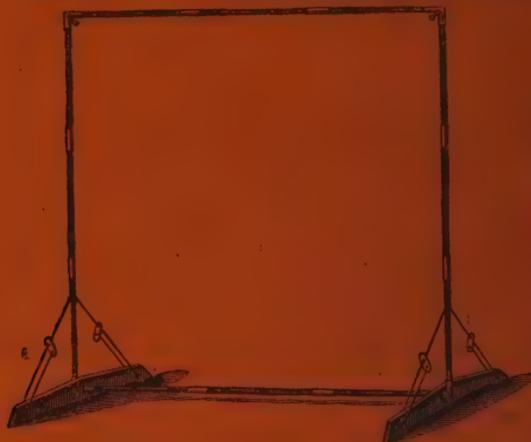
Contents in Cubic Feet.	Price including Valves, Unions, &c.	Price of Oxygen and Hydrogen.	Contents in Cubic Feet.	Price including Valves, Unions, &c.	Price of Oxygen and Hydrogen.
5 ..	27/9 ..	} 4d. per foot.	15 ..	37/- ..	} 3½d. TF per foot.
10 ..	34/- ..		20 ..	39/6 ..	
12 ..	36/- ..		30 ..	45/6 ..	
			40 ..	52/3 ..	

We keep in stock Cylinders, Valves, Nipples, Unions, Regulators, Gauges, and Keys.

Red and Black Tubing, very thick, 4d. and 5d. per foot.

**SHARP & HITCHMOUGH,**  
Lantern Specialists,  
LIVERPOOL.

## 'APTUS' PORTABLE SCREEN STANDS.



New Design.

- THIS novel Screen Elevator entirely does away with the usual obstacles to fitting up in a hall or private dwelling, as it can be set up without the slightest difficulty in a few minutes. The illustration fully describes it. The most simple and cheapest Screen Stand yet introduced.

	Without Box.	With Box.
1. 6 ft. square, and extra poles to make 4 ft. and 6 ft. ...	23/6	26/6
2. 9 ft. " " 4 ft., 8 ft., 9 ft. ...	34/-	36/-
3. 12 ft. " " 4 ft., 6 ft., 8 ft., 10 ft., 12 ft. ...	39/6	42/6
4. 15 ft. " " 4 ft., 6 ft., 8 ft., 10 ft., 12 ft., 14 ft. ...	40/-	45/-

The above are the four usual sizes, but others can be supplied on very short notice.

## 'APTUS' WASHABLE CLOTH LANTERN SCREENS.

4 ft. x 4 ft. ...	7/-	6 ft. x 6 ft. ...	11/-
5 " x 5 " ...	9/-	7 " x 7 " ...	13/-
8 ft. x 8 ft. ...	15/-		

## 'APTUS' OPAQUE LANTERN SHEETS.

These Sheets are prepared with a special flexible, waterproof material, perfectly white and opaque. The prices include 3-inch Roller, Batten, Cord, and Pulleys. TTF

5 ft. x 5 ft. ...	13/-	9 ft. x 9 ft. ...	25/-	15 ft. x 15 ft. ...	67/6
6 " x 6 " ...	15/6	10 " x 10 " ...	31/6	16 " x 16 " ...	73/6
7 " x 7 " ...	18/6	12 " x 12 " ...	42/-		
8 " x 8 " ...	22/-	14 " x 14 " ...	56/-		

Sample on application.

To be had through all Wholesale Houses and Dealers.

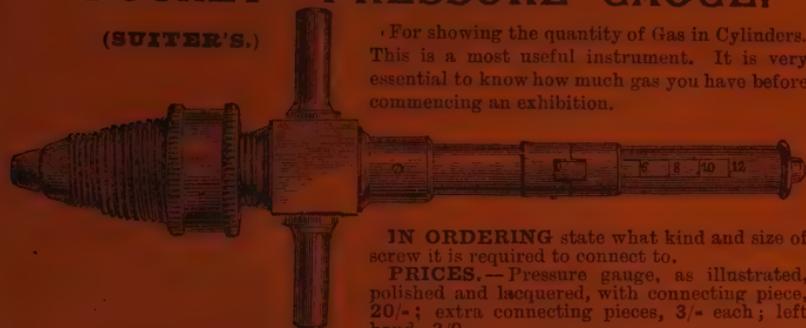
## 'APTUS' NEW BLOW-THROUGH JET,

With every movement by Screw and Rack Adjustment, 50/-

SHARP & HITCHMOUGH, LANTERN SPECIALISTS,  
LIVERPOOL.

## 'POCKET' PRESSURE GAUGE.

(SUITER'S.)



For showing the quantity of Gas in Cylinders. This is a most useful instrument. It is very essential to know how much gas you have before commencing an exhibition.

IN ORDERING state what kind and size of screw it is required to connect to.

PRICES.—Pressure gauge, as illustrated, polished and lacquered, with connecting piece, 20/-; extra connecting pieces, 3/- each; left hand, 3/9.

## 'APTUS' LANTERN MATS.

Strong Cloth Slide Binders, 1/- per 50.

And Gummed Binders, in 1/- Boxes.

Circular, Dome, Cushion, Oval and Square.

TTF

PRESTO LANTERN CARRIER, 2/-, 2/6, & 3/-.

CHADWICK'S SELF-CENTERING LANTERN CARRIER, 5/-

In ordering Lantern Slide Mats state whether you prefer paper white one side or all black.

Fancy Lantern Mats, 1/- per Box, assorted designs.

CATALOGUE OF LANTERNS AND SLIDES, POST FREE, 6d.

## 'APTUS' CONDENSERS (For Magic or Optical Lanterns.)

These Condensers are composed of two Plano-convex Lenses mounted in brass; finest quality. 4-inch diameter, 10/6; 4½-inch diameter, 12/6; 4¾-inch diameter, 16/6.

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## TRANSFER PICTURES,

FOR THE EASY & INEXPENSIVE PRODUCTION OF COLOURED LANTERN SLIDES.

Marvellous Effects. 3s. 6d. per Sheet (3¼ × 3¼) of One Dozen.

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New Designs, 4/6 per Sheet.

In many respects these Transfers are superior to Hand-painted Slides. List of Subjects on application.

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Book of Lectures, 1/-

## 'APTUS' LANTERN SLIDE BINDING VICE.

For firmly holding the slide and cover glass in position while applying the binding.

Prices from 1/- to 2/6 each.

## WOOD BOXES FOR LANTERN SLIDES.

To hold 50. 2/- each. Best 3/6.

CLOTH-COVERED LANTERN BOXES, with Grooves to hold 36, 1/3

With movable divisions to hold 50, 1/6 each.

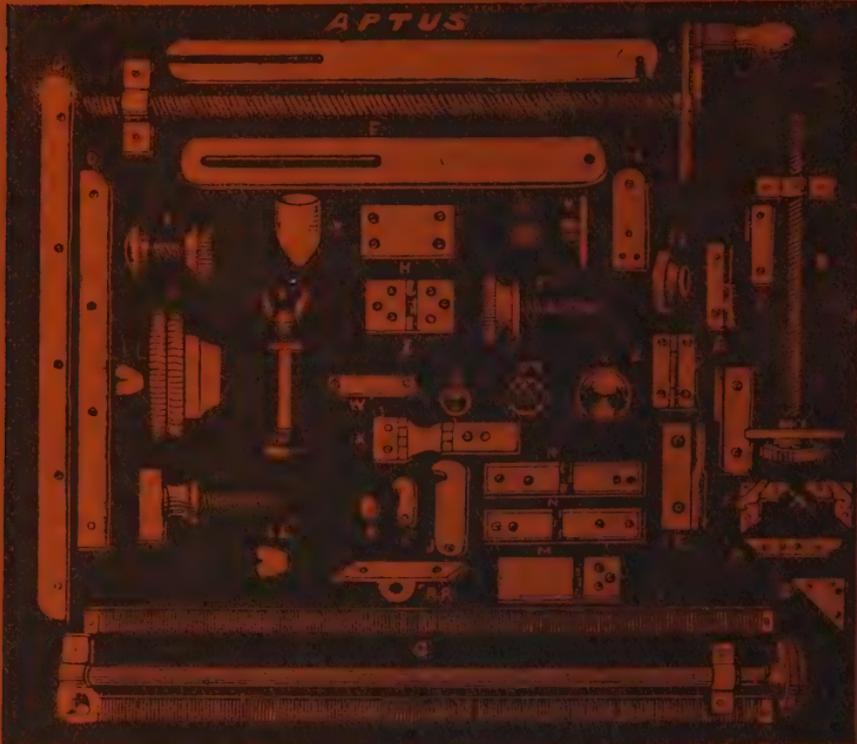
## SHARP & HITCHMOUGH,

WORKS & WAREHOUSE—

GRESHAM BUILDINGS.

101 & 103 Dale Street, Liverpool.

➤ SPECIALTIES IN CAMERA FITTINGS. ◀



**Special Quotations for Wholesale Quantities.**

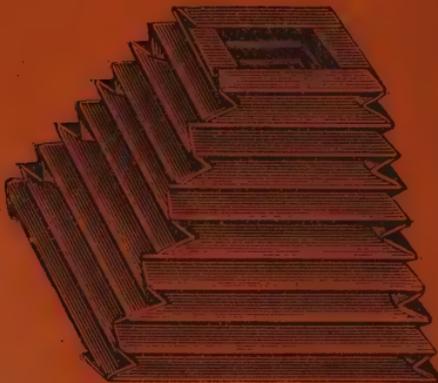
A. Strong Screw for Cameras, folding handle, each ... ..	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	10×8	12×10	15×12
B. Lighter Screw for Cameras ... ..	2/6	4/-	6/6	8/8	10/6	12/6
C. Rack and Pinion set, special size to order ... ..	3/-	5/-	7/6	10/6	12/6	15/-
D. Brass Strips for Camera Backs, per pair ... ..	-/6	-/9	1/-	1/3	1/6	2/-
E. Pull-off Hinges, per pair ... ..	-/2	-/2	-/3	-/3	-/3	-/3
F. Stretcher for Le Meritoire, lacquered ... ..	1/-	1/6	2/-	2/6	3/-	3/6
G. " Instanograph " ... ..	1/-	1/6	2/-	2/6	3/-	3/6
H. Plates for Stands, each ... ..	-/1	-/1	-/2	-/2	-/2	-/2
I. Hinges for Tail Boards, per pair ... ..	-/2	-/3	-/4	-/4	-/6	-/6
J. Hooks for Slides, per pair ... ..	-/1	-/1	-/1	-/1	-/1	-/1
J. " Stands, " ... ..	-/2	-/2	-/3	-/3	-/4	-/4
K. Turn Buttons for Slides, per pair ... ..	-/1	-/1	-/1	-/1	-/1	-/1
L. Pinion Milled Head... ..	-/6	-/8	-/8	-/9	-/10	1/-
LL. Cone Nut for " ... ..	-/2	-/2	-/2	-/2	-/2	-/2
M. Clip Hinges for Dark Slides, per pair ... ..	-/2	-/2	-/3	-/3	-/4	-/4
N. Hinges for Focussing Glass, " ... ..	-/2	-/2	-/3	-/3	-/4	-/4
O. Rising Front Screws, each ... ..	-/4	-/5	-/6	-/8	-/8	-/8
OO. Ivory Numbers for Slides ... ..	-/3	each,	2/6	dozen.		
P. Screws for bottom of Camera ... ..	-/4	-/6	-/6	-/9	-/9	-/9
Q. T.Screws for Stands ... ..	-/6	-/8	-/8	1/-	1/-	1/-
R. Ears for Stands, per set of 6 ... ..	-/4	-/6	-/9	1/-	1/-	1/4
RR. Bearings for Pinions, per pair... ..	-/4	-/4	-/6	-/5	-/5	-/5



**'APTUS' CAMERA BELLOWS.**



**TO ORDER.**



Full Catalogue of Brasswork, post free.

Suitable for Camera :	Length Extended.	Square,		Oblong,		Best Varnished Maroon Leather.		Unvarnished Leather.		Twill.	
		Outside.	...	Outside.	...	Square.	Oblong.	Square.	Oblong.	Square.	Oblong.
Quarter Plate	7 inch.	4 3/4 x 4 3/4	...	4 3/4 x 3 3/4	...	3/0	2/8	2/10	2/6	2/3	2/0
5 x 4	9 "	5 1/2 x 5 1/2	...	5 1/2 x 4 1/2	...	3/8	3/3	3/6	3/0	2/9	2/6
Half Plate	12 "	7 1/4 x 7 1/4	...	7 1/4 x 5 1/2	...	6/9	6/3	6/3	5/9	3/9	3/6
Ditto	14 "	7 3/8 x 7 3/8	...	7 3/8 x 5 3/4	...	7/3	6/9	6/6	6/0	4/3	3/9
Whole Plate	18 "	8 1/2 x 8 1/2	...	8 1/2 x 6 1/2	...	10/6	9/6	9/0	8/6	6/0	5/6
Ditto	20 "	9 3/8 x 9 3/8	...	9 3/8 x 7 3/4	...	13/0	11/0	10/6	9/9	7/6	6/6
10 x 8	22 "	11 3/8 x 11 3/8	...	11 3/8 x 9 3/4	...	15/0	13/6	12/6	11/9	10/6	9/0
12 x 10	24 "	13 x 13	...	13 x 11	...	17/6	15/6	14/6	13/6	13/0	11/6
15 x 12	30 "	16 x 16	...	16 x 13	...	24/0	22/0	20/0	19/0	18/0	16/6

In Ordering please state if Taper or Parallel Bellows is required.

N.B.—Figures in third and fourth columns represent the outside measurement of Bellows when closed.

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Telegrams:—'APTUS FINDER,' Liverpool. Telephone No. 2405.

**OXFORD LINE MOUNTS, OR INDIA TINTED MOUNTS.** TT

IN CREAM, BRISTOL, RED OXFORD LINES.

WHITE, WITH NEUTRAL GREY TINTS.

Size of Board.	Size of Line.	Per 100.	Per doz.
8 by 6	5½ by 3½	4/-	-70
8½ " 6½	5 " 4	4/6	
8 " 6	6 " 4½	4/6	
9½ " 8	6½ " 5½	5/6	
10 " 8	7 " 5	6/-	-70
10 " 8	7½ " 5½	6/-	

Size of Board.	Size of Tint.	Per 100.	Per doz.
12 by 9	8 by 6	9/-	1/4
12 " 10	8½ " 6½	10/-	
12 " 10	9 " 7	10/-	
12 " 10	9½ " 7½	10/-	
14 " 11½	10 " 8	13/-	1/9
15 " 12	10½ " 8½	16/-	2/2
18 " 14	12 " 10	20/-	2/4
20 " 16	14 " 11	32/-	4/3

**RETAIL PRICE OF MOUNTS.** TT

Size.	Gilt Bevel Enamel.				Gold Hand Enamel.				Red Line Enamel.				Plain Enamel.				Design Backs.			
	100	50	25	12	100	50	25	12	100	50	25	12	100	50	25	12	100	50	25	12
C-D-V...	3/-	1/6	-/10	-/5	1/6	-/9	-/5	-/3	1/4	-/8	-/5	-/3	1/-	-/7	-/4	-/2	2/-	1/-	-/6	-/4
½	4/-	2/-	1/-	-/6	3/-	1/6	-/10	-/5	3/-	1/6	-/10	-/5	2/-	1/-	-/6	-/4	3/6	1/9	1/-	-/6
5×4	5/-	2/6	1/3	-/8	3/6	1/9	-/11	-/6	3/6	1/9	1/-	-/6	3/-	1/6	-/10	-/5	—	—	—	—
Cabinet...	6/-	3/-	1/6	-/9	4/-	2/-	1/-	-/7	4/-	2/-	1/-	-/7	3/6	1/9	1/-	-/6	4/-	2/-	1/-	-/8
½	8/-	4/-	2/-	1/-	5/-	2/6	1/4	-/9	5/-	2/6	1/3	-/8	4/5	2/3	1/2	-/7	6/-	3/-	1/6	-/9
10×8	14/-	7/-	3/6	1/9	12/-	6/-	3/-	1/6	—	—	—	—	—	—	—	—	—	—	—	—
12×10	24/-	12/-	6/-	3/-	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	36/-	18/-	9/-	4/6	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

**Gold Bevelled-Edge Midget Mounts.**

	Enamelled Cream, Chocolate, and Blue.	C-D-V Midget. 2½ × 1½	Victoria Midget. 2½ × 1½	Cabinet Midget. 2½ × 1½	Promenade Midget. 3½ × 1½
6 Sheet Enamel, per 1000	.. .. 18/-	.. .. 18/-	.. .. 21/-	.. .. 21/-	.. .. 21/-
" " " 100	.. .. 2/-	.. .. 2/2	.. .. 2/4	.. .. 2/6	.. .. 2/6
" " " 50	.. .. 1/3	.. .. 1/2	.. .. 1/4	.. .. 1/4	.. .. 1/4
" " " 25	.. .. 8d.	.. .. 8d.	.. .. 9d.	.. .. 9d.	.. .. 9d.
" " " doz.	.. .. 4d.	.. .. 4d.	.. .. 5d.	.. .. 5d.	.. .. 5d.

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**FEROTYPE PLATES.**

'Special' Buffalo, 14×10, Black or Chocolate, per doz. 4s.; per box of 200 Sheets, £22 2s. half-box, £12 2s.; quarter doz., 13s. 6d.

**AMERICAN CUT-UP FEROTOTYPE PLATES.**

Per box of 8 dozen, Black or Chocolate, 3½×2½, 2s. 10d.; 4½×3½, 4s. 3d. per box.

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size	Per gross.	Doz.
½ size (2½×2)	.. .. 0s. 10d.	.. .. 1s. 0d.
" (3½×2½)	.. .. 2s. 0d.	.. .. 2s. 6d.
" (4½×3½)	.. .. 3s. 6d.	.. .. 4s. 6d.

**MATS AND PRESERVERS.**

size	Per gross.	½ Gross.	Per doz.
½ size (2½×2)	.. .. 3s. 0d.	1s. 6d.	0s. 3d.
" (3½×2½)	.. .. 3s. 10d.	2s. 0d.	0s. 5d.
" (4½×3½)	.. .. 6s. 11d.	3s. 6d.	0s. 8d.

**CASES.**

size	Doz.
½ size (2½×2)	.. .. 1s. 6d.
" (3½×2½)	.. .. 2s. 0d.
" (4½×3½)	.. .. 4s. 6d.

**TRAYS.**

size	Gross.	Doz.
½ size (2½×2)	.. .. 5s. 0d.	0s. 6d.
" (3½×2½)	.. .. 6s. 6d.	0s. 7d.
" (4½×3½)	.. .. 10s. 6d.	1s. 0d.

**FEROTOTYPE ENVELOPES (New Designs).** TT

size	Per 100.	Per doz.
½, ¾, & 1 size	.. .. 100	1s. 4d.
5×4	.. .. 2s. 0d.	.. .. 18s. 0d.
Cabinet	.. .. 3s. 0d.	.. .. 28s. 0d.

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**The Mawson**  
**are**  
**The Best.**

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— DRY —

Ask your  
Dealer  
for

# Collodion PLATE.

NO New Developers needed  
NO Long Fixing.  
NO Long Washings.  
NO Long Drying.  
NO Staining.  
NO Frilling.  
NO Clearing Bath needed.  
NO Alum Bath.

ARE ISOCHROMATIC.

Are not liable to Halation.

Can be dried before a Fire  
and finished at once.

UNAFFECTED BY CLIMATE

Will Keep Indefinitely.

## BRILLIANT LANTERN SLIDES

Easily  
Obtained.

These Plates are Rapid, and suitable  
for either Contact or Reduction.

PLATES  $3\frac{1}{2} \times 3\frac{1}{2}$  ... .. 1/3 per Dozen.  
Selected Thin Glass, 3d. doz. extra.

## BRILLIANT NEGATIVES.

With all the Vigour and Bloom and  
Rapid Printing Powers of a Wet Col-  
lodion Film.

Quarter-plate ... 2/3 per Dozen.

Half-plate ... 4/6 " "

Whole-plate ... 8/- " "

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BIRMINGHAM DRY COLLODION PLATE CO., Ltd.  
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SAMPLE BOXES of Lantern Plates, post free, 1/6, from our Agents as above.

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MANUFACTURE of PLATES

Embraces

The MAWSON, The CASTLE,

The OPAL, The LANTERN,

The PHOTO=MECHANICAL.

—————  
No pains or expense is spared to make each of its kind

AS GOOD AS IT CAN POSSIBLY BE MADE.

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MAJOR DAVIDSON writes, under date May 16th :—'After very careful comparison of your prints with those of five other firms to whom I sent Negatives for development, I find yours are clearer and better developed than the others submitted to me.'

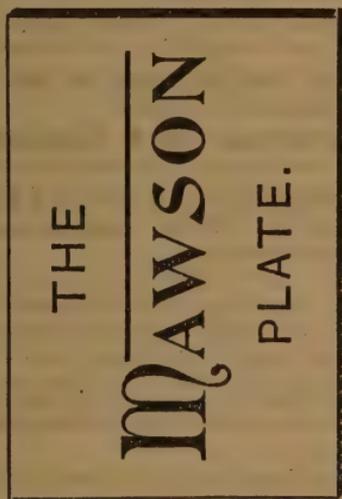
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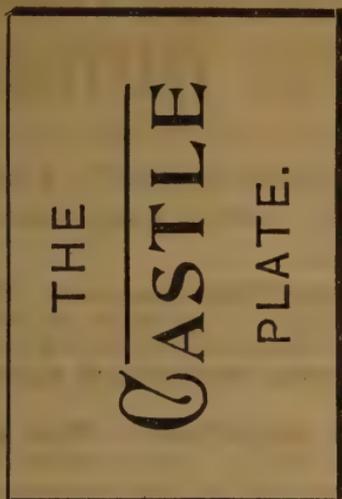
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**P.O.P.P.****PRINTING-OUT PLATINUM PAPER****NO** Fallures**NO** Developing**NO** more Toning**NO** Process so simple**NO** Prints so Permanent**NO** Results so beautiful**NO** Engraving more perfect**NO** Effects more admired**NO** Dealer should fail to Stock it**NO** Amateur should be without it

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If you once try this Paper you will use no other. It is the cheapest Process that you can get, and most beautiful. Hundreds of Amateurs throughout the World use it, and pronounce it perfect.

**PRICES.**

	Per doz.—	s.
Quarter Plate .....	10	4
Cabinets .....	16	
Half-Plate .....	20	
Whole Plate...	36	
8 × 10 .....	66	
12 × 10 .....	100	
15 × 12 ...	120	
Full Sheets:		
18 × 25, 2/6		
each.		

**HARDCASTLE'S 'NEW' DEVELOPER,** in 2 Solutions, 2/-, 3/6.

" **HYDROKINON DEVELOPER,** in 1 Solution, 1/- 1/6.

*By far the best and easiest of all Developers for Amateurs.*

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Are specially made for  
PHOTO-LITHOGRAPHERS & PHOTO-ETCHERS.

Mr. W. T. WILKINSON says:—

*'For the production of Negatives from line drawings suitable for printing upon zinc there is only one Dry Plate in the market that is at all times thoroughly reliable, that being Mawson's Photo-Mechanical. This plate, used with Payne's formula for Hydroquinone for Development, is a certain and reliable substitute for the Wet Collodion Process.'*

**MAWSON & SWAN, 33 SOHO SQUARE, LONDON.**

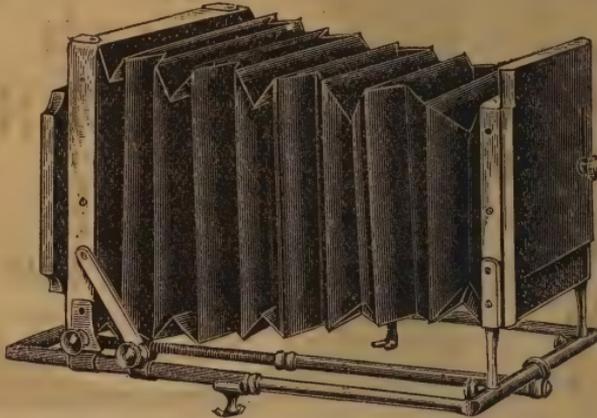
[See page 500, and alternate pages from 1223 to 1257, also cover.]

# The 'ZODIAC.'

(GRIFFITHS' PATENT.)

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EMBODYING ALL THE MODERN MOVEMENTS.



THE SMALLEST CAMERA ON THE MARKET.

FRONT VIEW. . SHOWING RISING FRONT AND EXTENDING BASE.

**T**HIS Camera signalises our entry into the manufacture of General Photographic Apparatus. Being totally unaffected by trying climates, it appeals with particular force to Merchants and Shippers, while the special nature of its construction makes it no less suitable and devisable to photographers at home. Though metal in many parts, the form is chiefly tubular, and the Camera is actually lighter than the usual make.

**PRICES.**

Complete with **Three** Double Dark Slides, Focussing Screen, and Ash Stand.

1/2-plate ... ..	£3 13 6	1/4-plate ... ..	£6 16 6
3/4 X 4 plate ... ..	4 4 0	10 X 8 plate ... ..	8 8 0
1/2 " " " " " " " "	5 5 0	12 X 10 " " " " " "	10 0 0

**COMPLETE SETS.**

In order to meet the demand for a really good Camera at a moderate price, we offer a modification of this Camera, complete with Lens, **Three** Double Slides, Focussing Screen, Stand, &c., at the following prices :-

1/2-plate ... ..	£2 12 6	1/4-plate ... ..	£5 15 6
3/4 X 4 plate ... ..	3 3 0	10 X 8 plate ... ..	7 7 0
1/2 " " " " " " " "	4 4 0	12 X 10 " " " " " "	9 0 0

The only differences are the omission of the extending base, cloth bellows instead of leather, and a plainer finish throughout, the quality and efficiency in other respects being quite equal to the best.

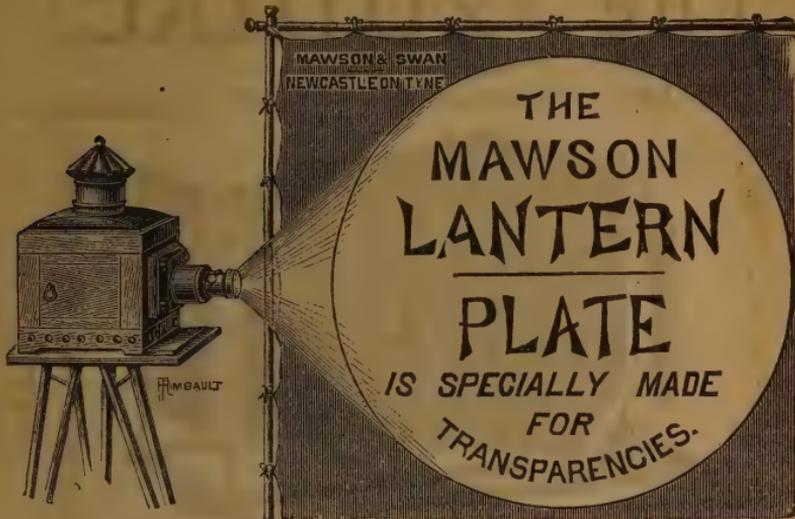
**THE NEW STEREO CAMERA IN ZODIAC MAKE.**

Best from £4 4s. Plain from £3 13s. 6d. R.R. Lenses, £2 2s. extra.

Makers of the 'GUINEA DETECTIVE,' and other Hand Cameras.  
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33 SOHO SQUARE, LONDON,  
AND  
MOSLEY STREET, NEWCASTLE-ON-TYNE.  
[See page 500, and alternate pages from 1223 to 1257, also cover.]

# WANTED ! WANTED ! WANTED !

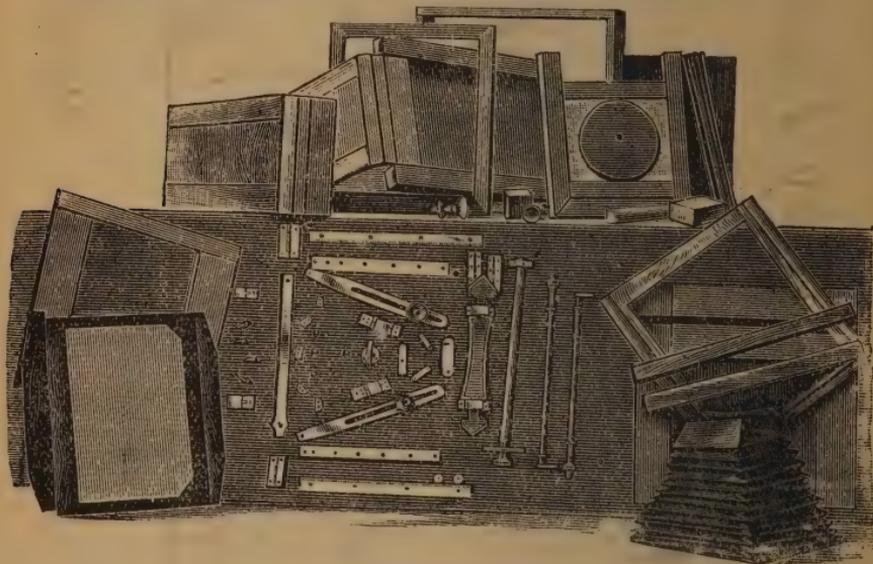
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A new Publication, the most Complete Work yet published, comprising  
**A COMPLETE LIST OF PHOTOGRAPHIC FITTINGS.**  
Post Free, **THREEPENCE.**

Vide Press Notice, *Photography*, March 30th :—'The book is profusely illustrated, and the directions are complete and plain. The second portion, dealing with the production of the photograph, is equally interesting, and would be found very useful for beginners.'



AIREDALE IN PARTS.

Makers of Cameras, Cameras in Parts, Tripods, Negative Boxes, Printing Frames and Draining Rack, Enlarging Apparatus, Burnishers, and all kinds of Brass Work and Bellows.

❖ **WATKINSON & CO.,** ❖

Harrison Street & Merrion Mills, North St., LEEDS.

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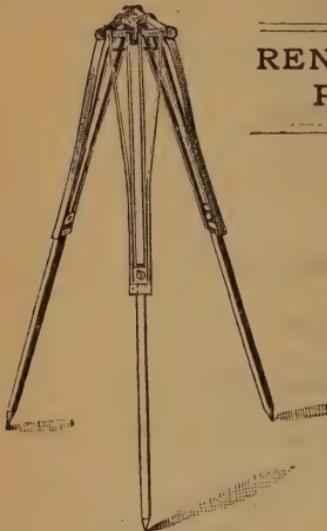
## THE CASTLE PLATES

*I answer—Because, of all the Plates I  
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be, for reliability and general excellence,*

THE BEST.

# ASHFORD'S IMPROVED PATENT SLIDING ADJUSTABLE STAND

Is still Unapproached in Point of Rigidity and Simplicity of Construction.



TWO-FOLD

RENEWAL OF  
PATENT.



THREE-FOLD.

The British Journal of Photography, August 10th, 1888, says:—'The Patent Stand of J. ASHFORD, which we have had occasion to subject to the test of actual practice, differs from any others we have previously seen. For its lightness it is a marvel of strength and rigidity.'

To be obtained of all first-class Photographic Dealers.

Two-fold.	<b>PRICES.</b>	Three-fold.	
5 ft. with 4 in. top... ..	18/6 each.	5 ft. with 6 in. top ... ..	25/- each.
5 ft. with 6 in. top... ..	21/- "	5 ft. with 8 in. top ... ..	30/- "
5 ft. with 8 in. top... ..	25/- "		

**Waterproof Cases, Leather Bound, with Straps, complete:**  
 For Two-fold Stand ... .. 5/- each. | For Three-fold Stand ... .. 4/6 each.

**WHOLESALE AGENTS:**

MARION & Co., Soho Sq., London; Mr. W. TYLAR, 57 High St., Aston, Birmingham.

**ASHFORD'S MAHOGANY DOUBLE SLIDES** for cut films. Fitted to any Camera. Three of these slides pack into a space of 1½ inches. Weight of ¼-plate, 5 oz.; ½-plate, 2½ oz. These slides hold the films along all the edges. Prices, ¼-plate, 6s. 6d. each; ½-plate, 4s. each.

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in favour of the  
**MAWSON and the CASTLE PLATES.**

**ESSEX.**

HALSTEAD,

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To Messrs. MAWSON & SWAN.

*Gentlemen,—I have for some time discarded all other makes of plates in favour of your 'Castle' (except for experimental purposes), and have come to the conclusion that they are the finest plates in the market for all-round work. . . . They put me so much in mind of Mawson's Collodion of years back, and for the first time I am able to produce negatives of the old wet-plate character. I intend to stock them and supply them to Amateurs.*

*I remain,*

*Yours respectfully,*

(Signed) H. D. HAWKINS.

**MAWSON & SWAN, 33 SOHO SQUARE, LONDON.**

[See page 500, and alternate pages from 1223 to 1257, also cover.

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For **PLUCK, BRILLIANCY, and SPEED,**  
cannot be excelled.

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Telegrams—'NATIONAL, SOUTHAMPTON.'

**WATTS' PATENT**

**WALKING STICK  
CAMERA STAND.**

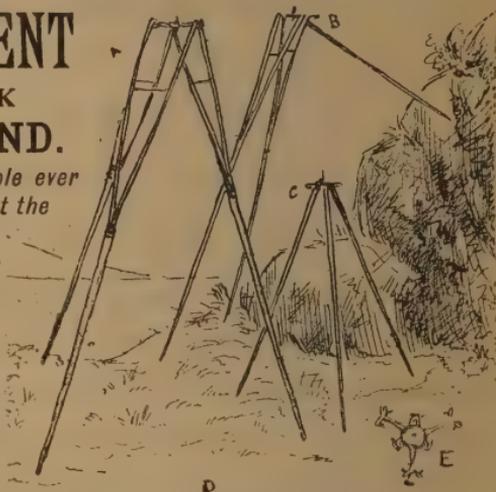
*The lightest & most portable ever  
produced. As exhibited at the*

**MANCHESTER  
JUBILEE EXHIBITION.**

See comment on Prize Photo-  
graphs in the *Review of Reviews.*

**WEIGHT 18 oz.**

Stands 4 ft. 8 in. high when  
opened to the full. Will carry  
any kind of Camera, and is  
specially adapted for tourists,  
travellers, &c. The handle con-  
tains a lens for focussing without  
a cloth. Price **25/-.**



**W. WATTS,**

*(Maker & Patentee),*

**41 South King Street,  
MANCHESTER.**

- A. Represents the Stand open on level ground.  
B. " " " " for hillside.  
C. " " " " lowest elevation.  
D. " " " " closed as a walking stick.  
E. Tripod Top.

**THE CAPE.**

ROYAL OBSERVATORY.

November 2nd, 1892.

To H.M. ASTRONOMER,

*Royal Observatory, Cape of Good Hope.*

*Dear Sir,—The last two gross of Star Plates received from Mawson & Swan are fully equal to previous consignments in quality. . . . Convey to Messrs. Mawson & Swan my congratulations on their having brought emulsion making to such perfection that two batches should be identical in every respect.*

*I am, dear Sir,**Your obedient Servant,*

C. RAY WOODS,

*Photo. Asst.*

LONDON, S.W.

October 19th, 1893.

To Messrs. MAWSON &amp; SWAN.

*Gentlemen,—Please to send on the 'Castle' Plates on order (20 gross Castle  $\frac{1}{2}$ ) as quickly as possible. We are running short of them, and I can always rely on these plates to give me the results I desire.*

*Yours very faithfully,*

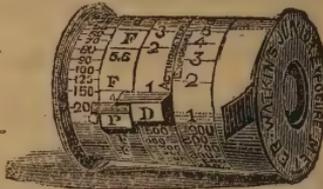
MARTIN JACOLETTE.

**MAWSON & SWAN, 33 SOHO SQUARE, LONDON.***[See page 500, and alternate pages from 1223 to 1257, also cover.]*

# The WATKINS EXPOSURE METER.

**S**INCE the last issue of the 'British Journal Almanac' a New and Cheap Form of the Watkins Exposure Meter has been introduced, viz. THE JUNIOR WATKINS. This little instrument has been devised to meet the want of a cheap and thoroughly reliable Exposure Meter. It is available for all Out-door subjects, Interiors, and Copying; but is not so complete for advanced photography as the well-known STANDARD PATTERN Watkins Exposure Meter. It can be conveniently carried in the waistcoat pocket, and it requires no further adjustment for varying lights when once set for plate and stop.

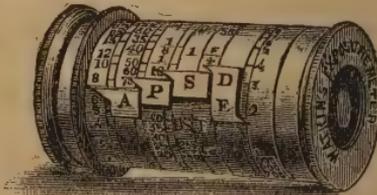
Price



7/6

THE STANDARD WATKINS EXPOSURE METER still continues to maintain the high position it took soon after its introduction over three years ago, and it is still by far the best of the many exposure instruments before the public.

Price



15/-

**IMPORTANT.**—To facilitate the Matching of the Sensitive Paper to the standard tint, a Blue Glass (patented) has been added to the JUNIOR and STANDARD Watkins Meters, and all users can have this valuable addition forwarded, price 6d.

PRICE of the JUNIOR, with full printed Instructions	...	...	...	7/9
Ditto, Standard Meter, ditto, ditto	...	...	...	15/3
Ditto, with extra divided Ring, to facilitate Enlarging and Copying	...	...	...	18/3
EXPOSURE NOTES (New Edition), with ruled lines and much valuable information	...	...	...	1/7

POST FREE FROM ALL DEALERS.

R. FIELD & CO., 142 Suffolk St., BIRMINGHAM.

**TYNESIDE.**

12 REGENT TERRACE, GATESHEAD.

March 20th, 1893.

To Messrs. MAWSON &amp; SWAN,

Mosley Street, Newcastle.

*Dear Sirs,—It may interest you to know that, about 13 years ago, when I made an attempt at Photography, I bought a dozen of your dry plates, some of which, owing to circumstances limiting my spare time, I put away until recently. During ten years they lay in a box in an attic, and for the remainder of the time in a cellar (not entirely free from dampness), when I had occasion to try them for contact printing, and, as you will see from the accompanying developed plate, I found them still good, and not affected either by lapse of time or the varied experience of their storage. I think you will agree with me that this fact is worthy of record, and bears testimony to the excellency of the plates you prepare.*

*Yours truly,*

J. IONS. CLARK.

**MAWSON & SWAN, 33 SOHO SQUARE, LONDON.***[See page 500, and alternate pages from 1223 to 1257, also cover.]*

WORRY NO MORE!

# WOOD'S WASHER

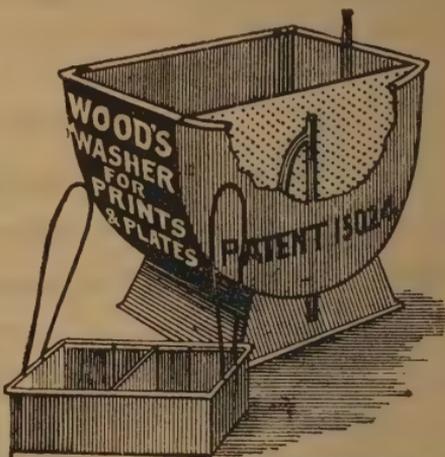
With adjustable Rack, will remove all trace of 'Hypo' from plates in fifteen minutes, and prints in thirty minutes

WITHOUT ANY ATTENTION.

Simplest  
and  
Most Efficient.

No Bruising or  
Tearing of Prints

Non-aeration of  
Water,  
consequently  
Prints and Plates  
are not injured  
by being covered  
with Airbells.



### PRICES.

To wash all Prints and Plates up to

$\frac{3}{4}$ -pl. Washer, 10s.

$\frac{1}{2}$ -pl. Rack, 3s. 3d.

$\frac{1}{4}$ -plate — Washer, 12s. 6d.

$\frac{1}{2}$ -pl. Rack, 4s. 6d.

12x10—Washer, 22s. 6d.

12x10, Rack, 8s.

Also large Washer, specially made for Professionals.

Galvanised Iron, Triple Enamelled.

Will wash 350 to 400 Cabinets at one time, and all Prints and Plates up to 15x12.

Washer, 42s.

Rack, 13s. 6d.

PRIZE MEDAL, BIRMINGHAM.

WILL LAST A LIFETIME.

The only Prize Medal WASHER and RACK on the Market.

RACK ADJUSTABLE FOR ALL SIZES.

Perfect in Action. Absolutely Unrivalled. Thousands Sold.

Write for List of Testimonials, &c., to the Company.

To be obtained from all Dealers, or from

WOOD'S WASHER CO.  
20 TEMPLE STREET, LIVERPOOL.

## LONDON.

147 STRAND, LONDON.

October 16th, 1893.

Gentlemen,—For outdoor and indoor views we have used most of the best plates in the market, and our Operators prefer the 'Castle' and the 'Mawson' to any others, for even, good gradation easy development, and UNIFORM EXCELLENCE.

Yours faithfully,

BEDFORD LEMERE.

BANK OF ENGLAND.

May 1st, 1893.

Dear Sirs,—On Saturday afternoon I tried the experiment I referred to. I went down the river with 'Castle' plates, lens working at  $f/11$ , shutters at  $1/80''$ . I send you prints from snaps taken. The light was  $10''$  on Stanley's Actinometer, consequently not first class. I was greatly surprised and pleased at the results. Of course, I can see that by using the 'Mawson' plate, stopped down to  $f/16$  or  $f/22$ , I thereby gain greater sharpness and definition, which, for enlarging or lantern slides, is a *sine qua non*.

Yours faithfully,

D. E. GODDARD.

MAWSON &amp; SWAN, 33 SOHO SQUARE, LONDON.

[See page 500, and alternate pages from 1223 to 1257, also cover.

# FREDK. BOEHM,

4 CULLUM STREET,  
LONDON, E.C.

## PHOTOGRAPHIC CHEMICALS.

PYROGALLIC ACID.                      HYDROQUINONE.  
GOLD CHLORIDE.                      SILVER NITRATE.  
SODA ACETATE.                      POTASSIUM CYANIDE.  
SODA HYPOSULPHITE.  
POTASSIUM OXALATE NEUTRAL.

*And all other Chemicals for Photographic use in  
faultless quality at best market value.*

☛ WHOLESALE QUANTITIES ONLY. ☛

**STOESS'**  
ORIGINAL IMPROVED  
PHOTOGRAPHIC  
**GELATINES.**

**STOESS'**

Improved Gelatine for  
**EMULSIONS.**

*Supplied in Hard, Medium,  
and Soft quality.*

For the **PHOTOTYPE** and  
all other Processes.

*ALL OTHER KINDS OF GELATINES.*

TRADE MARK.



'S' BRAND.

Photographic Gelatines are our Speciality ever since Gelatine has been introduced in photographic processes. Thorough experience enables us to meet all requirements.

*For Samples and Particulars please apply to*

**MR. FREDK. BOEHM,**  
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*Sole Agent for the United Kingdom of*

**THE HEIDELBERG GELATINE WORKS,**

**STOESS & CO.,**

Ziegelhausen, near Heidelberg, GERMANY.

## JAMAICA.

13 DUKE STREET, KINGSTON, JAMAICA.

February 25th, 1893.

To Messrs. MAWSON & SWAN.

Dear Sirs,—I received last week the 100 dozen plates I wrote you that I had ordered by Messrs. E. A. de Pass & Co., of London.

They are as good as the first lot, and if I get them equal to these received I will always order them from you.

I am pleased with them, and like the way you send them.

With best regards,

Yours respectfully,

J. B. VALDES.

## TRINIDAD.

L. F. SELLIER, of Trinidad, writing under date May 18th, 1893, says:—

‘I may state that I have used your plates, and they have given me entire satisfaction. I have also recommended and sold some to other Photographers here, who found them equally as good.’

MAWSON & SWAN, 33 SOHO SQUARE, LONDON.

[See page 500, and alternate pages from 1223 to 1257, also cover.]

Photographers in North of Scotland should write for  
special terms to

**JAMES HENDERSON,**  
13 Crown Street,



**ABERDEEN.**



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ON £2 CASH ORDERS.

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THE ARTIST IN WATER COLOURS.  
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OF SUPERIOR QUALITY.

24 SOHO SQUARE, LONDON.

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## THE 'CASTLE' PLATE.

Size	$4\frac{1}{2} \times 3\frac{1}{2}$	$5 \times 4$	$6\frac{1}{2} \times 3\frac{1}{2}$	$6\frac{1}{2} \times 4\frac{1}{2}$	$7\frac{1}{2} \times 5$	$8\frac{1}{2} \times 6\frac{1}{2}$
Per doz.	1/-	... 1/7	... 1/10	... 2/3	... 3/5	... 4/3

## THE 'MAWSON' PLATE.

Size	$4\frac{1}{2} \times 3\frac{1}{2}$	$5 \times 4$	$6\frac{1}{2} \times 3\frac{1}{2}$	$6\frac{1}{2} \times 4\frac{1}{2}$	$7\frac{1}{2} \times 5$	$8\frac{1}{2} \times 6\frac{1}{2}$
Per doz.	1/6	... 2/3	... 2/6	... 3/6	... 5/-	... 6/6

## THE 'MAWSON' LANTERN PLATE.

Size	$3\frac{1}{2} \times 3\frac{1}{2}$	$4\frac{1}{2} \times 3\frac{1}{2}$	$5 \times 4$	$6\frac{1}{2} \times 3\frac{1}{2}$	$6\frac{1}{2} \times 4\frac{1}{2}$	$8\frac{1}{2} \times 6\frac{1}{2}$
Per doz.	1/-	... 1/-	... 1/9	... 2/2	... 2/8	... 5/-

## THE PHOTO-MECHANICAL PLATE.

Size	$4\frac{1}{2} \times 3\frac{1}{2}$	$6\frac{1}{2} \times 4\frac{1}{2}$	$7\frac{1}{2} \times 5$	$8\frac{1}{2} \times 6\frac{1}{2}$	$9 \times 7$	$10 \times 8$
Per doz.	1/9	... 3/6	... 5/-	... 6/6	... 9/-	... 12/-

## MAWSON & SWAN'S BROMIDE OPALS.

COATED ON SMOOTHED POT OPAL GLASS.

Size	$4\frac{1}{2} \times 3\frac{1}{2}$	$5 \times 4$	$6\frac{1}{2} \times 4\frac{1}{2}$	Size	$8\frac{1}{2} \times 6\frac{1}{2}$	$10 \times 8$	$12 \times 10$
Per doz.	... 1/6	... 2/6	... 3/-	Per half doz.	3/6	... 6/6	... 8/6

**33 SOHO SQUARE, LONDON;**  
**MOSLEY STREET, NEWCASTLE-ON-TYNE.**

*[See page 500, and alternate pages from 1223 to 1257, also cover.]*



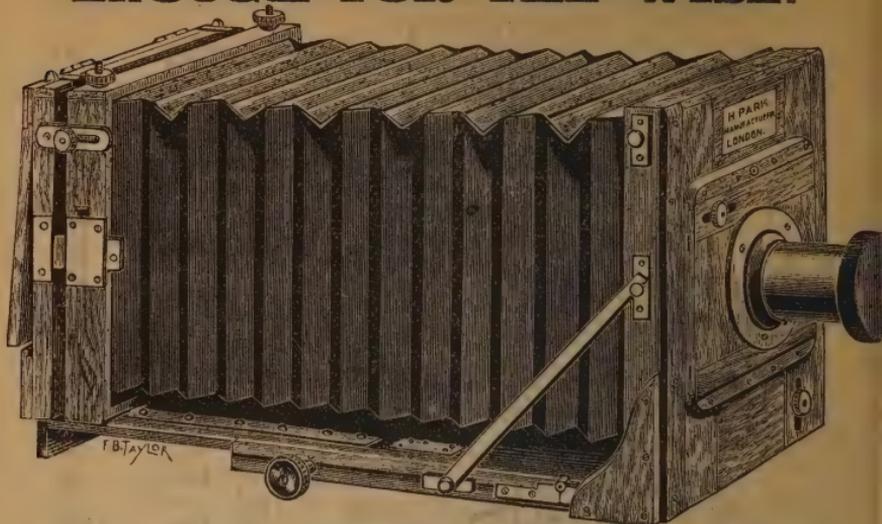
# MAWSON & SWAN'S BROMIDE PAPER

*Is recommended for*

*The Quick production of Direct Enlargements, Printing  
by Artificial Light, Copying Mechanical Drawings, and  
for Recording Instruments.*

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AND  
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## ENOUGH FOR THE WISE.



**PARK'S IMPROVED LONG-FOCUS CAMERA.** The most Perfect Durable Instrument yet devised. Simplicity and Strength.

PRICE, WITH ONE DOUBLE SLIDE.

For Plates. Inches.	Horizontal and Vertical.	Square.	For Plates. Inches.	Horizontal and Vertical.	Square.
6½ × 4½	£6 0 0	£6 0 0	15 × 12	£12 0 0	£12 16 0
7¼ × 4½	6 0 0	6 6 0	18 × 16	—	16 10 0
7½ × 5	6 5 0	6 10 0	20 × 16	—	17 15 0
8¼ × 6½	7 0 0	7 13 0	22 × 18	—	18 5 0
10 × 8	8 10 0	9 0 0	24 × 20	—	21 0 0
12 × 10	9 15 0	10 2 0			

For Plates. Centimètres.	Price.	For Plates. Centimètres.	Price.
9 × 12	£5 5 0	21 × 27	£9 10 0
12 × 15	6 6 0	24 × 30	9 15 0
13 × 18	6 10 0	27 × 33	10 10 0
12 × 20	6 18 0	27 × 35	11 0 0
15 × 21	7 15 0	30 × 40	13 0 0
18 × 21	7 18 0	40 × 50	16 10 0
15 × 22	7 18 0	50 × 60	21 0 0
18 × 24	8 0 0		

### EXTRA DOUBLE DARK SLIDES.

Inches.	Price.	Inches.	Price.	Inches.	Price.
4½ × 3¼	£0 13 0	8 × 5	£0 18 6	15 × 12	£2 0 0
5 × 4	0 13 6	8½ × 6½	1 0 0	18 × 16	3 0 0
6½ × 4½	0 15 0	10 × 8	1 4 0	20 × 16	3 6 0
7¼ × 4½	0 18 0	12 × 10	1 10 0	22 × 18	3 12 0
	24 × 20				£3 16 0

*All made of specially seasoned Wood, selected with greatest care, and are made on the Premises.*

## VICTORIA CAMERAS ARE WELL KNOWN.

**HENRY PARK, Practical Photographic Apparatus Manufacturer,**  
(Seven years with P. MEAGHER, Eight with G. HARE.)

**Manufactory: 5 Station Buildings, Acton Street, Kingsland Road, London, N.E.**

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*Pamphlets giving*

CLEAR and CONCISE INSTRUCTIONS

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Is the OLDEST preparation for producing Negatives by Iron Development, and it has BY FAR THE LARGEST SALE—purely the result of its surpassing excellence.

**COLLODIONS**  
For Negatives  
For Positives  
For Photo-Lithography  
For Copying, &c.

Wch. Quarts, 5/- per pint. Single  
Bottles : Pints, 3/8; Half-pints, 3/8;  
5-oz. Bottle, 2/6; 4-oz. ditto, 2/-;  
2-oz. ditto, 1/-.

ALSO

**ENAMEL COLLODION.**

Wch. Quarts, 10/6; Pints, 3/-; Half-  
Pints, 1/9; and in 1/- Bottles.



[See page 500, and alternate pages from 1223 to 1257, also cover.]

# THE 'PHŒNIX' DARK-ROOM LAMP.



Fig. 1.

THE 'PHŒNIX' LAMP (fig. 1) is a boon to all Photographers who have gas at their disposal. The lamp is  $11\frac{1}{2}$  ins. high and  $7\frac{1}{2}$  ins. wide, has double casing, which secures a cool exterior, good ventilation, and absence of smell. The front of the lamp is glazed with ruby, and both sides also have ruby glass, but either can be supplied with yellow glass, Canary Medium or Canary Cloth, if preferred.

The chief points of novelty are the special Tap and arrangement of Burners, which enables the operator to use either the jet inside the lantern for non-actinic light or instantly to alter this to an invisible light, and by the same action turn on to full the



Fig. 2.

outside jet, which is then available for lighting the dark-room, or for printing transparencies or bromide prints. By turning the tap to B, both jets are at once reduced to a bye-pass light; at A, white light is obtained; and at C, non-actinic illumination. It is, therefore, easy to ensure instantly either actinic illumination, non-actinic light, or both jets turned to non-luminous lights. In order to ensure the latter, an adjusting screw is fitted to the tap, to enable the outside jet to be adjusted to invisibility for any pressure of gas. If an inverted funnel tube is placed over the lamp chimney with exit tube to pass through the partition of dark-room, the heat as well as the products of combustion are effectually disposed of, and ventilation is secured, as a continual circulation of air passes through the dark-room.

Reduced price, complete, 15/-; post free, 1/- extra.

The 'PHŒNIX' CAMERA (with important improvements, protected August 30th, 1893) is well made, which has swing Movements from the centre. The Back has Reversing Frame, which slides forward to allow of the use of short focus lenses, and has sufficient extension for the use of 15-inch focus lenses.

Price, with 3 Double Dark Slides	...	$\frac{1}{2}$ -plate, £4	...	$\frac{1}{2}$ -plate, £4 10s.	
* Extra if fitted with Aluminium	...	"	7/6	"	10/-.

\* The  $\frac{1}{2}$ -plate Camera fitted with Aluminium only weighs  $2\frac{1}{2}$  lbs.

The 'PHŒNIX' PORTABLE HYDROKINONE DEVELOPER, very suitable for travellers and for general use. Keeps indefinitely. In two tubes, A and B. Fig. 2 actual Pint size.

PRICE— $\frac{1}{2}$ Pint size, 6d.	;	Pint do. 8d.	;	Quart do. 1/-	;	2 Quart do. 1/6.
Postage—	...	1 $\frac{1}{2}$ d.	...	2d.	...	3d.

REYNOLDS & BRANSON,  
14 COMMERCIAL STREET, LEEDS.

# MAWSON & SWAN'S STANDARD Photographic : Varnishes.

## NEGATIVE.

EXTRA HARD. For use WITH  
Heat.

### →: PRICES. ←:

Bottles ... ..	6d. & 1/-
Half-Pints ... ..	1/4
Pints ... ..	2/6
W. Quarts ... ..	9/-
2 Gallon Tins ... ..	30/-

## VARNISHING NEGATIVES.

For this purpose nothing can be better than MAWSON & SWAN'S EXTRA HARD NEGATIVE.



It is manufactured at our own works, and none but the best materials are employed. It has been largely used by the best Photographers, and has stood the test of time.

[See page 500, and alternate pages from 1223 to 1257, also cover

# SANDS, HUNTER & CO.,

MANUFACTURERS OF

## Photographic Apparatus

TO HER MAJESTY'S GOVERNMENT, THE ADMIRALTY, AND  
COLONIAL DEPARTMENTS.

### SILVER MEDALS AWARDED.

CRYSTAL PALACE, 1884.  
LIVERPOOL, 1885.

INVENTIONS, 1885.  
BRUSSELS, 1888.

PARIS, 1889.

DEALERS IN ALL KINDS OF

### FIRST - CLASS SECOND - HAND APPARATUS.

APPARATUS LENT ON HIRE.

SANDS & HUNTER'S NEGATIVE BOOK, for  
holding Sensitive Dry Plates.

THE 'IMPERIAL' CAMERA, as used by  
Messrs. ELLIOTT & FRY.

THE 'EXHIBITION' CAMERA, as used all over  
the World.

THE 'HONDURAS' EXHIBITION CAMERA,  
The cheapest Camera to be bought. Specially  
useful to Professional Photographers.

OUR NEW 1893 TOURIST CAMERA is  
the lightest and best to be obtained. In two patterns.

No. 1.—In half-plate size, weighs, with 3 double slides, 4lb. 5 oz. Price £6.

No. 2.—Weighs 2ozs. less. Price £4 4s.

Aluminium fittings to No. 1 pattern, 20/- extra. Turntable and three-fold stand, 27/6 extra.

THREE-FOLD BEST QUALITY ASH TRIPOD  
STANDS, metal heads, covered with leather.

The best to be obtained in London. Price for Half-plate size, 16/6,  
equal to those sold by other dealers at 25/-.

FULL CATALOGUE GRATIS AND POST FREE.

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# MATT VARNISH.



Dries rapidly without heat, producing a surface similar to finely ground glass.

Plain glass coated with this Varnish is very useful as a Focussing Screen; and it is most useful for softening the action of light in Printing, and for Strong Retouching.

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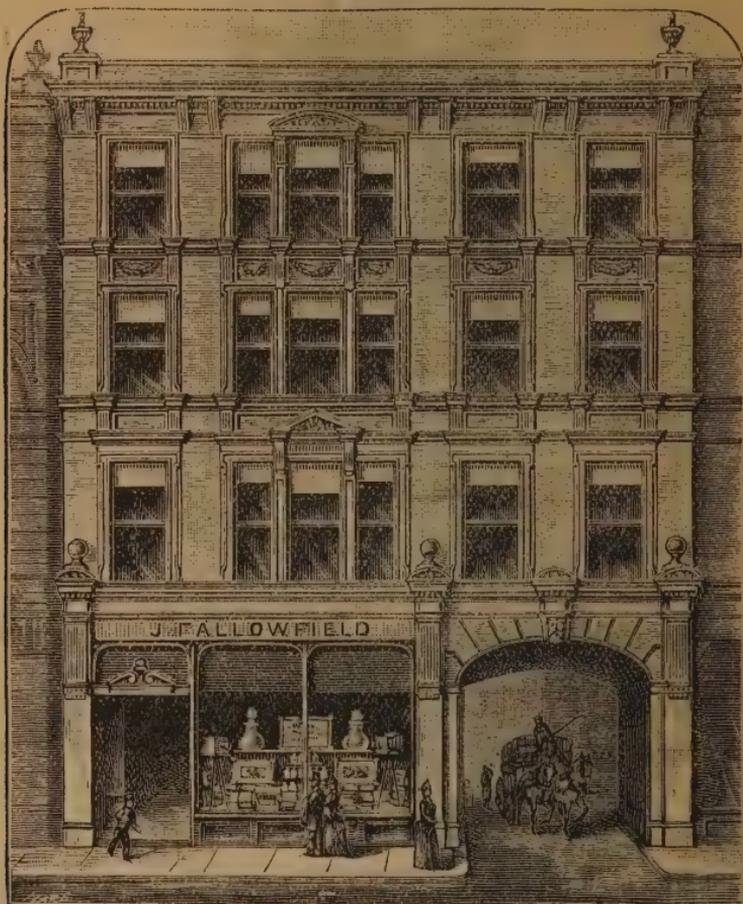


## MAWSON & SWAN, 33 SOHO SQUARE, LONDON.

111 [See page 500, and alternate pages from 1223 to 1257, also cover.]

On Page 398 I told you one thing to do. On this I tell you another:—  
**GET YOUR GOODS** from the Largest Photographic Stock Warehouse of  
 the World. Undeniably holding finest selection extant.

**Fallowfield's Central Photographic Stores,**  
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ONE SHILLING EACH.

**MAWSON & SWAN, 33 SOHO SQUARE, LONDON.**

*[See page 500, and alternate pages from 1223 to 1255, also cover*

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Popular Photographic Publications. —  
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MAKER OF THE

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CARRIERS, DISHES,  
&c.

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THESE are the finest series of Natural Cloud Negatives yet introduced. They are absolutely Permanent and Structureless, and so Transparent that they print *very quickly*, and can be used from *either side* to suit the lighting of the View. Their artistic value is enhanced by retaining all the distant horizon clouds. This series, which already comprises a number of beautiful effects, will be constantly extended, so that fresh Sets may be obtained from time to time. Each Cloud is produced in *all Sizes*, from Cabinet to 15×12. **An entirely New Series now ready.**

PRICES:—6½×4¼, 2/-; 8½×6¾, 3/6; 10×8, 4/6; 12×10, 5/6; 15×12, 7/6 each.

May be obtained from any of the PRINCIPAL DEALERS in PHOTOGRAPHIC MATERIALS, or from the Sole Proprietor and Manufacturer,

W. GREEN, CARBON PRINTING WORKS, BERWICK-ON-TWEED.

**G. W. SECRETAN,**  
ENLARGER, PRINTER, FINISHER,  
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The **SIMPLEST** and **CHEAPEST PROCESS** for the Reproduction of Photographs of any subject.

*Write for Price List and Specimens or call and see it working.*

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**BRIN'S OXYGEN, PURE HYDROGEN,  
AND  
COAL GAS FOR LIMELIGHT.**

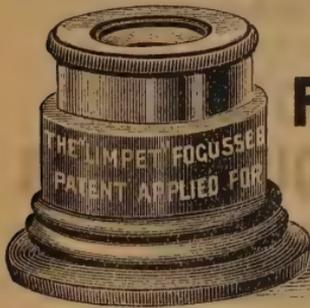
**THE BIRMINGHAM OXYGEN CO., LTD.,  
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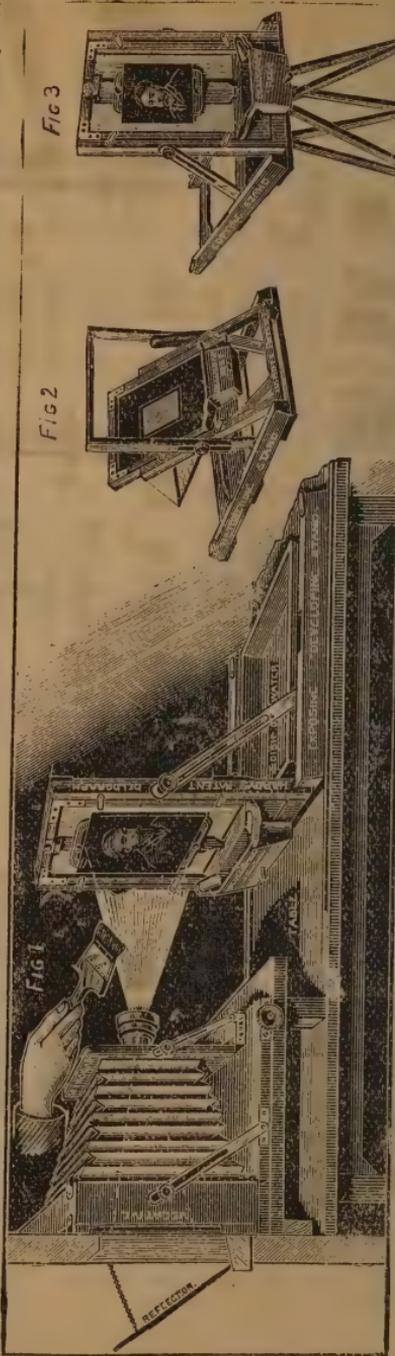
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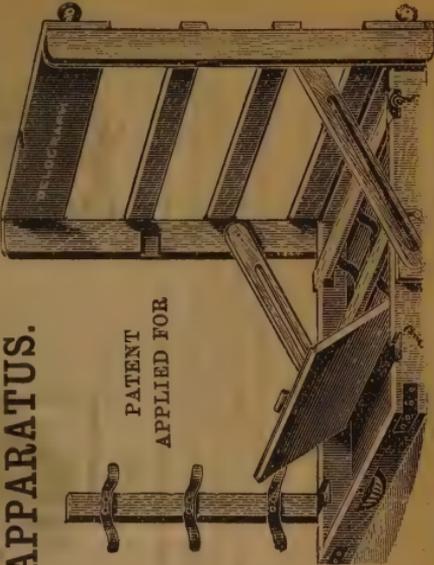


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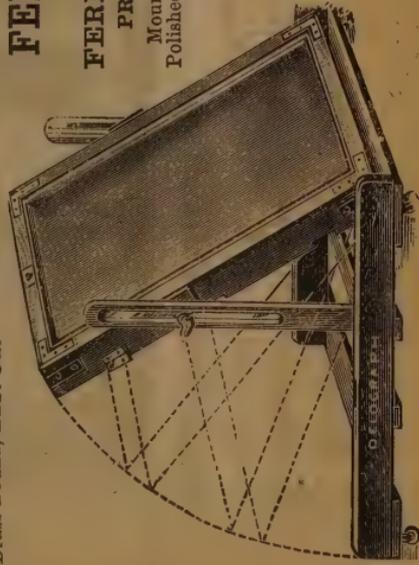


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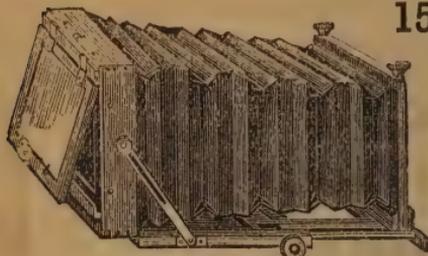
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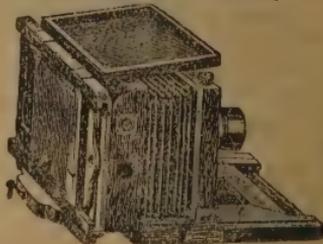
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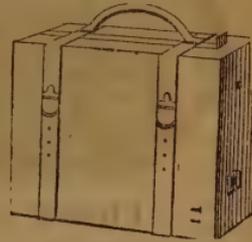


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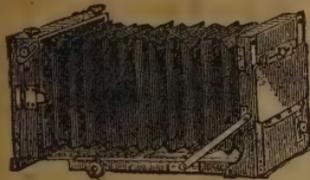
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Double Backs	6 0 0	7 0 0	8 0 0	9 0 0	11 0 0	14 0 0	18 0 0	22 0 0	26 0 0
Rectilinear Lens	2 10 0	3 10 0	4 0 0	4 10 0	6 10 0	8 0 0	10 10 0	14 0 0	20 0 0
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Bag, with Lock	0 12 0	0 16 0	0 18 0	1 0 0	1 5 0	2 0 0	2 10 0	3 10 0	4 10 0
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Double Backs	1 0 0	1 5 0	1 5 0	1 10 0	1 12 0	20 0	2 10 0	3 0 0	3 10 0

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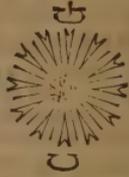


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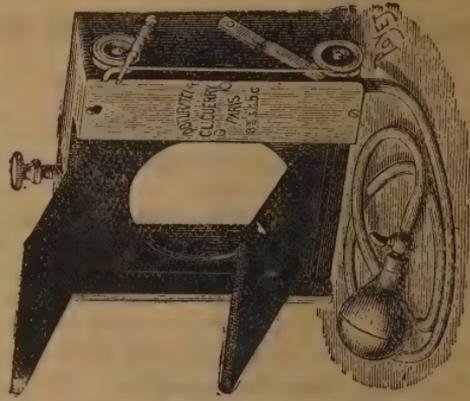
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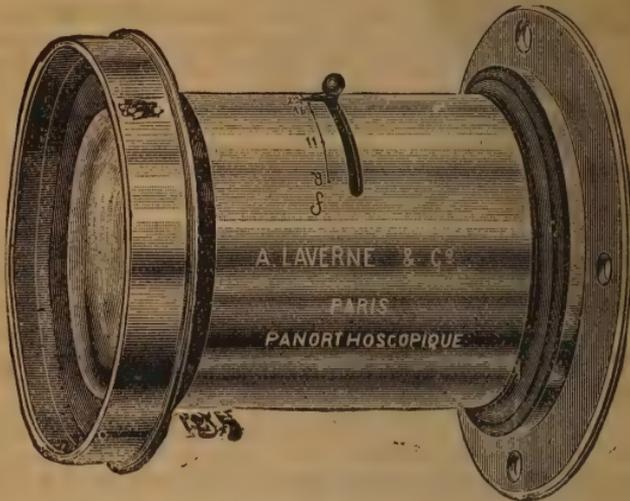
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In brass mounts	£2 17 0	£4 5 0	£5 0 0	£5 14 0	£8 0 0	£12 0 0
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**CLEMENT & GILMER'S Extreme Angle Panoramic, F/16.** Double Combination, embracing from 100 to 110°. Specially recommended for Architectural Subjects, Interiors, and Panoramic Views.

Back Focus	4 $\frac{1}{2}$ -in. 7x5	6-in. 9x7	8-in. 12x10	10-in. 14x11	12-in. 16x12	14-in. 18x14	medium stop.
	£1 12 0	£2 8 0	£3 4 0	£4 0 0	£5 4 0	£6 0 0	



No. 1.

**DETECTIVE LENSES.**

- No. 1. Anastigmatic Orthoscope, F/6, Iris diaph., rack movement, 5 in. equiv.,  $4\frac{1}{4} \times 3\frac{1}{4}$  ... .. £2 5 0  
 " 2. Rapid Rectilinear, F/7, Iris diaph., actioned from hood dial (new), 5 $\frac{1}{2}$  in. equiv. ... .. 2 0 0  
 " 3. Ditto, F/7, Waterhouse diaphragms, 5 $\frac{1}{2}$  in. equiv. 1 7 6  
 " 4. Ditto ditto ditto 6 in. equiv., 5x4 1 16 0  
 " 5. Ditto, 5x4, F/9, Iris diaph., rotating shutter masked setting (new), 6 in. focus... .. 2 12 0  
 " 6. Ditto,  $6\frac{1}{2} \times 4\frac{1}{4}$ , F/9, Iris diaph., rotating shutter masked setting (new), 8 in. focus ... .. 3 5 0

**AUTOMATIC FOCUSSER**, for fixed-focus Hand Cameras,  $\frac{1}{2}$ -pl. and 5x4, 8/-;  $\frac{1}{2}$ -pl., 12/-.  
 'Specially constructed for the above Detective Lenses.'

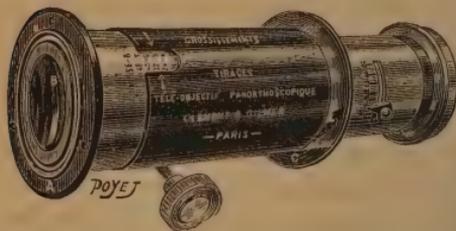
[See preceding and following pages.]

FRANCE.

# 'THE PANORTHOSCOPIC LENS'

Applied to long distance Photography.

**THIS Tele-Objective Panorthoscopic is suited** to all amateur cameras, instantaneous pictures of far distant objects



(often inaccessible) can be made by it, with perfect straight lines, remarkable depth and vigour. By reason of the considerable magnifying powers attained, its utility for military observations, sea views, mountainous scenery, and architectural subjects (in which all defects of perspective is entirely destroyed), will be universally approved of.

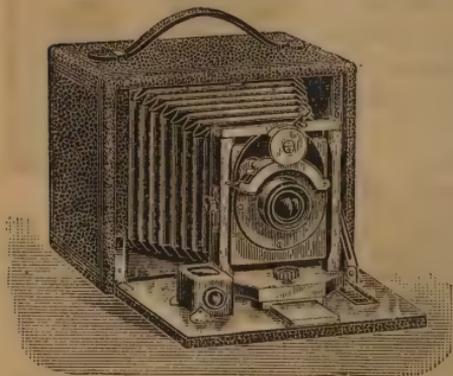
This Tele-photo objective may also be used for portraiture ( $\frac{1}{2}$  life size), modelling splendidly without retouching. The Panorthoscopic Lens may be detached from its amplifier and used as an *extra rapid* rectilinear combination.

This instrument is delivered in a morocco case at following prices:—

	In Brass.	In Aluminium.
For $\frac{1}{4}$ -plate Cameras magnifying from 3 to 8 times ...	£5 4s.	£7 4s.
For $\frac{1}{2}$ -plate Cameras magnifying from 5 to 10 times ...	£6 8s.	£8 16s.

**THE NEW TELE-PHOTO DETECTIVE LENS** magnifying 3 times, working instantaneously with short focus, adaptable to all folding Hand Cameras, or Magazine Cameras with independent shutter. Price, in Brass, £4; in Aluminium, £5 8s.

## THE ULTRA HAND CAMERA



Is set up by two movements ready for taking pictures. To those who are tired and disappointed by the uncertain results obtained by magazine hand cameras, this up to date folding model will give entire satisfaction. It is fitted with focussing screen, 3 double dark slides for plates or cut films, central swing back, our best Rapid Symmetrical Lens and new central shutter for time or instantaneous exposures, also rising front. Is made to screw on stand in either horizontal or vertical position.

The fine leather covering makes it an elegant instrument for either lady or gentleman.

Prices for $4\frac{1}{2} \times 3\frac{1}{4}$ plates	...	...	...	£6 8 0
"    " $6\frac{1}{2} \times 4\frac{3}{4}$ "	...	...	...	8 0 0

[See preceding and following pages.]

FRANCE.

THE WILL BE SUCCESS FOR 1894 IS  
CLEMENT & GILMER'S

'Omega' Hand Camera

PATENT.

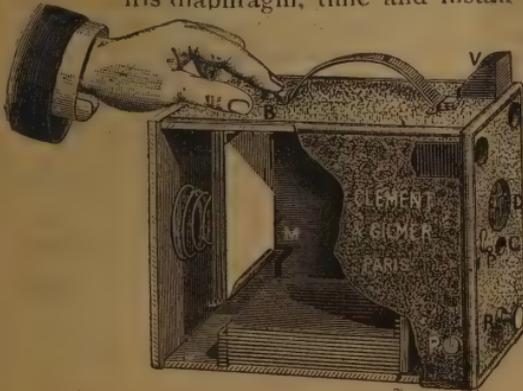


No. 1 carries 12 plates or cut films in sheaths, a rapid lens with rotating stops, time and instantaneous shutter, automatic counter, two finders; is leather covered with handle. ITS UNCONTESTED SUPERIORITY IN THE CHANGING SYSTEM consists in simply pressing the touch button, whereby the whole of the twelve plates are changed

successively in the space of a minute. The exposed plates are held in position by a plate clamp placed in the base. Price £2.

Fitted with patent dovetail sliding catch for instant application to all tripod tops, with two sinking plates, £2 4s.

No. 2. — The same camera as just described, with best rapid rectilinear lens, iris diaphragm, time and instan-



taneous shutter, variable speeds, extra rectangular clear vision finder for use when held at eyesight level, or mounted on a stand. Covered in best morocco, £4. Fitted with patent dovetail sliding catch, with two sinking plates, £4 4s.

[See preceding and following pages

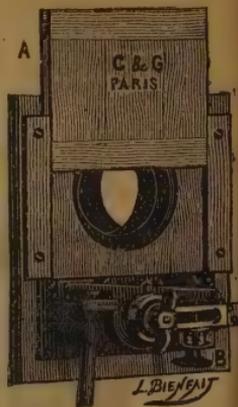
## FRANCE.



## CLEMET & GILMER'S UNIVERSAL ADAPTER.

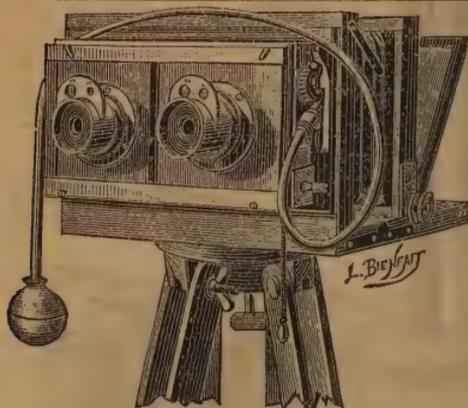
A Mechanical Flange, receiving various sizes of lenses, dispensing with extra fronts to cameras. In five sizes.

No. 1	full aperture	2-in.	in brass ...	16/-	... in aluminium	21/8
" 2	"	2½-in.	"	17/8	"	24/-
" 3	"	2¾-in.	"	22/-	"	29/8
" 4	"	3-in.	"	30/-	"	40/-
" 5	"	4-in.	"	40/-	"	52/-



**CLEGL SHUTTER.**—EXTRA RAPID. For Time and Instantaneous exposures, working at various speeds with pneumatic release. Is to be fixed on front board of camera. Lens to be adapted to sliding front, permits also the use of various lenses by extra fronts.

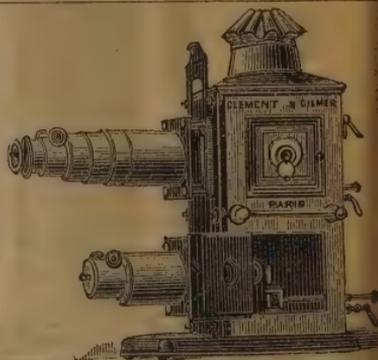
PRICES.— $\frac{1}{2}$ , 28/-;  $\frac{1}{4}$ , 28/-;  $\frac{1}{2}$ , 28/-; 10x8 and 12x10, 32/-



## NEW TOURISTS' STEREOSCOPIC APPARATUS.

The Outfit consists of a Mahogany Camera, Leather Bellows, Rising and Cross Front, with three Slides, Curtain Shutter, time and instantaneous, and mahogany Tripod Stand.

In case, with pair of View Lenses... .. £6 10  
Ditto, Rapid Rectilinear Lenses, Iris Diaphragm. £8 0



## THE AMERICAN STAR BIUNIAL LANTERN.

For Dissolving Views. In polished mahogany, panelled rosewood doors, bright brass telescopic front with rackwork curtain effect, two jets and dissolving tap, 4½-in. condenser and double combination lenses. In case.

New Catalogue of Optical Lanterns, 88 pages, just published, for the trade only, free on demand.

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Telegrams: 'PROGRESS,' PARIS.

[See preceding and following pages.]

FRANCE.

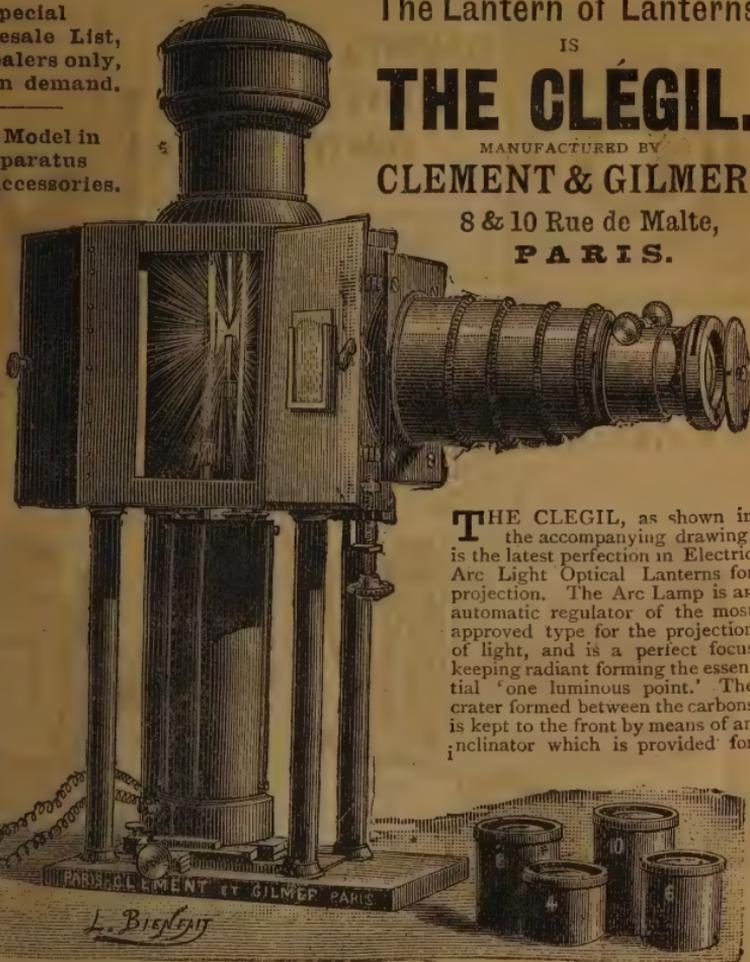
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for Dealers only,  
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Apparatus  
and Accessories.

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IS

**THE CLÉGIL.**

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**CLEMENT & GILMER,**  
8 & 10 Rue de Malte,  
**PARIS.**



Price complete, £30.

**T**HE CLÉGIL, as shown in the accompanying drawing, is the latest perfection in Electric Arc Light Optical Lanterns for projection. The Arc Lamp is an automatic regulator of the most approved type for the projection of light, and is a perfect focus keeping radiant forming the essential 'one luminous point.' The crater formed between the carbons is kept to the front by means of an inclinor which is provided for

this purpose. This lamp requires a continuous current of 7 to 12 ampères at 45 to 50 volts mounted in derivation, and is capable of furnishing from 2000 to 3000 candle power.

The optical parts comprise a 4 1/2 inches meniscus condenser, and four double combination lenses mounted in tubes 4, 6, 8, and 10 inches focus, which may be used simultaneously in the one lens jacket seen at front of lantern.

The 4 inch focus throws a disc 12 feet diameter at 16 feet 4 inches distance.

" 6	"	"	"	"	24	"	6	"	"
" 8	"	"	"	"	32	"	8	"	"
" 10	"	"	"	"	40	"	10	"	"

The telescopic front is of bright brass highly finished. Each draw is fitted with a clamp screw to insure perfect rigidity and horizontality when drawn to different lengths. The whole is detachable from the body of the lantern. A second front is supplied to take the place of the former for scientific demonstration.

*CLEMENT & GILMER's Optical Lanterns. Latest Improvements and large Variety in Russian Iron, Mahogany Single Bi-unials and Tri-unials.*

[See preceding pages.]

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PLAQUES ET PAPIERS  
PHOTOGRAPHIQUES.

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10 fr.	14 fr.	18 fr.	22 fr.	32 fr.	55 fr.	80 fr.	

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Dose pour 1 lit. Développateur séc.	...	...	...	...	...	...	...	...	3 fr.
Le flacon de 125 grammes	...	...	...	...	...	...	...	...	1 fr.
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Pour l'obtention d'épreuves positives par noircissement direct.

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→‡ PARIS. ‡←

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With Instantaneous Spring Shutter and Rotating Diaphragms.

PORTABLE INSTANTANEOUS APPARATUS,  
With Drop or Blind Shutter.

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8 × 9 c/m, or 9 × 12 c/m.

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**THE SYNOSCOPE.****NEW SHORT-FOCUS WIDE-ANGLE RECTILINEAR LENS.**

2½ inches focus covers a 7 × 5 plate; 3 inches focus covers 9 × 7.

Catalogues Free.

**A. GORDE, Optician,****88-90 RUE DE BELLEVILLE, PARIS.**

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Advantages: Regular and adjustable delivery of emulsion; even distribution of emulsion; quick setting; quick coating (50 whole plates per minute); clean automatically-washed backs; perfectly rigid and level setting surface; no waste of emulsion; no ice required for cooling; selection of thick and thin glass unnecessary; easy changing of size. FOR PARTICULARS APPLY TO

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GERMANY -

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RAPID LENS FOR PORTRAITS AND GROUPS IN THE STUDIO.

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PRICES.

NO.	Equiv. focus. Inches.	Largest effective diameter of Lens. Inches.	Size of Plate covered at f/6.3. Inches.	PRICES.		
				Brass Mounts with Waterhouse Diaphragms. Marks.	Iris Diaphragms. Marks.	Alumin. Mounts with Iris Diaphragms. Marks.
1	5½	1¼	2¾ × 3¼	140	155	165
2	6	1¾	3¼ × 4	180	195	205
3	7¾	1½	3¾ × 4¾	220	235	250
4	8¾	2	4¾ × 6	300	320	335
5	10½	2½	5¼ × 7¼	420	440	460
6	12	2¾	5½ × 8½	540	560	580
7	14	3¾	6½ × 8½	680	700	725
8	16¾	3¾	7¼ × 9¾	850	870	895

[See following pages.]

## GERMANY.

**CARL ZEISS, JENA.****SERIES II.—ANASTIGMAT 1:6.3.**

OUTDOOR INSTANTANEOUS LENS FOR SHORTEST POSSIBLE EXPOSURE. (Doublet of 5 Lenses, Field over 80°.)

PRICES.

NO.	Equiv. focus. Inches.	Largest effective diameter of Lens. Inches.	Size of Plate covered at $f/9$ . Inches.	Brass Mounts with		Alumin. Mounts
				Waterhouse Diaphragms. Marks.	Iris Diaphragms. Marks.	with Iris Diaphragms. Marks.
1	3 $\frac{3}{8}$	...	2 $\frac{1}{2}$ × 3 $\frac{1}{2}$	80	95	105
2	4 $\frac{1}{4}$	...	3 $\frac{1}{2}$ × 4	90	105	115
3	5 $\frac{1}{2}$	1	3 $\frac{3}{8}$ × 4 $\frac{7}{8}$	110	125	135
4	6 $\frac{1}{4}$	1 $\frac{1}{4}$	4 $\frac{1}{4}$ × 6	140	155	165
5	8 $\frac{1}{2}$	1 $\frac{1}{2}$	5 $\frac{1}{2}$ × 7 $\frac{1}{2}$	180	195	205
6	10	1 $\frac{3}{4}$	5 $\frac{3}{4}$ × 8 $\frac{1}{2}$	220	235	250
7	12	2	6 $\frac{1}{2}$ × 8 $\frac{3}{4}$	300	320	335
8	14 $\frac{1}{2}$	2 $\frac{1}{2}$	7 $\frac{1}{2}$ × 9 $\frac{3}{4}$	420	440	460
9	17 $\frac{1}{2}$	2 $\frac{3}{4}$	8 $\frac{1}{2}$ × 10 $\frac{3}{4}$	540	560	580
10	20 $\frac{1}{2}$	3	9 $\frac{1}{2}$ × 12	680	700	725
11	23 $\frac{3}{8}$	3 $\frac{1}{2}$	10 $\frac{1}{2}$ × 14	850	870	895

**SERIES IIIa.—ANASTIGMAT. 1:9.**

INSTANTANEOUS OUTDOOR LENS & GROUP LENS.

(Doublet of 5 Lenses, Field over 90°.)

PRICES.

NO.	Equiv. focus. Inches.	Largest effective diameter of Lens. Inches.	Size of Plate covered at $f/12.5-1/18$ . Inches.	Brass Mounts with		Alumin. Mounts
				Revolving Diaphragms. Marks.	Iris Diaphragms. Marks.	with Iris Diaphragms. Marks.
1	4 $\frac{1}{2}$	...	3 $\frac{1}{2}$ × 4 $\frac{1}{2}$	80	—	—
2	6	...	4 $\frac{1}{2}$ × 6	90	—	—
3	6 $\frac{7}{8}$	...	5 $\frac{1}{4}$ × 7 $\frac{1}{4}$	105	120	130
4	7 $\frac{1}{2}$	1	5 $\frac{1}{2}$ × 8 $\frac{1}{2}$	120	135	145
5	9 $\frac{1}{4}$	1 $\frac{1}{4}$	6 $\frac{1}{4}$ × 8 $\frac{3}{4}$	150	165	175
6	10 $\frac{1}{2}$	1 $\frac{1}{2}$	7 $\frac{1}{4}$ × 9 $\frac{1}{4}$	180	195	205
7	12 $\frac{1}{2}$	1 $\frac{3}{4}$	8 $\frac{1}{4}$ × 10 $\frac{1}{4}$	240	255	270
8	16 $\frac{3}{8}$	2	9 $\frac{3}{8}$ × 12	350	370	385
9	20 $\frac{1}{4}$	2 $\frac{1}{4}$	10 $\frac{1}{4}$ × 13 $\frac{3}{8}$	450	470	490
10	24	2 $\frac{3}{4}$	12 × 16	600	620	640
11	27 $\frac{3}{8}$	3	13 $\frac{3}{8}$ × 18	750	770	795
12	65	3 $\frac{1}{2}$	16 × 20	900	920	945

**SERIES III.—ANASTIGMAT. 1:7.2.**

RAPID LENS. (Doublet of 5 lenses. Field over 80°.)

PRICES.

NO.	Equiv. focus. Inches.	Largest effective diameter of Lens. Inches.	Size of Plate covered at $f/12.5$ . Inches.	With		Alumin. Mounts
				Waterhouse Diaphragms. Marks.	With Iris Diaphragms. Marks.	with Iris Diaphragms. Marks.
1	3 $\frac{3}{8}$	...	3 $\frac{1}{4}$ × 4	70	85	105
2	4 $\frac{1}{4}$	...	3 $\frac{1}{2}$ × 4 $\frac{1}{2}$	80	95	115
3	5 $\frac{1}{4}$ <sup>3/8</sup>	1	4 $\frac{1}{4}$ × 5 $\frac{1}{4}$	90	105	125
4	7 $\frac{1}{8}$	1 $\frac{1}{4}$	5 $\frac{1}{4}$ × 7	120	135	160
5	8 $\frac{3}{8}$	1 $\frac{1}{2}$	5 $\frac{1}{2}$ × 8 $\frac{1}{2}$	150	165	190
6	9 $\frac{1}{4}$	1 $\frac{3}{4}$	6 $\frac{1}{4}$ × 8 $\frac{1}{4}$	180	195	225
7	12 $\frac{1}{8}$	2	7 × 9 $\frac{1}{2}$	240	260	300
8	17 $\frac{3}{8}$	2 $\frac{1}{4}$	9 $\frac{1}{4}$ × 11 $\frac{1}{4}$	380	400	450
9	23	3 $\frac{1}{4}$	11 $\frac{1}{4}$ × 15 $\frac{1}{4}$	540	—	590

Waterhouse Diaphragm

[See preceding and following pages.]

GERMANY.

**CARL ZEISS, JENA.**

**SERIES IV.—ANASTIGMAT. 1:12.5.**

**RAPID WIDE-ANGLE AND COPYING LENS.**

(Doublet of 4 Lenses. Field of 100° and 85° respectively.)

NO.	Equivalent focus. Inches.	Largest effective Diameter of Lens. Inches.	Size of Plate covered at f/18—f/25. Inches.	PRICES.		
				Marks.	With Iris Diaphragms. Marks.	Aluminium Mounts. Marks.
1 ...	2 $\frac{7}{8}$ ...	1 ...	3 $\frac{1}{2}$ × 4 ...	64 ...	— ...	— ...
2 ...	3 $\frac{1}{2}$ ...	1 ...	3 $\frac{1}{2}$ × 4 $\frac{3}{4}$ ...	64 ...	— ...	— ...
3 ...	4 $\frac{1}{2}$ ...	1 ...	4 $\frac{1}{2}$ × 5 $\frac{3}{4}$ ...	64 ...	— ...	— ...
4 ...	6 $\frac{1}{8}$ ...	1 ...	5 $\frac{1}{2}$ × 8 $\frac{1}{2}$ ...	80 ...	— ...	— ...
5 ...	7 $\frac{1}{4}$ ...	1 ...	7 × 9 $\frac{1}{2}$ ...	100 ...	115 ...	— ...
6 ...	10 $\frac{1}{4}$ ...	1 ...	9 $\frac{1}{2}$ × 11 $\frac{1}{2}$ ...	150 ...	165 ...	— ...
With Stop f/36						
7 ...	15 $\frac{1}{2}$ ...	1 $\frac{5}{8}$ ...	11 $\frac{1}{2}$ × 15 $\frac{1}{2}$ ...	200 ...	215 ...	— ...
8 ...	23 $\frac{1}{2}$ ...	2 ...	15 $\frac{1}{2}$ × 19 $\frac{1}{2}$ ...	350 ...	370 ...	— ...
9 ...	35 $\frac{1}{2}$ ...	3 ...	19 $\frac{1}{2}$ × 23 $\frac{1}{2}$ ...	800 ...	— ...	Waterhouse Diaphragms
10 ...	48 $\frac{1}{2}$ ...	3 $\frac{3}{4}$ ...	23 $\frac{1}{2}$ × 29 $\frac{1}{2}$ ...	1800 ...	— ...	Diaphragms

**SERIES V.—ANASTIGMAT. 1:18.**

**WIDE-ANGLE LENS AND COPYING LENS.**

(Doublet of 4 Lenses. Field at 105° and 90° respectively.)

NO.	Equivalent focus. Inches.	Largest effective Diameter of Lens. Inches.	Size of Plate covered at f/36. Inches.	PRICES.		
				Marks.	With Iris Diaphragms. Marks.	Aluminium Mounts. Marks.
1 ...	3 $\frac{3}{8}$ ...	1 ...	4 $\frac{1}{2}$ × 5 $\frac{1}{2}$ ...	64 ...	— ...	— ...
2 ...	4 $\frac{1}{2}$ ...	1 ...	5 $\frac{1}{2}$ × 7 $\frac{1}{2}$ ...	64 ...	— ...	— ...
3 ...	5 $\frac{1}{2}$ ...	1 ...	6 $\frac{1}{2}$ × 8 $\frac{1}{2}$ ...	80 ...	— ...	— ...
4 ...	7 $\frac{3}{8}$ ...	1 ...	7 $\frac{1}{2}$ × 10 $\frac{1}{2}$ ...	100 ...	— ...	— ...
5 ...	8 $\frac{1}{2}$ ...	1 ...	9 $\frac{1}{2}$ × 11 $\frac{1}{2}$ ...	120 ...	135 ...	— ...
6 ...	10 $\frac{1}{2}$ ...	1 ...	10 $\frac{1}{2}$ × 13 $\frac{1}{2}$ ...	150 ...	165 ...	— ...
7 ...	12 $\frac{1}{2}$ ...	1 ...	11 $\frac{1}{2}$ × 15 $\frac{1}{2}$ ...	180 ...	195 ...	— ...
Reproduct. of charts						
8 ...	18 $\frac{1}{2}$ ...	1 ...	11 $\frac{1}{2}$ × 15 $\frac{1}{2}$ ...	240 ...	255 ...	— ...
9 ...	24 $\frac{1}{2}$ ...	1 $\frac{1}{2}$ ...	15 $\frac{1}{2}$ × 19 $\frac{1}{2}$ ...	350 ...	365 ...	— ...
10 ...	37 $\frac{1}{2}$ ...	2 $\frac{1}{2}$ ...	19 $\frac{1}{2}$ × 25 $\frac{1}{2}$ ...	700 ...	— ...	— ...
11 ...	51 $\frac{1}{2}$ ...	3 ...	27 $\frac{1}{2}$ × 34 ...	1200 ...	— ...	Waterhouse Diaphragms
12 ...	65 $\frac{1}{2}$ ...	4 ...	35 $\frac{1}{2}$ × 43 $\frac{1}{2}$ ...	2000 ...	— ...	Diaphragms

**CARL ZEISS,**

OPTISCHE WERKSTÄTTE,

— JENA. —

[See preceding pages.]

GERMANY.

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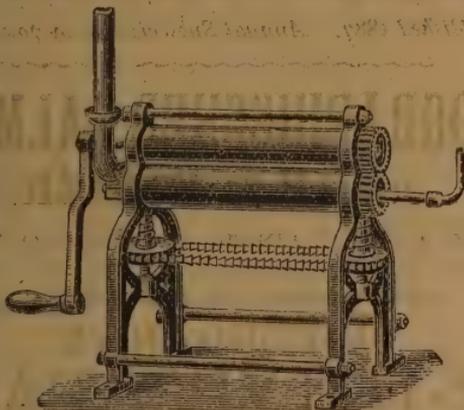
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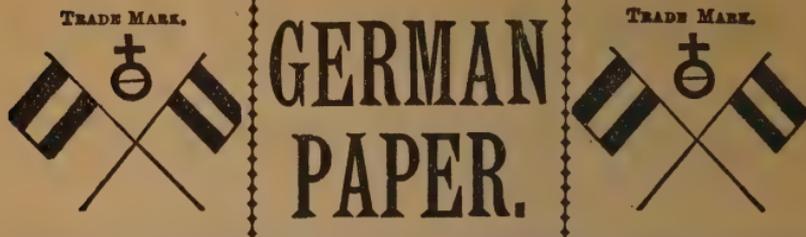
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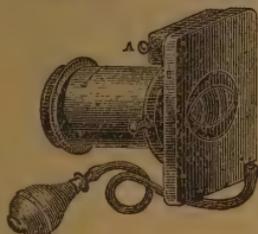
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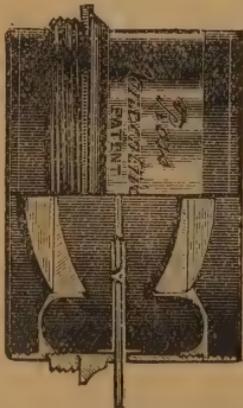
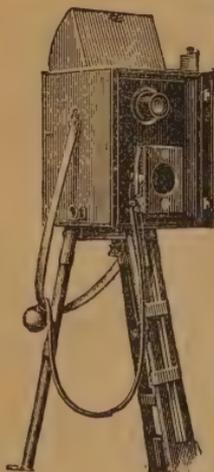
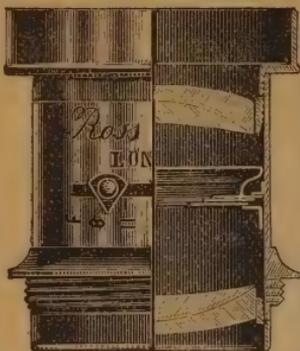
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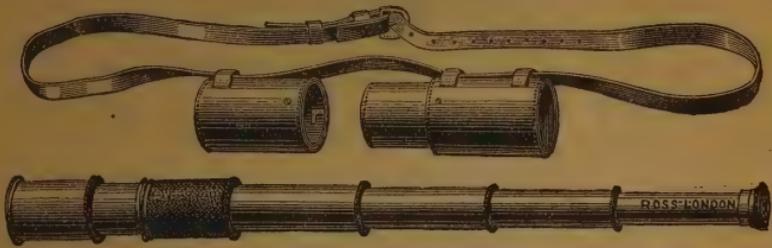
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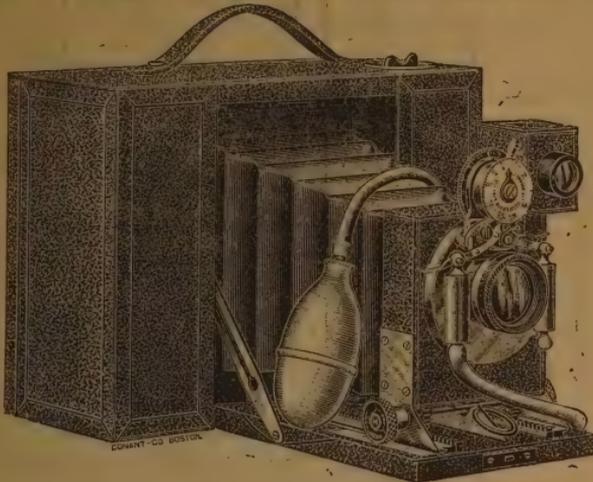
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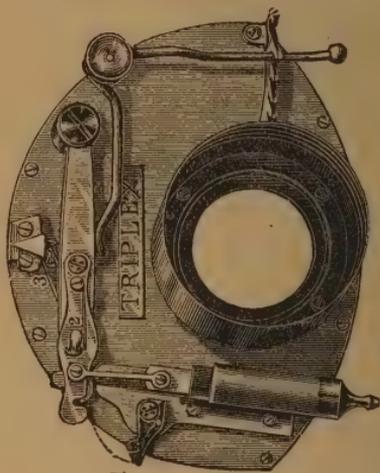
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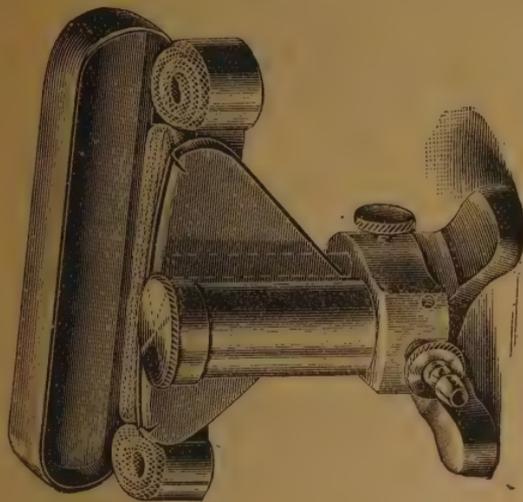
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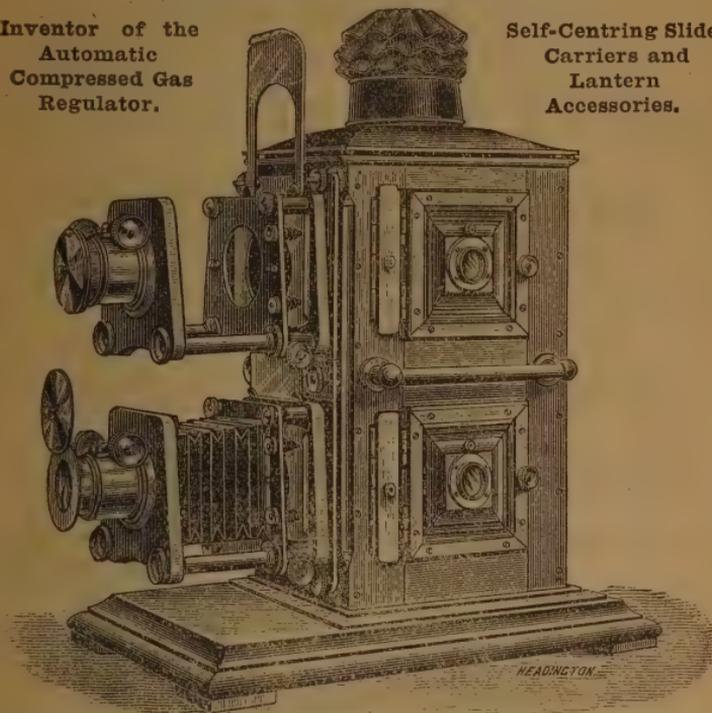
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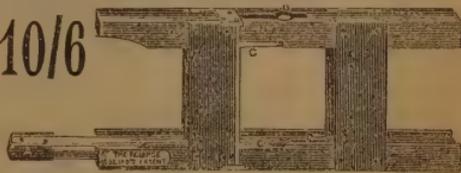


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	$\frac{1}{4}$	$\frac{1}{2}$	1/1	10x8	12x10	15x12	18x14
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Extra Rapid Euryscope F6, Waterhouse Stops } 31 6...45 0...70 0...120 0...170 0... — ... —							
Iris ... 42 0...55 0...82 0...135 0...185 0... — ... —							
Rapid Euryscope Waterhouse Stops, F8, ... } 31 6.. 37 6...63 0... 75 0... 95 0...115 0...150 0							
Iris ... 40 0...50 0...80 0... 90 0...170 0...135 0...190 0							
Rapid Rect., Waterhouse Stops, F8 } 20 0...25 0...35 0... 50 0... 65 0... 95 0...135 0							
Iris ... 25 0...30 0...40 0... 55 0... 75 0...110 0...155 0							
2nd Quality, Waterhouse Stops, F8 } 12 6...17 6...25 0... 40 0... 50 0 Iris, 5s. extra.							
Wide Angle, Rotating Stops.—							
1st Quality, F 11 31 6...37 6...63 0... 75 0... 95 0...115 0...150 0							
2nd Quality ... 23 6...30 0...50 0... 65 0 — — —							

.....

Detective Doublet, Medium Angle, F 14, 5s. 6d.

Special Rapid Detective Euryscope, F 6, 3½, 4½, 5, 6 or 7-inch Focus, 42s. to 63s. for ¼ plate to 8x6.

~~~~~

7x5 Tele Photo Lens, 3 to 8 Times Enlargement,  
100s.

.....

S. BEVERLEY,  
92 CHURCH ST., BLACKPOOL.

# CHADWICK.

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DEAR READER,

It would be impossible to illustrate or even to enumerate the whole of my Specialities in a single advertisement. The more space I occupy in these pages the more I have to pay, and the cost of advertising must come out of profit somehow. If I did not advertise at all I should have fewer customers, and by the same argument, to advertise more I ought to do a bigger trade, and consequently be able to exist on less profit. Yes; but my Specialities are neither Soap nor Dry Plates; everybody uses soap, and nearly every reader of this Annual uses Dry Plates, but they are not always wanting Cameras or Lanterns, &c., and as my Photographic and Lantern Apparatus are Special Lines, which the public is not yet educated up to, there is a limit to the extent to which advertising may be successful. My ambition has not been to run the biggest trade, but to hold the highest reputation for the goods I supply. In Stereoscopic Apparatus I have succeeded in both gaining the highest reputation, and doing the largest trade—one brought the other.

It is quite true that I have many imitators, both in Photographic and Lantern Apparatus, but as a rule these pirates are more commercial than practical, and it is not difficult for me to keep ahead of them.

I offer for sale nothing that I have not personally tested or used in my own practice. I claim to have as much enthusiasm in Photographic, Lantern, and Microscopic matters as any reader of these pages, amateur or professional, and the best of everything is not too good for me; anything not the best is practically useless to me, especially since I discovered (a long time ago) that the best is not necessarily the most expensive.

And now, having arrived at nearly the end of my advertising space, I conclude by inviting you to send for my pamphlets and price lists. You will find they differ from ordinary trade catalogues.

We have two Series, one on Photographic, the other on Lantern and Optical Projection matters, so please say which you require. Of course we shall be glad to send both sets if you promise to read them, notwithstanding that they cost, out of pocket, about **6d.** or **9d.** for printing and **3d.** postage.

---

**W. I. CHADWICK, 2 St. Mary's Street, MANCHESTER.**



PHARMACEUTICAL, PHOTOGRAPHIC, AND  
TECHNICAL CHEMISTS.

Always the Best House for the Best Chemicals.

IMITATED BY NUMBERS, EQUALLED BY NONE.

## HINTO-KINONE,

The first, best, and only reliable  
CONCENTRATED DEVELOPER

For Negatives, either Plates or Films, Lantern Slides and  
Transparencies, Opals or Bromide Papers.

KNOWN AND USED ALL OVER THE WORLD.

HINTO-KINONE is generally acknowledged to be unequalled.

HINTO-KINONE has fairly beaten every other developer offered  
for sale without exception.

HINTO-KINONE has won the confidence of its clients by the work  
it has done and is doing.

HINTO-KINONE has proved for nearly six years that its virtues  
remain unimpaired by time or climate, either tropical or arctic.

HINTO-KINONE has never required apologies or explanation to be  
formulated for disappointments and failures, because none have ever been  
charged and substantiated against it.

HINTO-KINONE does not require the assistance of some other  
developer to enable sufficient density of image to be obtained.

HINTO-KINONE never creates sores and skin disease upon the hands.

HINTO-KINONE always produces the most pleasing tones for  
Lantern Slides and Decorative Transparencies.

HINTO-KINONE is annually increasing its sales by leaps and  
bounds.

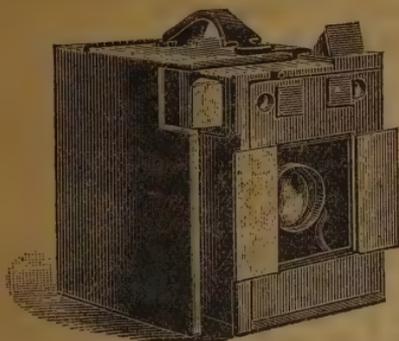
HINTO-KINONE is NOT 'Made in Germany,' but at 38 Bedford  
Street, Strand, W.C.

HINTO-KINONE is sold at  $\frac{2}{3}$  and  $\frac{4}{3}$ ; packed and posted  
inland,  $\frac{3}{-}$  and  $\frac{5}{3}$ . For export, in zinc-lined cases of one dozen  
bottles, at  $\frac{28}{6}$  and  $\frac{54}{-}$ .

# HINTON'S CAMERAS

Still maintain the reputation of satisfying buyers, with the best value, as serviceable and well-made Apparatus, in the market.

## HINTON'S HALF-PLATE COMBINED HAND AND STAND CAMERA,



with three double backs, long and short focus aluminium lenses, focusing screen and magnifier, aluminium blind shutter for snap and adjustable time exposure, is the finest instrument of its class in the world.

Price ... .. £20

Dimensions " " " " " " 9 x 9½ x 6  
Weight " " " " " " 6 pounds.

HINTON'S QUARTER-PLATE HAND & STAND CAMERA, for 12 plates or films, is the smallest, lightest, and simplest in the world. Covered neatly in morocco leather, with selected single first-class lens and



time and instantaneous shutter, £3; or with selected R.R. lens, adjustable shutter, and additional focus changing arrangement for portraits and groups, price, complete, £5 10s. Dimensions, 8½ x 6½ x 4. Weight, 2lbs. 13ozs

Many other forms of valuable Apparatus and Lenses, both new and secondhand, may be seen and purchased at HINTON'S.

# HINTON'S PLATES,

## MATT BACK GROUND GLASS,

Oppose halation and offer the Operator the most effective foundation for the production of temporary or permanent Retouching effects, the introduction of clouds, blocking out, or other operations with pencil, brush, or stump. Very fine, clean, and choice Plates. 1894 Series.

### PRICE LIST.

| Per dozen      | $\frac{1}{2}$ | $5 \times 4$ | $6\frac{1}{2} \times 3\frac{1}{2}$ | $\frac{1}{3}$ | $7\frac{1}{2} \times 5$ | $\frac{1}{4}$ | $10 \times 8$ | $12 \times 10$ | $15 \times 12$ |
|----------------|---------------|--------------|------------------------------------|---------------|-------------------------|---------------|---------------|----------------|----------------|
| Ordinary ...   | 2/-           | 3/6          | 4/6                                | 5/-           | 6/6                     | 8/6           | 14/-          | 20/-           | 36/-           |
| Extra Rapid... | 2/6           | 4/6          | 5/6                                | 6/-           | 8/6                     | 11/-          | 17/6          | 27/-           | 44/-           |

# HINTON'S FILMS.

### PRICES per dozen.

|                                        |      |                                        |      |
|----------------------------------------|------|----------------------------------------|------|
| $4\frac{1}{4} \times 3\frac{1}{4}$ ... | 1/9  | $7\frac{1}{2} \times 5$ ...            | 6/-  |
| $5 \times 4$ ...                       | 3/-  | $8\frac{1}{2} \times 6\frac{1}{2}$ ... | 7/6  |
| $6\frac{1}{2} \times 4\frac{3}{4}$ ... | 4/-  | $10 \times 8$ ...                      | 12/6 |
| $12 \times 10$ ...                     | 18/- |                                        |      |

Extra Thick and Stiff Films, more convenient for the larger sizes.

|                                        |      |                                        |      |
|----------------------------------------|------|----------------------------------------|------|
| $6\frac{1}{2} \times 4\frac{3}{4}$ ... | 8/-  | $8\frac{1}{2} \times 6\frac{1}{2}$ ... | 14/- |
| $7\frac{1}{2} \times 5$ ...            | 12/- | $10 \times 8$ ...                      | 20/- |
| $12 \times 10$ ...                     | 30/- |                                        |      |

# HINTOTYPE PAPER.

In the manufacture of this Paper HINTON & CO. have attempted with entire success to produce, not a cheap and inferior imitation of a good paper (an object more calculated to degrade than to elevate results), but an improvement upon it. The ease with which cleanliness of prints, brilliancy, and agreeable tones are obtained by the use of this absolutely perfect paper, have attached to it numbers of the best workers, and beginners invariably produce better work with it than with any other.

### PRICES per Dozen.

|               |              |              |               |                         |               |               |                |                |              |
|---------------|--------------|--------------|---------------|-------------------------|---------------|---------------|----------------|----------------|--------------|
| $\frac{1}{2}$ | $5 \times 4$ | $6 \times 4$ | $\frac{1}{3}$ | $7\frac{1}{2} \times 5$ | $\frac{1}{4}$ | $10 \times 8$ | $12 \times 10$ | $15 \times 12$ | Full sheets. |
| 1/9           | 1/-          | 1/3          | 1/6           | 1/9                     | 2/9           | 4/-           | 6/-            | 9/-            | 17/6         |

Send for one of Hinton's Photographic Priced Paper Lists, and choose from the BEST and choicest Papers in the market,

# HINTON'S STANDARD SOLUTIONS

HAVE TAKEN and MAINTAINED THE LEAD FOR YEARS,  
All attempts at imitation having resulted in disastrous failures.



**HINTO-KINONE DEVELOPER.**— Concentrated, effective, reliable, unchangeable. Ever ready, never failing. Known and used all over the world. In one solution,  $2/3$  and  $4/3$ ; if packing and inland postage are included,  $3/-$  and  $5/3$ , with leaflet of instructions enclosed.

**BI-QUINOL.**—The same Developer in two solutions,  $3/-$  and  $5/-$ ; if packing and inland postage included,  $3/9$  and  $6/3$ .

**HINTO-PYROGALLOL.**—A perfectly reliable ten per cent Pyro Developer. Keeps its condition for years. With three accurately calculated and reliable formulæ for use with either Ammonia, Potash, or Soda, in ten per cent solutions, attached to each bottle,  $2/-$ ; if packing and inland postage are included,  $3/-$ .

**HINTON'S COMBINED TONING AND FIXING BATH** still commands the largest sale of any, notwithstanding the desperate endeavours to exploit cheap imitations. Price  $2/6$  and  $4/6$ ; if packed and posted inland,  $3/9$  and  $6/-$ .

**HINTON'S ARISTO-PASTE**, the first and best cold mountant.  
**HINTON'S VARNISHES**, a great variety. Retouching Medium, Encaustic Paste, Hintopaque, and many other useful, effective, and reliable preparations.

Send for a Price List of Photographic Preparations.

**NOTE.**—All Hinton's Solutions not of the nature of Varnishes are sold in glass-stoppered bottles only.

They may be obtained from—

LONDON.—CITY: HUGHES & SON, OPTICIANS, 59 FENCHURCH STREET; FALLOWFIELD, 146 CHARING CROSS ROAD.

LIVERPOOL.—ATKINSON, 37 MANCHESTER STREET.

EDINBURGH.—HADDON, OPTICIAN, MAITLAND STREET.

BRADFORD.—WALKER & CO.

WINDSOR and ETON—G. P. CARTLAND.

EASTBOURNE.—COX, OPTICIAN; BROWN, CHEMIST.

AND AT THE MANUFACTORY—

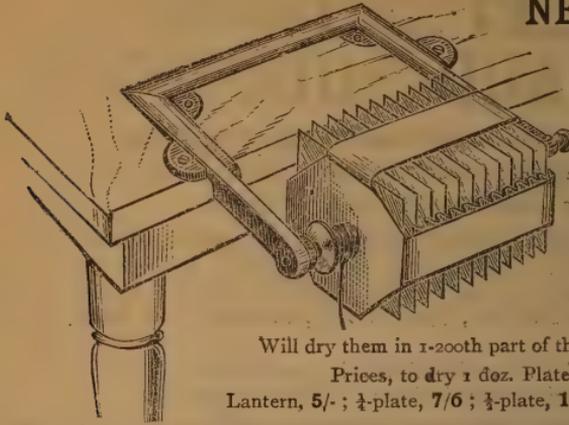
## HINTON & CO.

38 Bedford St., Strand, London, W.C.

**PUMPHREY'S NOVELTIES, 1894.**

**NEW PATENT MACHINE**

**For Drying Photographic Plates.**



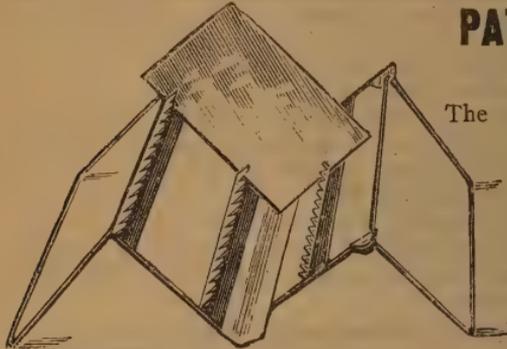
Enables the operator to pack up his plates a few minutes after washing them. Simple in construction, easily fixed or removed, and so moderate in price as to be available to everyone.

Will dry them in 1-200th part of the usual time.

Prices, to dry 1 doz. Plates at a time:

Lantern, 5/-;  $\frac{1}{4}$ -plate, 7/6;  $\frac{1}{2}$ -plate, 15/-; whole-plate, 25/-

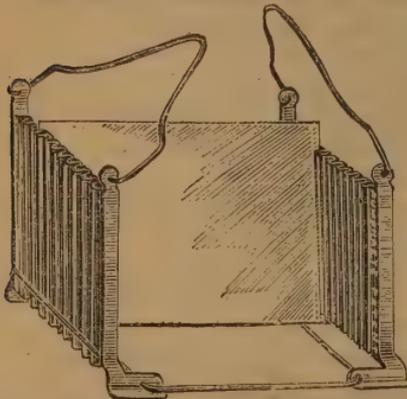
**PATENT DRAINING RACK.**



The part A is arranged for a strip of blotting paper that hastens the process of drying greatly; it folds into very little space. Price 1s. each.

Suggestions for required and generally useful apparatus worked out for mutual benefit or at an agreed charge.

**PATENT REVERSIBLE RACK.**



|                           |     |
|---------------------------|-----|
| 1 to $\frac{1}{2}$ ... .. | 2/- |
| 1 to 5 x 4 ... ..         | 2/6 |
| 1 to $\frac{1}{4}$ ... .. | 3/- |
| 1 to 8 x 10 ... ..        | 4/- |
| 8 x 10 to 10 x 12 ... ..  | 6/- |

Wholesale of all Dealers or of Patentee, 132 Angelina Street, Birmingham.

Fold into smaller space than any other Racks.

Same Rack in use for Larger Size.

Patent Reversible Racks, Patent Drainers Tank, Plate Boxes, Ruby Lamps, Squeegees, Changing Bags, Printing Frames, Lifters, &c., &c.

Illustrated Lists on Application. Goods forwarded free by post or otherwise on receipt of remittance.

**J. PUMPHREY, 132 Angelina Street, Birmingham, England.**

THE  
PHOTOGRAPHER'S  
COMPANION.

BEING A COLLECTION OF  
HINTS, EXPEDIENTS, AND FORMULÆ,  
SYSTEMATICALLY ARRANGED AS  
A SUPPLEMENTARY REFERENCE BOOK FOR USE IN  
THE STUDIO AND DARK-ROOM,

By EDWARD DUNMORE.

Price 1s. Cloth, 1s. 6d.

HENRY GREENWOOD & CO., PUBLISHERS,  
2 York Street, Covent Garden, London.

*And may be obtained from ALL Photographic Dealers and Booksellers throughout the World.*

Estab. 1854.] PUBLISHED EVERY FRIDAY. [Price Twopence.

THE  
**British Journal of Photography.**

**THE BRITISH JOURNAL OF PHOTOGRAPHY** is the Leading Photographic Journal, and the oldest in existence. It is extensively circulated amongst all classes of Amateur and Professional Photographers throughout the world. The immense number of advertisements it secures (large and small) is the best evidence of its value, and a striking testimonial to its remarkable influence.

**THE BRITISH JOURNAL OF PHOTOGRAPHY** is recognised as the authority upon all matters of Photographic Technique, and is admitted to contain the earliest and most reliable news of new discoveries, inventions, and advances. It has a large staff of representative writers, who discuss all phases and departments of Photography in an able, clear, and exhaustive manner.

**THE BRITISH JOURNAL OF PHOTOGRAPHY** always contains something to interest the man of Science, the Amateur, the Professional, the Dealer, the Manufacturer, the Beginner, the Veteran, the Artist—and thus its readers being drawn from all classes interested in Photography, the value of its announcement pages for the purposes of advertising is correspondingly great.

For Advertisement and Subscription Scale of Charges, see pages 1033 & 1293

HENRY GREENWOOD & CO., PUBLISHERS,  
2 York Street, Covent Garden, London.

To whom all Advertisements and General Business Communications should be addressed.

# WYNNE'S

## INFALLIBLE EXPOSURE METER

has during the past season proved an unqualified success, having reduced the question of Exposure from complexity to simplicity and absolute certainty. The correct exposure required for every speed of plate on every kind of Subject and under every condition of light is shown simultaneously against each of the 27 graduated diaphragms by simply setting the Actinometer time on exposure scale against the speed number of the plate used. Compare this simple rule with the complicated directions for other instruments.



The Meter has been very greatly improved, remodelled, and simplified, and now appears complete with Actinometer in the form of a watch.

The scales have been reduced to two, against three in the original form, and four to six in other forms of Meters.

The instruments (the cases of which are of best Nickel and Solid Silver) are beautifully finished, and may be worn instead of, or in addition to, the ordinary watch.

The Actinometer and the Sensitive Paper have also been greatly improved, the latter being now entirely unaffected by damp. It is so sensitive that it will colour to the standard tint in 3 seconds in diffused light in Summer.

The simplicity of the instrument is not obtained by ignoring any of the factors of Exposure, but by the scales being so designed that each of them represents in itself two or three of these factors. Thus, the Scale of Diaphragms represents, firstly, The Scale of Diaphragms; secondly, The Speed of Plate; and thirdly, the Variation of Exposure due to Subject; while the Time Scale represents the Actinometer Time and also the Exposure in seconds or minutes.

The Scales are also so divided and arranged that when they are set correctly for one Diaphragm they are simultaneously set correctly for every Diaphragm, from the largest to the smallest.

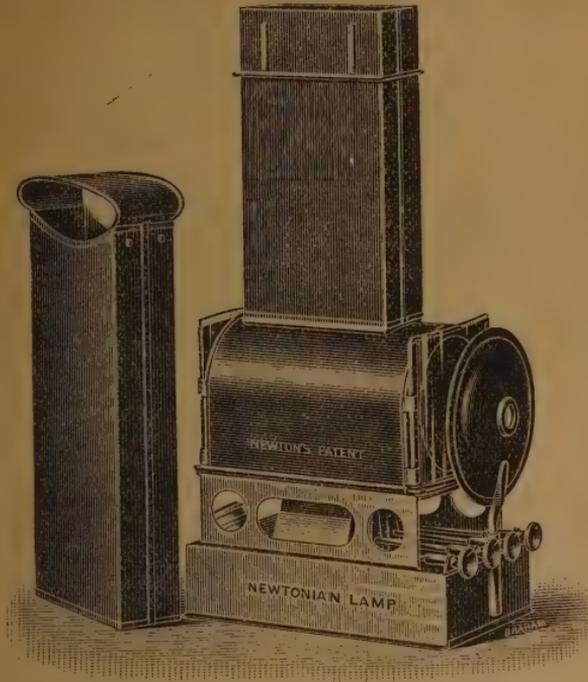
The system of Plate Speed Numbers, the design and arrangement of Scales, the improved form of Actinometer, and of the instrument generally, are protected by the Copyright and Patent Laws, and the advantages arising therefrom are not, and cannot, be shared by any other system.

Can be had on Trial and cash returned if not approved.

For Prices see advertisements in issues of the Photographic Papers; and for full particulars apply to the

**INFALLIBLE EXPOSURE METER COMPANY, WREXHAM.**

THE NEW PATENT  
'NEWTONIAN' LAMP,  
For Enlarging and Magic Lanterns.

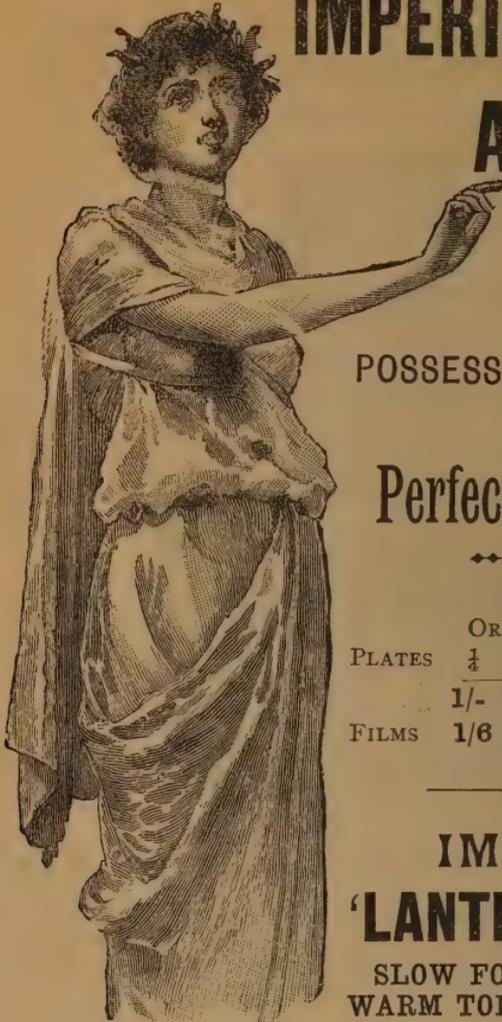


More Brilliant than any other Lamp.

It is easier to work than any other. There are no unnecessary adjustments. The Reflector is *permanently* adjusted to its most effective distance. The chimney is *permanently* adjusted to the exact height.

PRICE ... .. 20/-

**NEWTON & CO.,**  
3 FLEET STREET, LONDON,  
Scientific Instrument Makers to the Queen, the Government,  
the Royal Institution, &c., &c.



# IMPERIAL PLATES AND FILMS

ARE THE MOST

**RAPID**

AND

POSSESS all the QUALITIES

for giving

## Perfect Negatives.



### PRICES:

| PLATES | ORDINARY.     |               |               | EXTREME.      |               |               |
|--------|---------------|---------------|---------------|---------------|---------------|---------------|
|        | $\frac{1}{4}$ | $\frac{1}{2}$ | $\frac{1}{1}$ | $\frac{1}{4}$ | $\frac{1}{2}$ | $\frac{1}{1}$ |
|        | 1/-           | 2/3           | 4/3           | 1/6           | 3/8           | 6/6           |
| FILMS  | 1/6           | 3/8           | 6/6           | 2/-           | 4/6           | 8/-           |

## IMPERIAL

## 'LANTERN' PLATES

SLOW FOR WARM TONES.      RAPID FOR BLACK TONES.

Price: ONE SHILLING per doz.

Unequalled for Delicacy of Gradation and Colour.

OF ALL LEADING DEALERS.

THE 'IMPERIAL' DRY PLATE CO., Ltd., Cricklewood, London, N.W.

# C. LAWRENCE,

## Photographic Apparatus Manufacturer,

12 GOWAN AVENUE, FULHAM PALACE ROAD, LONDON, S.W.  
 Late 141 FULHAM PALACE ROAD,  
 HAMMERSMITH, LONDON, W.

Sole Inventor and Manufacturer of The 'Clifford' Hand Camera Patent, by which Twelve Plates can be exposed in less than as many seconds.



FIG. 2.

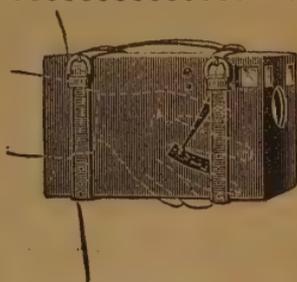


FIG. 1.

Fig. 1 shows a 5x4 Camera in a Lady's hand (this block being cut from a Photograph),

Fig. 2 shows the Camera with the front lid open showing the shutter and lens.

30 cut films can be used in the space of 12 plates.

*The Camera may be turned on its side for upright Pictures.*

Price of Camera, with one book to carry 12 Plates, and fitted with Taylor, Taylor & Hobson's D Lens, with Iris Diaphragm:—

$\frac{1}{4}$ -Plate, £10 12s.; 5x4in. Plate, £11 13s.; French size, Centimeters, 9x12, £11 13s.; New Sunk Crystal Finders, 10s. 6d. the pair; Screw and Fitting for Stand, 2s. 6d.; Solid Leather Case for ditto, £1 1s. The New Focussing Arrangement, which is worked from the outside, 10s. 6d.

The above Camera is the smallest, most compact, and the simplest to use of any Camera in the market. The Shutter is always ready, a simple movement of a knob, less than half-an-inch, changes and brings the next plate into position. The size of  $\frac{1}{4}$  Plate with 5" Lens, being  $8\frac{1}{2}'' \times 5\frac{1}{2}'' \times 5\frac{1}{2}''$ .

*Further particulars on application.*

→ † MUCKLOW'S † ←

*Improved*

**ALBUMENISED, SENSITISED,  
AND PHOTOGRAPHIC PAPERS.**

Noted for their Rapid Printing, yielding any Tone,

AND

**NOT BLISTERING.**

The sale of these papers has more than doubled during the past twelve months!

*Also an improved*

**ROUGH MATT**

**PAPER FOR PLATINUM TONING.**

Producing permanent Platinum Prints much cheaper than hitherto, without the uncertainty of ordinary Printing-out Platinum Papers, and with the additional advantage of keeping well.

**COLLODION-CHLORIDE PAPER.**

All Papers are Supplied in Sheets, and cut to the usual sizes ready for printing.

*Samples Free on receipt of Stamped Envelope.*

**DRY PLATES, CAMERAS, LENSES, &c.  
PURE MOUNTS of EVERY DESCRIPTION**

*Blocked and Printed at the Lowest Price.*

**Most Liberal Terms to Dealers and Shippers.**

◆◆◆◆◆  
**2 TURLE ROAD, LONDON, N.**

DO NOT BUY A  
**HAND CAMERA**

UNTIL you have SEEN

**SWINDEN'S**

(Late SWINDEN & EARP)

**NEW PATENT**

Automatic & Bag Changing Arrangements Superseded.

A high class instrument at a price within  
the reach of all Photographers.

~~~~~  
**WILL BE READY SHORTLY.**  
~~~~~

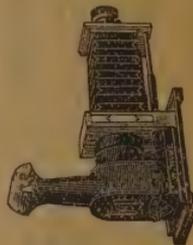
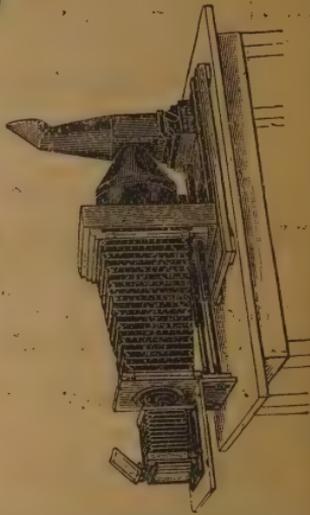
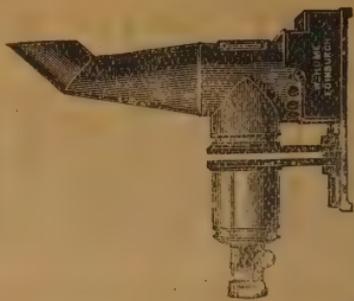
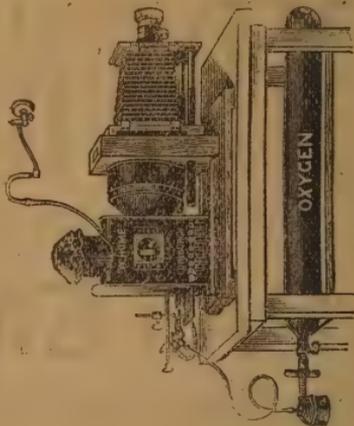
Announcement will be made in the weekly  
Photographic Papers when obtainable.

**TO BE HAD OF ALL DEALERS.**

**THE CANTILEVER ENLARGING APPARATUS.**

In 30 sizes, various Patterns. Prices complete from £4 to £105. British, American, Indian and Continental Sizes ready for Despatch.

2nd Edition. 24th Thousand.  
**CANTILEVER PAMPHLET.**  
 32 pages, 50 Engravings. Contains Prices, Cable Code, Description and full Instructions



Designed and Manufactured  
 only by

**WILLIAM HUME, 1 LOTHIAN STREET, EDINBURGH.**

MANUFACTURERS TO THE TRADE ONLY.

# The ROYALTY CAMERAS

GOLD MEDAL, PARIS 1892.

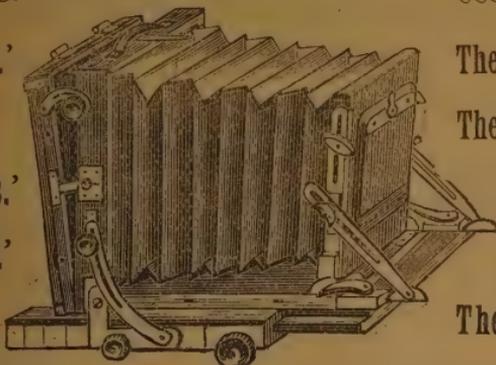
The 'Countess.'

The 'Duke.'

The 'Marquess.'

The 'Empress.'

The 'Baron.'



The 'Duchess.'

The 'Baroness.'

The 'Queen.'

The 'Earl.'

The 'Princess.'

THE 'KING.'

## THE LONDON AND PARIS OPTIC AND CLOCK CO.

(WALTER H. THOMPSON),

24 Edmund Place, } Aldersgate Street, London, E.C.  
& 7 Jewin Street, } Telegraphic Address, 'Lunettier, London.'

*Wholesale Agents for Great Britain and Ireland for the Celebrated 'NYS' DRY PLATES.*

**CHEAPEST AND BEST IN THE MARKET.**

**SPECIALITIES:**

**THE 'ROYALTY' STEREOSCOPIC, AND THE  
'ROYALTY' POCKET CAMERAS.  
'ROYALTY' LENSES AND STANDS.**

**SPECIAL QUOTATION TO SHIPPERS.**

# THE BRISTOL PHOTOGRAPHIC STORES,

14 LOWER ARCADE, BRISTOL.

**Dealers in New & Second-hand Photographic  
Apparatus.**

**THE LARGEST & BEST STOCK IN THE WEST OF ENGLAND**

*Country Photographers specially catered for.*

ORDERS BY POST HAVE PROMPT ATTENTION. CARRIAGE PAID ON  
ALL ORDERS OVER 20s. IN VALUE.

|                                                                       | <i>s.</i> | <i>d.</i> |
|-----------------------------------------------------------------------|-----------|-----------|
| Sensitised Papers, per quire, post free ... ..                        | 12        | 0         |
| "    per $\frac{1}{2}$ "    "    ... ..                               | 6         | 6         |
| "    per 6 sheets "    ... ..                                         | 4         | 0         |
| "    per 3 "    ... ..                                                | 2         | 0         |
| Oxford Line Mounts, 10 x 8, for $\frac{1}{2}$ plate, per 100 ...      | 4         | 0         |
| "    "    12 x 10, for $\frac{1}{2}$ plate, per 100 ...               | 6         | 0         |
| <i>All sizes, from <math>\frac{1}{2}</math> to 15 x 12, in Stock.</i> |           |           |
| Cabinet Mounts, printed at bottom 'Cabinet Portrait,' per 100 ...     | 1         | 6         |
| "    gold, bevel edge, best quality, per 100 ...                      | 5         | 0         |
| C.-D.-V. Mounts, cream, round corners, per 100 ...                    | 6d.       | to 1 0    |
| "    gold, bevel edge, best quality, per 100 ...                      | 2         | 6         |
| Johnson's Chloride of Gold, 15 grain tubes, 1/10, per doz. ...        | 20        | 0         |

**Over 200 Cameras and Lenses of all sizes in stock, new and  
second-hand, at the lowest possible price.**

*All Goods sent out on three days' approval, and money returned if not perfectly  
satisfactory in every respect.*

**SECOND-HAND APPARATUS PURCHASED FOR CASH OR EXCHANGED.  
CAMERAS AND LENSES LENT ON HIRE.**

Printing, Toning, and Mounting for Amateurs or the Trade. Prices strictly  
moderate. Send Stamp for Price List.

Dissolving Views by Oil or Limelight at reasonable rates. Large stock of Slides.

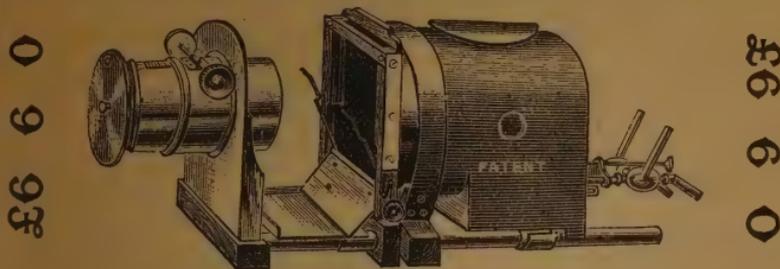
Competent Operator with Limelight Apparatus for Tableaux, Bazaars,  
& Amateur Theatricals, &c.

Brass work and all Fittings for Cameras in stock or made to order.

**Small quantities of Mounts printed at a nominal charge.**

*Cheques crossed 'Lloyd's Bank' payable to L. & H. WHETTER.*

**DON'T FAIL TO SECURE THE NEW LANTERN.**



**MATTHEWS'**  
**PORTABLE OPTICAL LANTERN.**

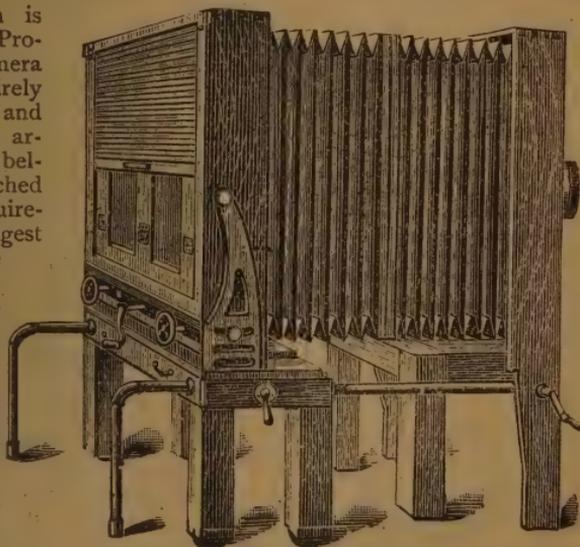
(Patent applied for.)

MANUFACTURED BY

HOLMES & WATSON, 35 DANBURY STREET, ISLINGTON, LONDON, N.

Special attention is called to The New Process Printing Camera designed on entirely new principles, and with extension so arranged that extra bellows can be attached to meet the requirements of the longest focus lenses. The dark slide is furnished with moveable bars so that any size plate from  $6\frac{1}{2} \times 4\frac{3}{4}$  can be used.

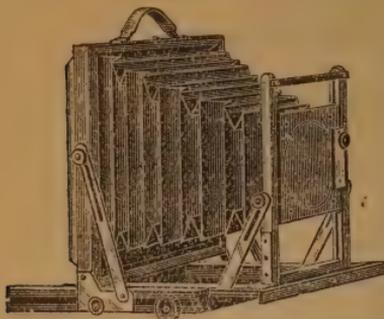
These Cameras are built from 24 inches square to any larger size required, and in three different qualities of finish.



Best Quality, £1 5s. 6d. per inch; Second Quality, £1 1s. per inch;  
Third Quality, 16s. 6d. per inch.

**HOLMES & WATSON,**  
35 Danbury Street, Islington, LONDON, N.

**SHEFFIELD PHOTO CO.**  
**Wholesale and Retail Photographic**  
**Dealers and Opticians**  
**FARGATE AND PINSTONE STREET, SHEFFIELD.**  
 Awarded SILVER MEDAL FOR EXCELLENCE, Trades' Exhibition, 1892.



### THE COMPACTUM CAMERA.

Finest Honduras Mahogany-polished Camera, Leather Bellows, long extension, short focus arrangement, and all the latest improvements

Focus, 3 to 15 in. Weight,  $\frac{1}{2}$ -plate, 2 $\frac{1}{2}$  lbs.

PRICE WITH 1 SLIDE:

|                                |                          |
|--------------------------------|--------------------------|
| $\frac{1}{2}$ Plate, £4 10 ... | Extra Slides, 15/- each. |
| $\frac{1}{4}$ " 6 0 ...        | " 20/- "                 |
| $\frac{1}{8}$ " 8 0 ...        | " 26/- "                 |
| $\frac{1}{16}$ " 10 0 ...      | " 30/- "                 |

Turn Table and 4-fold Stand for  $\frac{1}{2}$  or  $\frac{1}{4}$ -Plate  
 25/- and 30/- each.

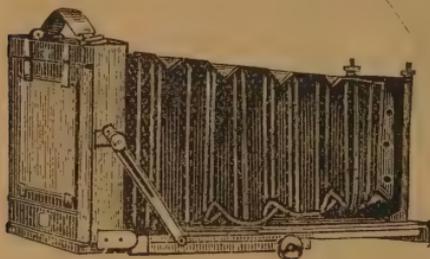
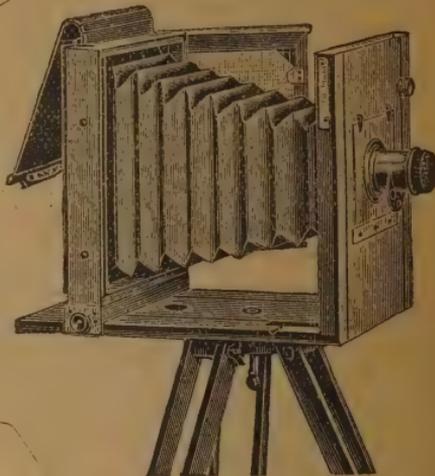
### THE 'CLUB' SET.

Made of polished Italian Walnut, Conical Bellows, which can be reversed for oblong Pictures; Universal Aplanatic Lens, giving excellent definition.

Price, with 1 Double Slide, with Triple Hinges,  $\frac{1}{4}$ -Plate, 55/- complete.

Elegant Case, with Shoulder Straps, 7/6 each.

4-Fold Stand for same, 10/3.



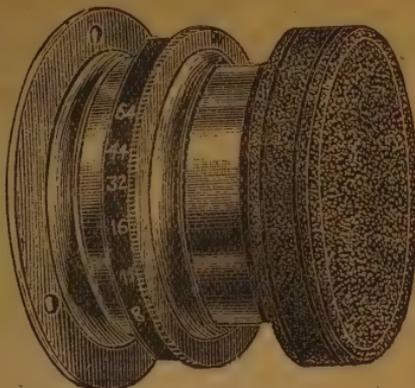
### THE CITY SET.

Comprising Polishing Mahogany Camera, long Extension, Reversing Back, Swing Back, with hinged Slide; Achromatic Lens, with Iris Diaphragms and Folding Stand.

$\frac{1}{4}$ -Plate, £3 3s.

[See following pages.]

# SHEFFIELD PHOTO CO.'S Rectilinear Lenses.



For Portraits, Groups, Architecture, and Views.

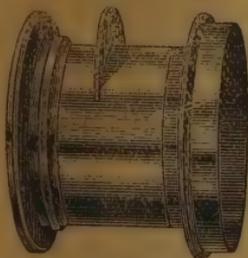
**Waterhouse Stops.**

|                                  |                               |                             |                |                        |
|----------------------------------|-------------------------------|-----------------------------|----------------|------------------------|
| 5x4 and $\frac{1}{2}$ -plate ... | Focus $4\frac{1}{2}$ -in. ... | Diameter $1\frac{1}{8}$ ... | Price 21/- ... | Iris Silver Ring, 30/- |
| $\frac{1}{2}$ -plate or 8x5 ...  | ,, $7\frac{1}{2}$ -in. ...    | ,, $1\frac{1}{2}$ ...       | ,, 25/- ...    | ,, ,, 40/-             |
| $\frac{1}{4}$ ,, to 10x8 ...     | ,, $10\frac{1}{2}$ -in. ...   | ,, $1\frac{3}{4}$ ...       | ,, 45/- ...    | ,, ,, 60/-             |
| 10x8 to 12x10 ...                | ,, $13\frac{3}{8}$ -in. ...   | ,, $2\frac{1}{2}$ ...       | ,, 90/- ...    | ,, ,, 110/-            |

Second Quality Iris Rectilinear Lenses:— $\frac{1}{2}$ -plate, 25/-;  $\frac{1}{4}$ -plate, 35/-.

## SHEFFIELD PHOTO CO.'S WIDE-ANGLE RECTILINEAR LENSES,

WITH REVOLVING STOPS.



|                                  | Focus.                  | Diam.              | Price. |
|----------------------------------|-------------------------|--------------------|--------|
| $\frac{1}{2}$ -Plate and 5x4 ... | $2\frac{1}{2}$ -in. ... | $1\frac{1}{8}$ ... | 25/-   |
| $\frac{1}{4}$ ,, ,, 7x5 ...      | $4\frac{1}{2}$ -in. ... | $1\frac{1}{2}$ ... | 35/-   |
| $\frac{1}{8}$ ,, ,, ...          | $5\frac{1}{2}$ -in. ... | $1\frac{3}{4}$ ... | 60/-   |
| 10x8 ...                         | $7\frac{1}{8}$ -in. ... | $2\frac{1}{2}$ ... | 70/-   |
| 12x10 ...                        | $7\frac{3}{4}$ -in. ... | $2\frac{1}{2}$ ... | 100/-  |

These are excellent Lenses for Interior, Copying and Engineering Work.

Sold subject to seven days' trial, for cash with order.

## SHEFFIELD PHOTO CO.'S PORTRAIT LENSES.

With Rack and Pinion. Working Aperture, F 4. Waterhouse Diaphragms, numbered according to the Photographic Society's Standard.

- No. 1. C.-D.-V. Distance for full length 15 ft., equivalent focus 5 in., back focus  $4\frac{1}{2}$  in. ... 30/-
- No. 2. Cabinet and Half-plate. Distance for full length Cabt. 14 ft., equivalent focus  $8\frac{1}{2}$  in., back focus  $6\frac{1}{2}$  in. ... 60/-
- No. 3. Promenade and Whole-plate. Distance for full length Cabinet 19 ft., equivalent focus 12 $\frac{1}{2}$  in., back focus 9 $\frac{1}{2}$  in. ... 90/-

[See preceding and following pages.]

# THE 'SUCCESS' HAND CAMERA.

## No. 1 PATTERN.

For 12 Plates,  $4\frac{1}{2}$  by  $3\frac{1}{4}$ .

Beautifully made in Walnut, Rectilinear Lens, Time and Instantaneous Shutter, 12 Sheaths, 2 Finders. The Simplest Hand Camera made.  $3\frac{1}{2} \times 2\frac{3}{4}$ , 25/-;  $\frac{1}{2}$ -Plate, 50/-. Complete in neat Case, with Shoulder Straps.

No. 2 as No. 1, but with Focusing Arrangement, Shutter for Slow or Quick Exposures, Rectilinear Lens, with revolving Stops, for 12  $\frac{1}{2}$ -Plates, 65/-; Stereo, 84/-.

No. 3 made of Polished Walnut, with black Binding, and has a register of Exposed Plates. Time and Instantaneous Shutter, which can be regulated, and Rectilinear Lens, with revolving Stops. Two Finders. Complete, in Travelling Case, with Straps, for 12 Plates,  $4\frac{1}{2} \times 3\frac{1}{4}$ , 90/-. With case complete.



No. 3. 90/-



No. 1.—For 6  $\frac{1}{2}$ -Plates.  
Price £1 11s. 6d.

# THE 'PIONEER.'

Size  $5\frac{1}{2}$  by  $5\frac{1}{2}$  by  $7\frac{1}{2}$  ins.

Weight, inclusive of 6 Plates, about 2 $\frac{1}{2}$  lbs.

This new apparatus, representing a small travelling case, covered with black imitation leather, is elegantly fitted up, and can therefore be used completely unnoticed. 'Pioneer' has an Aplanatic Lens of strong illuminating power, with firm diaphragm, time and instantaneous shutter, and 2 view finders, one each for portrait and landscape photos. The changing of plates is effected in the simplest possible manner, viz., by moving a lever.

No. 2 'Pioneer,' covered in Morocco for 6  $\frac{1}{2}$ -Plates, 45/-.

No. 3, 12 Plates, 63/-.



# THE 'UNO' CAMERA.

For 12  $\frac{1}{2}$ -Plates.

Covered in Black Leatherette, with 2 View Finders, Spirit Level, and Rapid



Achromatic Lens. Simplicity itself. Plates changed by turning a button. Time and Instantaneous Shutter. No 1., price 12/6. No. 2, in Leather, 21/-.

# THE SHEFFIELD PHOTO CO.,

Fargate and Pinstone Street.

*See preceding and following pages.*

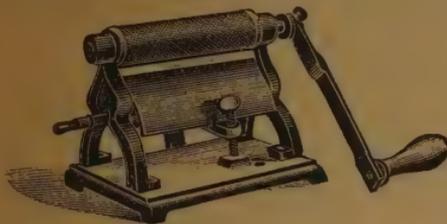
**SHEFFIELD PHOTO CO.'S  
COMBINATION CHANGING BAG  
AND FOCUSING CLOTH.**

The very thing for Tourists. Don't be without one.

1/4-Plate, 4/6; 1/2-Plate, 5/6; 1-Plate, 6/6.

The Amateur, of Jan. 2, 1890, says:

"We have seen a neat form of Changing Bag supplied by the Sheffield Photo Co., by means of which plates can easily be transferred from box to dark slides, or vice versa, in the open air, without danger of light access. To the tourist such a contrivance is almost a necessity



**THE  
'EXCEL' BURNISHER  
FOR GAS OR OIL.**

These Burnishers are an improvement on any which have hitherto been made, both Bar and Roller being protected from smoke and flame, and so avoiding spoilt prints.

|                |     |      |     |     |                           |     |      |
|----------------|-----|------|-----|-----|---------------------------|-----|------|
| Cabinet size   | ... | 7/6  | ... | ... | Nickeled, superior finish | ... | 10/6 |
| 6 1/2 in. Roll | ... | 11/6 | ... | ... | " "                       | ... | 15/- |
| 9 in. "        | ... | 15/- | ... | ... | " "                       | ... | 20/- |

**BEVEL GLASS OPALINES.**

**WITH LEATHERETTE BACKS.**

|                                | Plain Bevel Glass. |        | Gilt Bevel. |        | Coloured Border and Gilt Line. |        |
|--------------------------------|--------------------|--------|-------------|--------|--------------------------------|--------|
|                                | doz.               | gross. | doz.        | gross. | doz.                           | gross. |
| 4 1/2 x 3                      | 1/6                | 15/-   | 2/3         | 24/-   | 4/-                            | 42/-   |
| 6 x 4 Cabt.                    | 2/6                | 24/-   | 3/6         | 36/-   | 5/-                            | 48/-   |
| 6 1/2 x 4 1/2 1/2-plate        | 3/-                | 30/-   | 4/-         | 45/-   | 5/6                            | 54/-   |
| 8 x 6                          | 4/-                | 37/6   | 5/-         | 54/-   | 7/-                            | 78/-   |
| 8 1/2 x 6 1/2 or 8 1/2 x 6 1/2 | 4/6                | 42/-   | 6/-         | 66/-   | —                              | —      |
| 9 x 7                          | 4/6                | 42/-   | 6/6         | 72/-   | 10/-                           | 108/-  |
| 11 x 7 1/2                     | 6/-                | 60/-   | 9/-         | 96/-   | 12/6                           | 132/-  |

Boxes:—1/4-plate, 7d. doz., 6/- gross; Cabt., 9d. doz., 8/- gross; 1/2-plate, 10d. doz., 9/- gross; Whole-plate, 1/1 doz., 12/- gross.

**BEVEL PLUSH PADS IN BOXES.**

1/4-plate, 5/- doz.; 1/2-plate, 9/- doz.; Whole-plate, 12/- doz. With Strut Backs and Rings.

Lantern Catalogues, 70 pages. 15,000 Slides for Sale or Hire. Special Terms to Schools and County Councils. Photo Catalogue, 26 pages, post free 3 Stamps.

**THE SHEFFIELD PHOTO CO.,**  
Fargate and Pinstone Street, Sheffield.

See preceding pages.

# ROBERT C. MURRAY,

Photographic Stores.

CAMERAS, LENSES, OUTFITS, MATERIALS, & CHEMICALS.  
THE 'NYS' DRY PLATES.

Send for New Illustrated Catalogue of Special Cameras, &c., Post Free.

8 GARRICK ST., COVENT GARDEN, W.C.

*Over 25 years' experience in Practical Photography.*

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Process for INSTANTLY PRODUCING exquisite imitations of

**GOLD AND SILVER FERN LEAVES**  
ON MOUNTS.

GLASS FIRE SCREENS and PHOTO FRAMES as sold to the Countess of Bathurst, Countess of Ilchester, Lady Paget, &c. &c. Two charming framed specimens on bevelled glass sent post free for 1/6, cash with order. Agents wanted. Rapid sale amongst people of artistic taste.

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# DRUM BRAND

ALBUMENIZED and SENSITIZED

# PAPERS.

FRENCH



Largely used by Continental Photographers.

TRADE MARK.

Can be obtained of all London Dealers, or wholesale from

STUTZ & Co., 11 & 12 Great Tower St., London, E.C.  
A TRIAL SOLICITED.

## DRIED

# PALMS & GRASSES

FOR STUDIO DECORATION.

We will send, carriage paid, for 7s. 6d., the following:—

Two Phoenix Palms, 6 ft. high.

Two Areca " 4 " "

Three Ava Plumes, 5 " " "

One bunch Giant Reed, 4 ft. high.

One bunch Elephant Grass, 2 ft. high.

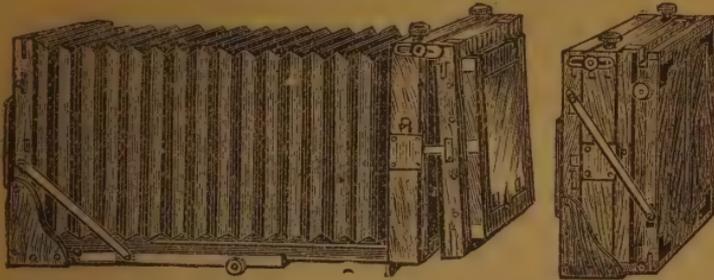
One Umolu, 2 ft. high.

All are bold yet graceful. Suited for Photography.

MARTIN CLARE & Co., Dried Grass Importers,  
26 WILSON STREET, LONDON, E.C.

**IMPROVED PORTABLE BELLOWS CAMERA.**

INVENTED AND INTRODUCED BY G. HARE, IN 1878.



**PRIZE MEDALS.**

AWARDED,

London, 1862.

Yorkshire Fine Art and  
Industrial  
Exhibition, 1866.

Vienna, 1873.

Brussels

Photo. Exhibition, 1875.

Amsterdam, 1877.

Royal Cornwall  
Polytechnic, 1879.

Yorkshire Fine Art and  
Industrial, 1879.

Ghent, 1880.

Bristol, 1880.

Dundee, 1882.

Brussels, 1883.

Royal Cornwall  
Polytechnic, 1883.

Bristol International  
Photo. Exhibition, 1883.

Inventions Exhibition,  
London, 1885.

Dundee International  
Photo. Exhibition, 1886.  
Paris, 1878.

**GEORGE HARE**

MANUFACTURER OF

PHOTOGRAPHIC

**CAMERAS**

AND

**APPARATUS,**

*Specially made for Hot and Trying Climates,  
Great Care being used in the selection of Materials,*

26 CALTHORPE STREET,

**LONDON, W.C., ENGLAND.**

Catalogues free on Application.

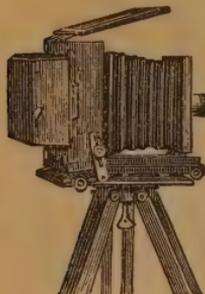


**G. HARE'S NEW CAMERA.**

THE ORIGINAL MODEL OF ALL LIGHT CAMERAS NOW IN  
THE MARKET.

ESTABLISHED 1854.

W. W. ROUCH & CO.'S  
High-Class Photographic Apparatus.



ROUCH'S  
'EUREKA' CHANGING BACK  
(PATENT).

THESE CHANGING BACKS carry 12 Plates, and are highly appreciated by Tourists, Travellers, Amateurs, and Photographers generally, as they save the bulk and expense of double backs, and avoid the necessity of changing Plates when on tour. They are fitted to any Camera. PRICE:— $\frac{1}{2}$ -plate, £2 10s.; 5x4, £2 15s.;  $6\frac{1}{2}$ x4 $\frac{1}{2}$ , £3; 7 $\frac{1}{2}$ x5, £3 10s.

The diagram shows ROUCH'S PATENT PORTABLE CAMERA, fitted with 'EUREKA' CHANGING BACK to hold 12 Plates. PRICES (with Reversing Frame and 'Eureka' Back):— $6\frac{1}{2}$ x4 $\frac{1}{2}$ , £7 5s.; 7 $\frac{1}{2}$ x5, £7 17s. 6d.

ROUCH'S QUICK-ACTING LANDSCAPE LENSES.

ROUCH'S  
INSTANTANEOUS DOUBLET,

For Landscapes, Groups, and Instantaneous Work.

THIS is an Aplanatic Lens, working at f/8, which gives a perfectly flat field and great depth of focus, and is entirely free from distortion. It is mounted in Rigid Settings, with Waterhouse Diaphragms. Prices:—

|                                        |                               |         |                                        |                                |        |
|----------------------------------------|-------------------------------|---------|----------------------------------------|--------------------------------|--------|
| 4 $\frac{1}{2}$ x3 $\frac{1}{2}$ ..... | 3 $\frac{1}{2}$ in. foc. .... | £1 10 0 | 8 $\frac{1}{2}$ x6 $\frac{1}{2}$ ..... | 10 $\frac{1}{2}$ in. foc. .... | £4 5 0 |
| 5x4 .....                              | 5 " " .....                   | 2 0 0   | 10x8 .....                             | 13 $\frac{1}{2}$ " " .....     | 5 5 0  |
| 6x5 .....                              | 7 $\frac{1}{2}$ " " .....     | 2 15 0  | 12x10 .....                            | 15 $\frac{1}{2}$ " " .....     | 7 15 0 |
| 8x5 .....                              | 8 $\frac{1}{2}$ " " .....     | 3 15 0  | 15x12 .....                            | 19 " " .....                   | 9 15 0 |

\*N.B.—This is the Lens that has given such universal satisfaction when used in conjunction with the 'EUREKA' CAMERA.

Testimonial Instantaneous Doublet Lens.

'I am very pleased with both Camera and Doublet Lens, the lens working beautifully for either portraits, groups, or views; in fact, as a general all-round lens I could not use a better.'—GEORGE LINEHAM, Fratton Road, Portsmouth.

ROUCH'S WIDE ANGLE DOUBLET.

For Landscape, Interiors, Architecture, and Copying.

| Size of Plate Covered.                    | Focus.                  | Price. | Size of plate Covered. | Focus.    | Price.  |
|-------------------------------------------|-------------------------|--------|------------------------|-----------|---------|
| 254. 4 $\frac{1}{2}$ x3 $\frac{1}{2}$ ... | 2 $\frac{3}{8}$ in. ... | £2 0 0 | 257. 10x8 ...          | 8 in. ... | £4 10 0 |
| 255. 6 $\frac{1}{2}$ x4 $\frac{1}{2}$ ... | 4 $\frac{1}{5}$ " ...   | 2 10 0 | 258. 12x10 ...         | 12 " ...  | 5 10 0  |
| 256. 8 $\frac{1}{2}$ x6 $\frac{1}{2}$ ... | 6 $\frac{1}{4}$ " ...   | 3 10 0 | 259. 15x12 ...         | 15 " ...  | 6 10 0  |

W. W. ROUCH & CO.,  
180 STRAND, and 43 NORFOLK ST., STRAND, LONDON,  
Manufacturers of High-Class Photographic Apparatus.

[See following page, and pages 2 and 3.



ESTABLISHED 1854.

➤ ROUCH'S ◀  
Gelatine :: Plates.



MADE IN

THREE DEGREES OF RAPIDITY—

**EXTRA RAPID, INSTANTANEOUS, AND SLOW LANDSCAPE.**

These Plates received a Silver Medal at the International Inventions Exhibition, 1885, a higher Award than any other Plate.

During the last ten years over Fifty Medals have been awarded to pictures taken on these Plates.

ROUCH'S PLATES are hand-coated, and the emulsion is rich in silver, and yields sparkling negatives of the highest class. These celebrated Plates have been in constant use by the principal Amateur and Professional Photographers for many years, and for uniformity, quality, and simplicity of manipulation are unexcelled by any other brand of plates in the market. Prices, particulars, and Developing Formulæ on application.

~~~~~  
**ROUCH'S 'MODEL' DARK TENT.**



THIS CELEBRATED DARK TENT is invaluable to the Amateur both as a Travelling Dark-Room for Developing or Changing Plates, and as a Permanent Laboratory at home when space is not otherwise available. It will be found replete with every convenience for working the different negative processes.

PRICES COMPLETE:

For Plates	8½ × 6½	... ..	£6 10 0
Do.	10 × 8	... ..	7 0 0
Do.	12 × 10	... ..	7 10 0
Do.	15 × 12	... ..	8 10 0

Waterproof Travelling Cases, small size, 18/-; larger sizes, 25/-

All genuine Tents are stamped with our Name and Address on Ivory Plate.

COMPLETE ILLUSTRATED CATALOGUE OF ALL PHOTOGRAPHIC REQUISITES ON APPLICATION. Price 6d.

**W. W. ROUCH & CO.,**

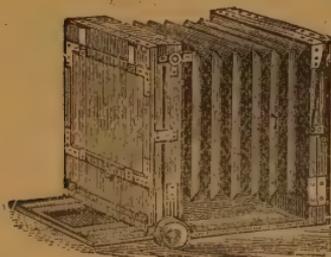
PHOTOGRAPHIC DEALERS AND MANUFACTURERS OF  
HIGH-CLASS PHOTOGRAPHIC APPARATUS, &c.,

180 STRAND, & 43 NORFOLK ST., STRAND, LONDON.

[See preceding page, and pages 2 and 3.]

**P. MEAGHER, Photographic Apparatus Manufacturer.**

## MEAGHER'S IMPROVED PORTABLE BELLOWS CAMERA.



This Camera is similar in construction to my well-known Binocular Camera, and possesses the following advantages over the existing Landscape or Kinnear form of Camera:—No screws are required for fixing; the focussing is effected from the back by the rack or screw adjustment; the focussing screen is attached to the Camera, and the bellows body is parallel. This will be found of great advantage when using wide-angle lenses. It is available either for the studio or field, the range of focus permitting the use of the

shortest-focus stereo lenses, or any of the Wide-angle, Doublet, or View Lenses, also for the C.-D.-V. or Cabinet Lenses.

'The Cameras you have already sent me are in constant use, but still look, and are, as good as ever.'—*Extract of Letter from M. V. PORTMAN, Esq., Port Blair, Andaman Islands, India, January 25th, 1892.*

These Cameras were selected by Captain Abney, R.E., F.R.S., for the Photographic Equipment of H.M.S. 'Challenger,' by the American Boundary Commissioners, and are used by the Military Engineers in the Royal Arsenal, War Department, Ordnance Survey, &c.

These Instruments are now in general use by many of the leading Amateur Photographers, to most of whom P. M. is indebted for letters of approval and recommendation, including Captain Abney, R.E., F.R.S., F. Beasley, Esq., W. S. Buddicom, Esq., B. H. Buxton, Esq., J. C. Cox, Esq., Sir J. Colomb, Major L. Darwin, R.E., W. Davidson, Esq., Major-General Dawson, C.B., Surgeon-Major Dobie, Capt. Duperier, R.E., Dr. Edmunds, G. S. Edwards, Esq., P. H. Emerson, Esq., Dr. Fraser, Wm. Foster, Esq., J. Gale, Esq., W. C. Hillier, Esq., H. Panmure Gordon, Esq., J. C. Grinling, Esq., W. S. Hobson, Esq., Bryan Hook, Esq., J. Norman Lockyer, Esq., F.R.S., Sir John Lubbock, E. Macroy, Esq., Dr. Mantell, Capt. S. M. Maycock, R.E., Prince of Monaco, Col. W. Noverre, Hon. Justice Parsons, M. V. Portman, Esq., Admiral Robinson, Dr. Roscoe, Linley Sambourne, Esq., Fred Slocombe, Esq., F. Machell Smith, Esq., J. Spiller, Esq., Nawab of Surat, Maharajah of Tipperah, Sir Henry Thompson, Dr. Vogel, Lieut. L. Wells, R.N., and many others.

Size.	Single Swing Reversing Frame & 3 Double Dark Slides		Brass Binding Camera & 3 Double Slides		Russia Bellows	Extending Front.	Eastman's Roll Holder
	$4\frac{1}{2} \times 3\frac{1}{4}$	£5 15 0	£0 15 0	£1 8 0	£0 10 0	£1 0 0	£2 0 0
$5 \times 4$	6 5 0	0 15 0	1 8 0	0 12 0	1 0 0	2 10 0	
$6\frac{1}{2} \times 4\frac{1}{2}$	7 16 0	0 15 0	1 8 0	0 15 0	1 0 0	3 0 0	
$7\frac{1}{2} \times 5$	8 0 0	0 15 0	1 8 0	0 16 0	1 5 0	3 7 6	
$8\frac{1}{2} \times 6\frac{1}{2}$	9 5 0	0 15 0	1 8 0	0 18 0	1 15 0	4 5 0	
$9 \times 7$	10 5 0	0 15 0	1 8 0	0 18 0	1 15 0		
$10 \times 8$	11 5 0	1 0 0	1 13 0	1 1 0	2 0 0	5 0 0	
$12 \times 10$	15 3 0	1 5 0	2 1 0	1 7 0	3 0 0	6 10 0	

These Cameras can be fitted with dividing partition and repeating front for stereo work at an extra cost of, up to  $8\frac{1}{2} \times 6\frac{1}{2}$ , 4/6;  $9 \times 7$  to  $12 \times 10$ , 6/6.

Size	Single Swing Reversing Frame & Double Dark Side		Brass Binding Camera and Double Slide.		Russia Bellows	Extending Front.	Extra Double Backs.	Brass Binding Extra Backs.
	$15 \times 12$	£14 0 0	£1 10 0	£2 0 0	£1 17 6	£4 10 0	£2 15 0	£0 6 0
$18 \times 16$	22 10 0	1 15 0	2 15 0	2 10 0	6 10 0	4 0 0	0 6 6	
$24 \times 20$	33 5 0	2 5 0	3 12 6	3 0 0	8 10 0	5 15 0	0 7 6	

Inner Frames to Cameras,  $4\frac{1}{2} \times 3\frac{1}{4}$  to  $7\frac{1}{2} \times 5$ , 2/-;  $8\frac{1}{2} \times 6\frac{1}{2}$  and  $9 \times 7$ , 2/3;  $10 \times 8$ , 2/6;  $12 \times 10$ , 3/-;  $15 \times 12$ , 4/-;  $18 \times 16$ , 5/-;  $24 \times 20$ , 5/6 each.

If required for copying purposes, these Cameras are made with Extending Fronts, and can also be fitted with Repeating Back for two Cabinets and two C.-D.-V. pictures on one plate, thus meeting all the requirements of the practical photographer.

**HIGHEST AWARDS WHEREVER EXHIBITED.**

**P. MEAGHER, Photographic Apparatus Manufacturer.**

# IMPROVED STUDIO CAMERA

## BELLOWS BODY, SCREW ADJUSTMENT FOR FOCUSING.

These Cameras are now in general use by the leading professional Photographers, including Valentine Blanchard Esq., Messrs. Barrauds, Ltd., J. T. Barker, Esq., G. K. Batten, Esq., W. Blackall, Esq., J. R. Bentley, Esq., Messrs. Debenham & Gould, Messrs. Disderi & Co. (Paris), Messrs. W. & D. Downey, F. C. Earl, Esq., J. Edwards, Esq., Messrs. Field & Co., Messrs. W. & A. H. Fry, A. Gandy, Esq., A. Glass, Esq., W. Gowland, Esq., R. L. Graham, Esq., J. Hawke, Esq., Messrs. Heath & Bullingham, Messrs. Hills & Saunders, C. J. Hopkins, Esq., F. Hopps, Esq., F. Jones, Esq., Messrs. E. Kay & Son, J. S. Kay, Esq., E. D. Lavender, Esq., Abel Lewis, Esq., Messrs. Lock & Whitfield, Messrs. Lombardi & Co., H. S. Mendelssohn, Esq., E. C. Porter, Esq., W. Raiston, Esq., H. T. Reed, Esq., Messrs. Siedle Bros., W. A. Smith, Esq., W. J. Suter, Esq., Messrs. A. & G. Taylor, J. Thompson, Esq., Messrs. Valentine & Sons, J. Verney, Esq., Marshall Wane, Esq., Messrs. Walery, Ltd., E. Wheeler, Esq., S. Victor White, Esq., S. Yeo, &c., &c.

Fig. 4 shows the Camera with screw adjustment for focussing and hinged focussing screen.

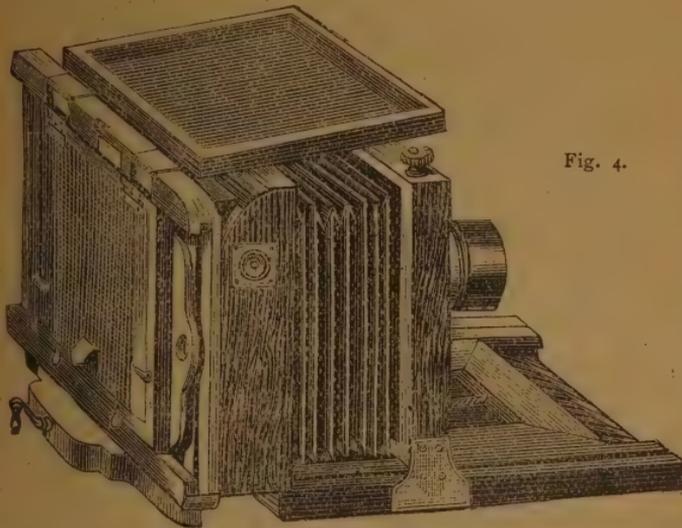


Fig. 4.

The Camera is also made with rack focussing adjustment, and focussing screen to slide, at same Prices.

This Camera is made extra strong for Studio Work, and is adapted for *Carte de Visite*, Cabinet, or Portrait Lenses of long focus. The backs of these Cameras are made square, and will take the plate either horizontally or vertically.

The  $6\frac{1}{2} \times 6\frac{1}{2}$  Camera is suitable for taking single Cabinet pictures or two *Cartes de Visite* on the  $6\frac{1}{2} \times 4\frac{1}{2}$  plate. The  $8\frac{1}{2} \times 8\frac{1}{2}$  Camera is suitable for taking single pictures  $8\frac{1}{2} \times 6\frac{1}{2}$  or two Cabinets on the  $8\frac{1}{2} \times 6\frac{1}{2}$ , or two *Cartes de Visite* on the  $6\frac{1}{2} \times 4\frac{1}{2}$  plate. The  $9 \times 9$  Camera is suitable for taking single pictures  $9 \times 7$ , or two Cabinets on the  $9 \times 7$ , or two *Cartes de Visite* on plate  $7\frac{1}{2} \times 4\frac{1}{2}$  or  $6\frac{1}{2} \times 4\frac{1}{2}$ . The  $10 \times 10$  Camera is suitable for taking single pictures  $10 \times 8$ , two Boudoir pictures on plate  $10 \times 8$ , two Cabinets on plate  $8\frac{1}{2} \times 6\frac{1}{2}$  or  $9 \times 7$ , or two *Cartes de Visite* on plate  $6\frac{1}{2} \times 4\frac{1}{2}$ . The  $12 \times 12$  Camera is arranged in the same manner as the  $10 \times 10$ .

**Prices, with one Single Back and two Inner Frames:—**

	$6\frac{1}{2}$ in Square.	$8\frac{1}{2}$ in.	9 in.	10 in.	12 in.	15 in.
For Plates	$6\frac{1}{2} \times 4\frac{1}{2}$	$8\frac{1}{2} \times 6\frac{1}{2}$	$9 \times 7$	$10 \times 8$	$12 \times 10$	$15 \times 12$
Single Swing Back...	£6 0 0	£7 5 0	£7 15 0	£8 15 0	£10 10 0	£15 15 0
Double "	7 0 0	8 5 0	8 15 0	9 15 0	11 15 0	17 15 0

Rack adjustment to Swing Back from 10/- extra.

Brass Binding  $9 \times 9$  and under, 25/- extra; above  $9 \times 9$ , 30/- extra.

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1 A Patent—For Cabinets, in short rooms, dia. 2½ in., distance 14 ft. £13 0/-	
2 A Patent—For Cabinets up to 8½ by 6½, dia. 3½ in., distance 20 ft. 18 0/-	
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4 A Patent—For Imperial Portraits and 10 by 8, dia. 4½ in., focus 14 in. 38 10/-	
5 A Patent—For Plates 15 by 12 and under, dia. 5 in., focus 18 in. ... 50 0/-	
6 A Patent—For Plates 20 by 16 and under, dia. 6 in., focus 22 in. .... 60 0/-	

### PORTRAIT AND GROUP (D).

3 D Patent—Portraits 8½ by 6½, Views 10 by 8, dia. 2½ in., focus 10½ in. £9 10/-	
4 D Patent—Portraits 10 by 8, Views 12 by 10, dia. 2½ in., focus 13 in. 13 10/-	
5 D Patent—Portraits 12 by 10, Views 15 by 12, dia. 3½ in., focus 16 in. 17 10/-	
6 D Patent—Portraits 15 by 12, Views 18 by 16, dia. 4 in., focus 19½ in. 26 10/-	
D Patent—Portraits 18 by 16, Views 22 by 20, dia. 5 in., focus 24 in. .... 48 0/-	
D Patent—Portraits 22 by 20, Views 25 by 21, dia. 6 in., focus 30 in. .... 58 0/-	

### STEREOSCOPIC LENSES.

Patent Stereographic Lens 3½ in. focus £4 5/-	
Ditto, with rack and pinion ... 4 15/-	
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No. 2 Ditto, ditto, 6 in. focus ..... 2 5/-	
Rect. Stereo Lenses, 2 & 2½ in. focus 4 0/-	

### OPTICAL LANTERN LENSES (Patent.)

Intended for use with the Optical Lantern only.

No. 1 Lens, 1½ and 1¾ in. dia. with rack motion £4 4	
No. 2 Lens, 1½ and 2 in. dia. " " 5 5	
CONDENSERS, ¾ in. dia. mounted; each 5 5	
Do. 4 in. " " " 6 6	

### NEW RECTILINEAR LANDSCAPE LENS. (PATENT.)

No.	Largest Dimensions of Plate.	Diameter of Lenses.	Equiv. Focus.	Price.
1	6½ by 4½ in.	1½ in.	8½ in.	£4 15 0
2	8½ " 6½ "	1¾ "	11 " "	6 0 0
3	10 " 8 " "	2 " "	13½ " "	8 0 0
4	12 " 10 " "	2½ " "	16½ " "	10 5 0
5	15 " 12 " "	2¾ " "	20 " "	12 10 0
6	18 " 16 " "	3 " "	25 " "	16 0 0
7	22 " 20 " "	3½ " "	32 " "	21 0 0

### RAPID RECTILINEAR (Patent).

The best Lens for general use out of doors, and for Copying.

Size of View or Landscape.	Size of Group or Portrait.	Equivalent Focus.	Price, Rigid Setting.
4½ by 3¼ in.	3½ by 3¼ in.	4 in.	£3 15 0
5 " 4 " "	4½ " 3½ " "	6 " "	4 10 0
6 " 5 " "	5 " 4 " "	8½ " "	5 10 0
8 " " "	6 " 5 " "	10 " "	6 5 0
8½ " 6½ " "	8 " 5 " "	11 " "	7 0 0
10 " 8 " "	8½ " 6½ " "	13 " "	9 0 0
12 " 10 " "	10 " 8 " "	16 " "	11 0 0
13 " 11 " "	French size.	17½ " "	12 0 0
15 " 12 " "	12 " 10 in.	19½ " "	15 0 0
18 " 16 " "	15 " 12 " "	24 " "	20 0 0
22 " 20 " "	18 " 16 " "	30 " "	27 0 0
25 " 21 " "	22 " 20 " "	33 " "	32 0 0

### Wide-Angle RECTILINEAR (Patent).

For Architectural Views in Confined Situations

No.	Largest Dimensions of Plate.	Back Focus.	Equiv. Focus.	Price.
1A A	7½ by 4½	3½ in.	4 in.	£4 10 0
1A	8½ " 6½ "	4½ " "	5½ " "	5 10 0
1B	10 " 8 " "	5½ " "	6½ " "	6 10 0
1	12 " 10 " "	6½ " "	7 " "	7 10 0
2	15 " 12 " "	7½ " "	8½ " "	10 10 0
3	18 " 16 " "	11 " "	13 " "	14 0 0
4	22 " 20 " "	14 " "	15½ " "	20 0 0
5	25 " 21 " "	17 " "	19 " "	30 0 0

\* To be had in pairs for Stereoscopic Views.

### Wide-Angle LANDSCAPE LENS (Patent).

For Landscapes Pure and Simple.

No.	Size of Plate	Equivalent Focus.	Price.
1A	5 by 4	5½ in.	£3 5 0
1	7½ " 4½ "	7 " "	3 15 0
2	8½ " 6½ "	8½ " "	4 10 0
3	10 " 8 " "	10 " "	5 10 0
4	12 " 10 " "	12 " "	7 0 0
5	15 " 12 " "	15 " "	8 10 0
5A	15 " 12 " "	18 " "	9 10 0
6	18 " 16 " "	18 " "	10 10 0
7	22 " 20 " "	22 " "	14 0 0
8	25 " 21 " "	25 " "	19 0 0

### NEW RAPID LANDSCAPE LENS.

For Distant Objects and Views.

No.	Largest Dimensions of Plate.	Diameter of Lenses.	Equiv. Focus.	Price.
1	6½ by 4½ in.	1.3 in.	9 in.	£4 10 0
2	8½ " 6½ "	1.6 " "	12 " "	5 15 0
3	10 " 8 " "	2.125 " "	15 " "	7 10 0
4	12 " 10 " "	2.6 " "	18 " "	9 10 0
5	15 " 12 " "	3 " "	22 " "	11 10 0
6	18 " 16 " "	3.5 " "	25 " "	14 0 0
7	22 " 20 " "	4.25 " "	30 " "	17 10 0

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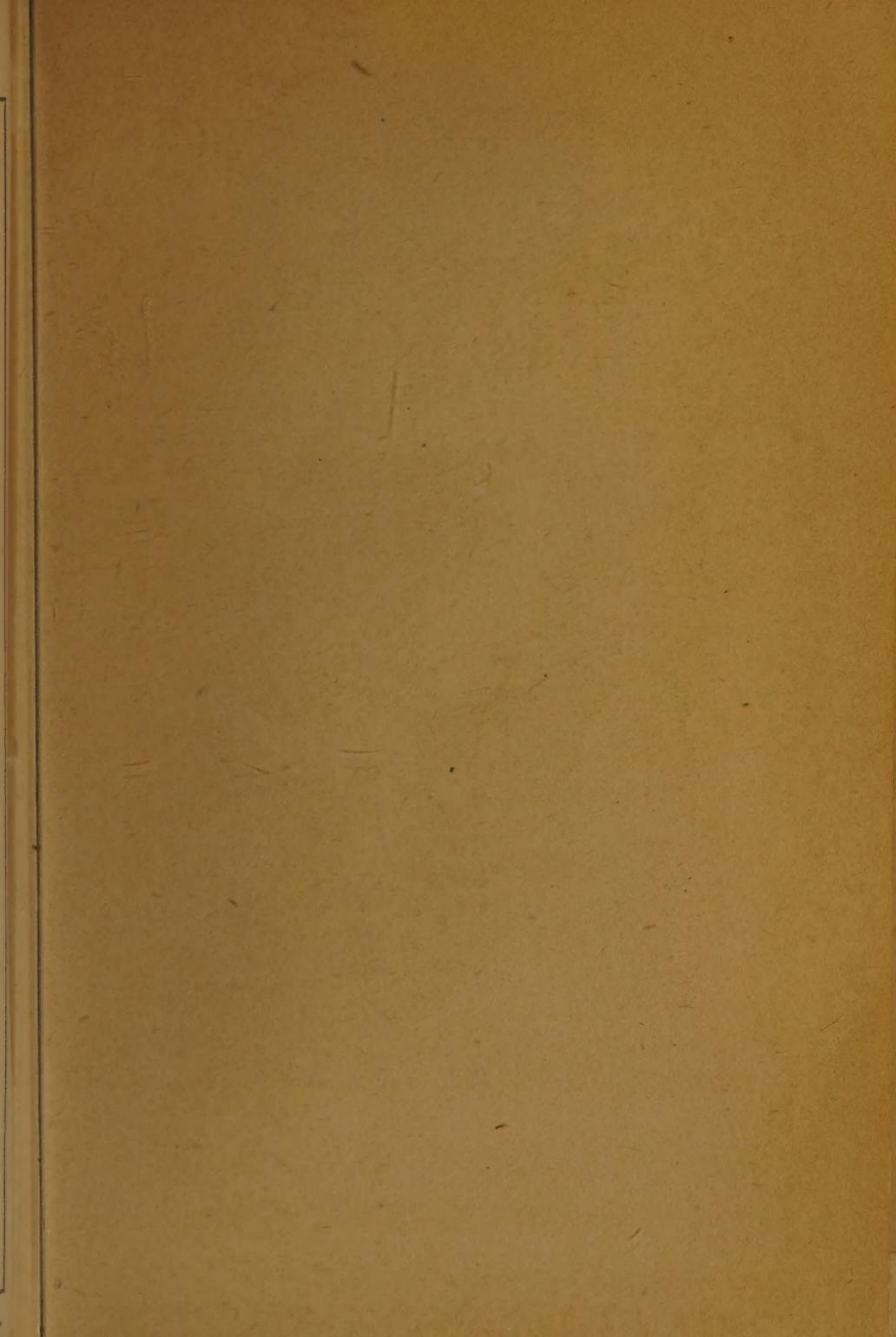
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