**A CAMERA. A HAND CAMERA. A TRIPOD. A LANTERN.**

**THE OPTICAL MAGIC LANTERN JOURNAL AND PHOTOGRAPHIC ENLARGER.**

A Magazine of Popular Science for the Lecture-room and the Domestic Circle.

Edited by J. HAY TAYLOR.

Vol. 5.—No. 67. DECEMBER 1, 1894. Xmas No., price 2d., Post-free 3d.

**THE MAGIC LANTERN: ITS CONSTRUCTION & USE.** Contains complete Instructions. Cloth Covers, PRICE 6d.

Each Magic Lantern is efficient for exhibitions. The Lens gives crisp definition, being a superior Achromatic Photographic Combination 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 reflector lamp has 3 wicks (or 4 wicks 2s. extra), yielding a brilliantly illuminated picture.—Each is complete in box.

**‘OPTIMUS’ SAFETY SATURATOR**

With Jet complete, 70s.

FREDK. E. IVES, says: It is the best. I have adopted it for my own use.

**‘OPTIMUS’ BI-UNIAL LANTERN FOR LIMELIGHT**

Panelled Mahogany Body, 4 doors and Moulded Feet, Achromatic Photographic Front Lens, Compound Condensers, Brass Stages and Sliding Tubes. £10 10s.

PERKEN, SON & RAYMENT, 99, HATTON GARDEN, LONDON. ‘OPTIMUS.’

**MAGIC LANTERNS AND SLIDES.**

Walter Tyler’s Helioscopic is perfection of all Lanterns, supplied to the Indian Government, School Boards, science classes, clergy, and exhibitors throughout the world. Impossible to have lanterns give better definition or more satisfactory results; specially constructed lens, which no other lantern possesses.

Walter Tyler’s Best Triples and Bi-unials are unsurpassed, and perfect in every detail. Good Bi-unials, mahogany bodied, brass fronts, and all improvements.

Regulators and Gauges.—Great reduction in price. The largest stock of Gas Cylinders in the world. Best seamless steel, tested and valued, all sizes at very low prices. OXYGEN or HYDROGEN Gas, of best quality and specially low prices, in Walter Tyler’s or customer’s own cylinders.

Lanterns and Slides.—If you wish to Hire, Purchase, or Exchange, you cannot do better that go to Walter Tyler, who makes this business a speciality, and you will thus save dealer’s and all intermediate profits.

HIRE DEPARTMENT is now perfect. Over 300,000 always in stock. Second-hand Lanterns and Slides.

WALTER TYLER, 48, WATERLOO ROAD, LONDON.

On account of great increase of business, WALTER TYLER has purchased the Lease of the extensive premises, 94, Waterloo Rd., in addition to Nos. 48-50, Waterloo Rd.
The Optical Magic Lantern Journal and Photographic Enlarger.
NOTICE.

A car in the recent Lord Mayor's show (spectacle makers' company) was fitted with one of Mr. Wrench's triple rack lanterns. Rumour says that Mr. Wrench having an eye to business had in waiting in a side street a car with out-stretched screen, in anticipation of the day becoming one of the dark ones not uncommon in November. An exhibition of lantern slides en route would certainly have added zest to the procession. The day however was bright, and the lantern merely stood as an example of the work of the British workman.

We do not often hear of lantern shows to the blind, yet one was given lately at the Royal Normal College for the Blind at Norwood. We presume that the lecture was for the blind, and the illustrations more especially for the benefit of the visitors. It is said to have been thoroughly enjoyed by both.

MESSRS. TAYLOR, TAYLOR & HOBSON are again making a special effort to further popularise the standard thread for lenses. They have made special arrangements with the inventor of a new portrait lens for its manufacture; the new lens is said to give an optically perfect plane image of a plane surface.

The lightest triple lantern said to have been made, was only lately manufactured out of aluminium by Mr. W. C. Hughes. The lantern was of the style known as the Malden triple.
The partnership between Messrs. Platt & Witte, of Birkbeck Road, High Street, Kingsland, has been dissolved by mutual consent, and Mr. E. G. Platt will continue the business at the same address, and will assume all responsibilities in connection with business transactions of the late firm. Mr. Platt is a go-ahead man, and as he makes a special point of suitting his patrons even to the smallest detail, it is invariably a case of once a customer, always a customer.

Still another branch is to be added to the already large business of Messrs. Theobald & Co. It is their intention shortly to blossom out as auctioneers to the optical and fancy trade in order to clear out dealers' dead stock. These sales will be held monthly, the first taking place on January 8th, 1895.

Hydrogen gas is now prepared in Germany—for filling military balloons—by heating a mixture of iron filings and slacked lime. An iron bottle, such as a mercury bottle, and set in a furnace giving a full red heat, should serve for this process, which may prove convenient for those who wish to prepare hydrogen for lantern use. From the point of view of avoiding stoppage of the exit tube, it would probably be best, says Mr. Hill in Invention, to set the bottle upright in the furnace, and adapt a clearing wire to the vertical tube by means of a perforated cork, a horizontal branch serving to lead off the hydrogen.

Messrs. Holmes & Watson are now making a special feature of fitting incandescent gas burners for lanterns, and make a special form of tray for the purpose.

At one of the meetings of a certain photographic society a funny incident lately happened. A lecture, illustrated by lantern views, was being given by a member. One member, who is supposed to be a bit of a wag, thinking to have a bit of fun at the expense of the lecturer, went over to the lantern, and when the operator was engaged, slipped in among the slides a picture of himself. Thinking it would be great fun after the lecturer announced that the next slide would be a view in — he sat down to await events. The lecture, however, did not proceed quite in the manner anticipated; for the lecturer, who grasped the situation, merely said, "The next slide, ladies and gentlemen, represents — a refractory donkey." Several meetings passed before the subject of the slide again put in an appearance at any of the meetings.

That noted pioneer in the early days of photography, the Rev. J. B. Reade, among other experimental researches, exercised his skill in trying to improve "Solar, and oxy-hydrogen gas microscopes," by separating to some extent the heating from the luminous solar rays in the optical system of the lantern. A paper by him on the subject was read before the Royal Society, December 22nd, 1836. He converged a beam of sunlight by a convex lens, and at a certain distance beyond the focus placed a second convex lens, in such a manner that the heat rays after passing through the second lens were either parallel or divergent. The luminous rays, being more refrangible, were brought to a focus nearer to the first lens and farther from the second; the latter lens then brought the luminous rays to a brilliant focus free, he said, from much heat. He added that "the light so obtained may be advantageously applied to the solar and to the oxy-hydrogen microscopes, from its producing no injurious effects on objects enclosed in Canada balsam, or even on living animalcules exposed to its influence."
ARCHER'S LANTERN NOVELTIES.

THE "IDEAL" LANTERN. The most perfect Single Lantern in the market. Enthusiastic Testimonials from Paul Lange, Esq., G. R. Thompson, Esq., Manchester Camera Club, and many others. Will show to perfection any distance, 8 feet to 80 feet from the screen.

THE "IDEAL" DISSOLVER AND CARRIER FRAME. The most perfect ever invented for Single Lanterns. Highly praised and used by the editor of this journal. Price 25s.

A Wonderfully Good Safety Jet. Price 16s.

The "Photinus," greatly improved, the most powerful Oil Light Lantern in the world. Price complete £4 4s.


"Hawarden Castle: Mr. Gladstone's Home.


Illustrated Catalogue, Many Novelties, Post Free, One Stamp.

ARCHER & SONS, Patentees and Manufacturers, 43 to 49, LORD ST., LIVERPOOL. Estd. 1848.
FOR Sale, a Bargain, Full-sized Magic Lantern, complete, 16 Coloured Slides, Lecture Book, and Double Carrier; all as good as new; price £1 10s.; Plain and Coloured Slides from 6s. per dozen.—Alfred Underhill, Lantern Slide Specialist, 32, Clarendon-road, Croydon.

STAINED Glass.—Will any Lantern Reader, amateur or professional, send Particulars of Slides, for Exchange, Loan, or Sale, Exhibiting Stained Glass Windows; Cathedral and other interiors which show the windows are likely to be suitable; Continental once, especially Brussels and Gouda wanted; the whole required to supplement lecture illustrations of Stained Glass.—O. Paterson, 115, West Regent-street, Glasgow, N.B.

12 SLIDES, "Life of a Missionary," hand-painted; cost 4s. 6d. each, sell 12s. net.—F. Sheaf, High-street, Dover.

HAVING given up the Hire Business in Slides, for reasons stated in last issue of this Journal, we are selling our Stock of 20,000 Slides at less than cost; catalogue, one stamp.—W. I. Chadwick, 2, St Mary's street, Manchester.

FOR Sale.—Splendid Lantern, mahogany, open stage, bellows front, long extension, Russian iron body, side doors, brass sight holes, best safety jet, slides on telescopic tubes, 4 inch condenser, and rack and pinion lens, measures 12 by 7 by 6½ inches. In box, lock, key and elevating board, new £5.—Taylor, 197, Sauchiehall-street, Glasgow.

HAND PAINTED best Glass Slides. Mont Cenis Snow Effects (1), 7s. 6d. Lecturer's Reading Limp, Churchyard. Scene, with Ghosts (2), cost 30s.; Mechanism (1), 12s. 6d. The lot for 30s. A Bargain.—A. P., 38, High-street, Glasgow.

slides made from negatives, 6s. doz.; customer's own slides coloured 4s. 6d. doz.; lanterns and slides for sale or hire; lists free.—W. T. Wing, Chatteris, Cambs.

WANTED, engagement as lanternist to lecturer or otherwise; own limelight lantern; 20 years' experience.—F., 18, Triangle, Bournemouth.

ADVERTISER, who is an experienced operator of bi-unial and triple lanterns, is open to take occasional engagements.—For vacant dates, apply Operator, 13, Dale-road, Kentish Town.

SLIDES made from negatives, 6s. doz.; customer's own slides coloured 4s. 6d. doz.; lanterns and slides for sale or hire; lists free.—W. T. Wing, Chatteris, Cambs.

WANTED, Lantern Slides, any subjects, coloured or plain; by any firm or makers; 500 sets wanted immediately; second-hand or new, exchanges arranged. State particulars and bottom price. No bantering.—Professor Walters, Baskerville Hall, Cambridge-street, Birmingham.

BI-UNIAL Lantern, mahogany polished body, all brass stages, one drawer, telescopic front tubes, open stages, four panelled doors, ruby tight holes, iron lining, dome and cover, pair blow-through jets, and six-way dissolver, pair double combination 6 inch focus lenses, and 4 inch condenser. Great bargain, sell £7 10s. lowest; nearly new, worth double.—Professor Walters, Baskerville Hall, Cambridge-street, Birmingham.

HUGHES' Best Paphmepos Lamp, with Chimney, complete; only been used a few times; cost £2 2s., offered at 20s.; one Oxy-calciun Spirit Lamp, 6s.—John Mason, Market-place, Newbury.

TIMBERLAKE Saturator for Single Lantern; quite new.—83. W. D. Ashwell, 26, Solon New-road, Clapham, S.W.

WANTED, offers for Scott's Patent Saturator, with Wide Bore Safety Jet; very little used.—Sydney, 83, Rectory-road, Burnley.

TO Lanternists and Slide Dealers.—Several Lanterns (including a Magnificent Bi-unial), Screens, Cylinders, Jets, Regulators, &c. A number of Sets of Tales, Effects, and Moving Slides, etc., left from last season, to be Sold Cheap.—Clearance Sale List post free from Alfred Underhill, Lantern Slide Designer, Clarendon-road, Croydon.

WANTED.—Photographic Slides of objects in motion taken instantaneously, shewing unnatural and peculiar phases of the objects photographed.—F. G. Heseldin, Cross Gates, Leeds.

HIGH-CLASS Bi-unial Lantern, by one of the best makers; expensively finished and fitted; 20 foot Screen, two 9 foot Gas Bags, cost £20; very strong Pressure Boards, etc., etc. Complete Lecturer's Outfit, little used; cost over £30. Price £21.—A. P., 38, High-street, Ryde, Isle of Wight.

CHRISTMAS Effect Sets.—"Cottage Window in Winter" (lady appears and feeds Robin Red-breasts), 2 slides, 4s. 3d.; "Manor House and Carol Singers," 3 slides, 6s. 3d.; Day and Moonlight, Summer and Winter Effects, in pairs, from 2s. 3d.; Mottos: "Welcome," "Good Night," "Merry Christmas," etc., 1s. 2d. each; all post free; list gratis.—Alfred Underhill, Dissolving View Artist, 32, Clarendon-road, Croydon.

LANTERN.—Splendid Optical Lantern. 4 inch condensers, three-wick lamp, in case, 20s., cost 2s.—A. J. Richardson, Dore, Sheffield.

MAHOGANY polished single lantern, iron lining throughout, handsome brass telescopic front, open stages, 3-wick Russian lamp, powerful rack and pinion lens, with flasher, 4 inch plano-convex condenser, enamelled dome, complete, only used 3 times, new last April, price £2 5s., cost £4 10s.; blow-through jet, quite new;俄国 wheel lime turner, 6s.; high pressure dito, 7s.—Professor Walters, Baskerville Hall, Cambridge-street, Birmingham.

BEARD'S Regulators.—As new, scarcely used; two oxygen, one hydrogen, 21s. each, ordinary Binn fittings; 40 feet Manchester hydrogen cylinder, complete (new) 35s., or offers, Beard's regulator to fit, 21s.—Arnold, 243, Lewisam High-road.

WANTED TO KNOW.—Experienced operator can accept engagements own apparatus (bi-unial); distance no object; terms moderate.—Beard, Studio, Worthing.

INCANDESCENT Gas Burners, two damaged, no bye-passes, with several shades and globes; cost £5, 60 to 80 candle-power; lowest price £3,—Blaker, Studio, Worthing.

The prices of the Back Numbers of the Optical Magic Lantern Journal are at present as follows:—
Effect for a Bi-unial Lantern.

The floral design and device, of which illustrations are given in this issue, are capable, when reproduced as lantern slides, and shown with a bi-unial lantern, of giving a very fine effect. Those of our readers who are inclined to make slides of them should proceed in the following manner:—First make a negative from the floral design, and while the camera is in the same position, a second negative, first pasting the device over the central flowers. We will thus have a negative of the design complete, and also one of the device with a floral border.

The camera having been allowed to remain in the same position, the outer designs of both negatives will be of precisely the same size. From these negatives make lantern transparencies (say by contact), two from the negative containing the full design, and one from that
with the device. One of the former can then
be coloured, and it will be found that it lends
itself to some artistic work. After projecting
upon the screen the slide with the device,
the plain slide with the full design can be
dissolved on, and afterwards the same coloured.

The effect presents a fine appearance,
for the outer border of the complete design being
coincident with that with the wording, the
central bunch of flowers only appears to be
added, or, more correctly, to take the place of
the wording. The plain and the coloured slide
being coincident, no change in outline should
be perceptible on the screen when the latter is
dissolved on, but only the colouring imparted to
the flowers.

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Old Polytechnic Lanterns and
Slides at the Lantern Society.

On the 26th ult., at the Lantern Society,
Hanover Square, W., "we" (i.e., J. Hay Taylor,
editor of this Journal) used two of the old
lanterns which were in use at the late Royal
Polytechnic for exhibiting a selection of the
large hand-drawn and painted slides which in
the olden days created such a furore.

In consequence of the invitation which was
inserted in our last issue, the large hall was
crowded with an appreciative audience.

After giving a few particulars of the lanterns
themselves, such as their being constructed on
cast iron foundations, having metal bodies with
9 in. compound condensers, with an auxiliary
collecting lens of 4 in. dia., non-achromatic
objectives of 12 in. focus and 6 in. dia.; jet
tubes which led from the side of the lantern,
and clockwork for rotating and raising the
limes, it was explained that one of the artists
(Mr. W. R. Hill—late Childe and Hill—who
had painted many of the slides to be shown)
was not only present, but had lent considerable
aid in connection with the present exhibition.

The lanterns and slides are the property of
Mr. Edmund H. Wilkie, one of the directors of
the late Royal Polytechnic, who had kindly
entrusted the speaker with them for
exhibition; and although he himself was
incapacitated through illness from being
personally present, yet was doubtless sitting at
home mentally feasting upon the exhibition of
his works of art—in other words, his mind was
at Hanover Square.

Accompanying the slides was a terse descrip-
tion, giving an account of the portion of the
entertainment in which each had played its
part in days gone by.

Fifty-seven slides in all were exhibited on the
screen, the titles of which were as follows:—

<table>
<thead>
<tr>
<th>Title</th>
<th>Artist</th>
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<tbody>
<tr>
<td>Great Hall of Royal Polytechnic</td>
<td>W. R. Hill.</td>
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<tr>
<td>Coaching Days</td>
<td>Clare.</td>
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<td>&quot; by Winter</td>
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<td>&quot; Depôt</td>
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<td>&quot; Halt for Changing</td>
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<td>&quot; Evening</td>
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<td>&quot; The Wayside Inn</td>
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<td>Waiting Room, King's Cross (G.N.R.)</td>
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<td>Railway Viaduct, with train</td>
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<td>Albert Bridge, Windsor</td>
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<td>Oxford from the Meadows</td>
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<td>Old Houses of Parliament—Day</td>
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<td>&quot; Night.</td>
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<tr>
<td>New</td>
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<td>Gravesend in 1853</td>
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<td>Deptford</td>
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<td>Burning the Martyrs, Smithfield</td>
<td>H. L. Childe.</td>
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<td>Great Fire in London</td>
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<td>British London</td>
<td>Childe &amp; Hill.</td>
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<td>Interior of Old St. Paul's</td>
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<td>St. John's Chapel in the Tower</td>
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<td>&quot; (illuminated)</td>
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<tr>
<td>Baron Munchausen — Chasing the Enemy</td>
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<td>Baron Munchausen—Half his Horse</td>
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<td>&quot; Baron under laurels</td>
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<td>&quot; beating coat</td>
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<td>&quot; firing shot</td>
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<td>&quot; effect of his shooting</td>
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<td>St. Goar</td>
<td>W. R. Hill.</td>
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<td>Rheinfel's Castle</td>
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<td>Ruins on Banks of Rhine (Lurline)</td>
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<tr>
<td>Lurline on the Rock</td>
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<tr>
<td>Peter talking to the Giant (from &quot;Heart of Stone&quot;)</td>
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<tr>
<td>Giant chasing Peter</td>
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<tr>
<td>Giant's Hand (painted by Mr. Hill from his own when in front of a mirror)</td>
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<td>Title Picture, Hyllemeer</td>
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<td>Meadows by Moonlight</td>
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<td>Heligoland</td>
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<td>Marshes</td>
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<td>effect Will-o'-the-wisp</td>
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<td>Mr. and Mrs. Noles in cavern</td>
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<td>Marshes, effect fire demons</td>
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<tr>
<td>&quot; cave scene</td>
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<td>&quot; with pillar</td>
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<td>&quot; effect</td>
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<td>Moored Torpedo</td>
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<td>Ship blown up</td>
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<td>Old Wardle's Kitchen</td>
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<td>Gabriel Grub—At Church Door</td>
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<td>Goblin's Cave</td>
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<td>Christmas Fare—Set Table</td>
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<td>&quot; Burning the Yule Log</td>
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<td>Village of Raleigh</td>
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<td>Carol Singers</td>
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<td>&quot; (the bedroom scene)</td>
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<tr>
<td>effect St. Nicholas</td>
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The entertainment throughout was greatly
enjoyed, and hearty votes of thanks were given
to Mr. J. Hay Taylor, Mr. E. H. Wilkie, and
J. & R. OLDFIELD,
Specialists in the manufacture of RUSSIAN IRON and BEST BLACK OPTICAL LANTERNS, &c. Also Photographic DARK-ROOM LAMPS (absolutely light-proof) and other Photographic Accessories.
To the Trade Only.

26, GEORGE ST., PARADE, BIRMINGHAM.

Dissolving View Magic Lanterns and Slides
Photographic Apparatus, Scientific Instruments and every description of miscellaneous property.

R. J. C. STEVENS begs to announce that he holds Sales of the above, every Friday, at half-past twelve precisely, at his great Rooms, 38, King Street, Covent Garden, London.

Gentlemen wishing to include property in these Sales are requested to send particulars one week prior to sale.

H. NIXDORFF & Co.,
MANUFACTURERS OF
Lantern Slide Post Boxes.
Wood Parcel Post Boxes.
Wood Boxes to go by Rail.

30, MAIDSTONE ST., HACKNEY RD., N.E.

Established over 100 years.

C. ACRES & Son,
Principal Artists to the late Polytechnic Institution, Adelaide Gallery, Panoptican and other Scientific Institutions, are prepared to undertake a few orders for Painting Dissolving Views or Photographic Slides at reasonable terms.

10, MALVERN ROAD, HORNSEY, LONDON, N.
THE MINIATURE MALDEN TRIPLE.

A Perfect Bijou Model used by B. J. MALDEN, Esq., with great success. Ventilation perfect, on a new and patent principle, and keeps cooler than the larger ones. Height, only 22 inches; weight lessened. Specially 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. Prices, £25 10s., £33 10s. and £31 10s. Elegant Brass Fronts. Should be seen; a magnificent little instrument.

THE DOCWRA TRIPLE, Prize medal, highest award. Supplied to Dr. H. Guinness, Madame Adelina Patti, and the Royal Polytechnic, &c. &c.


NOTES.—Mr. Dallmeyer’s New Lantern Objectives can only be obtained from Mr. Hughes.

HUGHES’ AICUISCOPIC LANTERN OBJECTIVE.

Giving fine definition, solid fronts, double milled heads, slot for coloured glasses. Price £1 5s. 6d., incomparable at the price.

W. C. HUGHES, Patentee and Specialist,
Brewster House, Mortimer Road, Kingsland, London, N.
Second-hand Lanterns and Slides—Bargains.
Gas Bag Explosion at Birmingham.

On Thursday evening, 1st ult., after an illustrated lecture at Mason College, Birmingham, it appears that someone removed the weights from a gas bag before the light in the lantern was put out. This was followed with a result not uncommon, viz.; an explosion. Two students were slightly injured, and all the windows in the hall were blown out.

With compressed gas at the present low rates, it is surprising that bags are employed at all. Had a cylinder been used, all would have been right, even under a little careless management.

It is amusing to read the remarks in some of the local papers, written evidently by some whose knowledge of lantern matters is doubtless somewhat vague. One writer says that: "The canvas bag which contained the gas used for heating the chalk exploded, &c." Another individual states that: "It is a mystery, for the apparatus, and material of which the canvas bag was made, were of the best."

In a case of this sort it is a question of conditions not quality.

A Nice Pair of Lantern Experiments.

In the course of the last session of the Royal Institution, Professor Dewar performed the following experiment with ice, a substance which it is impossible to cut.

He took a clear rectangular block of ice (w) three inches high, two inches broad, and one inch thick, and placed it upon the wooden support (x) with a magic lantern behind it, and a projection combination in front. N M are two one-pound weights, connected by a fine platinum wire, passing over the top of the block in the direction (N A E M). The pressure of the wire, due to the weights, slightly liquefied the ice below the wire, so that it travelled slowly downwards through the block, the wire taking a curve something like that described by the dotted line above (w). This curved part of the wire is focussed, so that upon the screen it can be seen slowly travelling downwards through the ice; at last the wire travels entirely through the ice, and rests upon the top of the wooden block (n). The ice-block now might be supposed to be cut in two, but it is not so. The phenomenon of regelation comes into play, so that immediately above the wire the separated ice freezes together again, and at the end of the experiment the block of ice, after the wire has passed entirely through it, is one solid block as at first.

This performance includes another and unintentional experiment, for ice-flowers appear in the block, and become visible upon the screen. Professor Tyndall once investigated the nature of these flowers. They are of different forms, nearly as varied as snow crystals, usually star-like, and presenting six rays of varied forms, which forms are alike in each particular star. The heat of the radiant in the lantern "uncrystallises" the ice at particular places, if the word may be allowed, and shows how it was originally built up. In the middle of each flower is a spot which shines by reflected light like burnished silver, and it might be supposed to be a bubble of air; but melt away the ice round the spot and it disappears, for the spot is a vacuum. When a spot first forms, by attention a slight "chink" can be heard. "Probably," said Professor Tyndall, "few here present were aware of the beauty latent in a block of common ice. And only think of lavish nature operating thus throughout the world. Every atom of the solid ice which sheets the frozen lakes of the North has been fixed according to this law. Nature "lays her beams in music,' and it is the function of science to purify our organs, so as to enable us to hear the strain."

When the intention of the experiment is to show the ice-flowers, much re-focussing with the projection combination has to be effected, to bring different flowers at different depths in the ice to sharp focus upon the screen.

The First Lantern for Opaque Objects.

By W. H. Harrison.

The first magic lantern for opaque objects appears to have been invented by Euler the mathematician, and was described in his "Letters to a German Princess." In his letter to her of January 8th, 1762, he gives the accompanying diagram thereof, Fig. I., and says that he had had the honour of presenting her with one of
The Optical Magic Lantern Journal and Photographic Enlarger.

The lanterns six years previously. The object to be optically projected was placed in the back of the lantern, and opposite it, in a sliding tube in the front of the lantern, was the projection lens. He says that it contained two side wings with lamps and mirrors to illuminate the object.

In the Encyclopaedia Metropolitana is a plan of this or another lantern by Euler for the projection of opaque objects, as represented in Fig. II., in which two lights are screened from the lens by either two curved mirrors, or one concave mirror with a hole in it; the lights and mirrors illuminate the object. The Encyclopaedia Metropolitana refers the reader to "Nov. Com. Petrap., Vol. 3., p. 303," a book which we have not been able to find.

These lanterns were not attached to the baseboard.

The German princess was Anhalt Dessau, niece of the King of Prussia, who had requested Euler to give her instruction in different branches of natural philosophy. Leonard Euler was born at Bâle, October 15th, 1707, and died suddenly of apoplexy while playing with his children, on September 7th, 1783.

The result of following Advice given in the "Optical Magic Lantern Journal."

By C. Reece.

In the October issue of the Optical Magic Lantern Journal, an article appeared by Mr. Geo. Kilburn, in which he gave various suggestions relative to the use of a screen or rack for transparencies. The writer of the article stated that when visiting a friend's house he was struck by the fine appearance of having a window screen, which was composed principally of lantern transparencies. On reading the article the thought came to me that it would be a good idea if I made one to place in my parlour window.

Suffice it to say that I did make one, and a good one too, and personally I found it a great convenience when arranging lectures in the daytime, for in front of me I had all the slides about which I was writing my lecture; and the screen being so made that any particular slide could be quickly taken out and another inserted, I found it a very simple matter to select and put in order those slides which I considered most suitable for my purpose.

Those who are interested and may wish to make such a window screen for themselves, can do so if they follow the instructions herewith, provided of course that they have the requisite mechanical ability to carry them out. As my window measured 52 inches across I decided to make my screen as near square as possible, for having plenty of slides at hand the size was immaterial. Each slide requires a $\frac{3}{4}$ in. square space, so the frame will carry fifteen pictures each way, or 225 in all.

The diagram (Fig. I.) represents one corner of screen. The outer frame (AA and BB) is of \(\frac{1}{4}\) in. bay wood \(\frac{1}{2}\) in. wide, and the intermediate grooved struts (Fig. II.) placed at distances of \(\frac{3}{4}\) in. full, apart, measuring from inside the slots. The struts are made from \(\frac{3}{8}\) in. strips \(\frac{1}{2}\) in. wide grooved on each side to a depth of \(\frac{1}{4}\) in., and \(\frac{3}{4}\) in. in width. The angles at which the grooves are cut (see A, Fig. II.) are but slight—about ten degrees, not more than one-third of that shown in the sketch. When they have been fixed in position, strips of \(\frac{3}{4}\) in. in thickness and \(\frac{1}{2}\) in. wide should be laid on the front of them to finish the appearance and prevent the slides from falling out (see c c c c, Fig. I.). If carefully made it should be very strong, and I think all lanternists will agree as to its artistic uses, but there are one or two disadvantages which in my case have cropped up, but then this is the way with most things.

As soon as the gas was lighted in the room the effect from the outside was gorgeous, especially as most of my slides were coloured. Presently I heard a knock at the door, and learned that the church curate wanted to know whether I felt inclined to give a lantern show to the charity for—I forget, but it was as much sense as sending out hair curlers for the ladies of the Fiji Islands. I replied that I was not
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inclined to undertake it. Later on, a schoolmaster wanted my price list for slides, with best rate of discount. I remarked that I did not deal in slides. Others came and asked for terms for colouring slides, and so on, one individual even asking me to lend him a jet, as his roared, and he had to commence an entertainment in the vicinity in a quarter of an hour. I was much annoyed with the numerous calls that I had for a few days, until one evening the beer cask being empty I sallied forth to get some for supper. I discovered that with a good light inside the room my house was quite a mark, for a number of people had come as close to the window as practicable in order to see my slides.

I then speedily realised the disadvantage of having a window screen of lantern slides in the front of the house, and quickly adapted it to one of the windows in the back. However, it shows that, if one goes about it in a proper manner, one can soon get a little trade together; and if I decide to go into the slide dealing business, the first thing that I shall do will be to have a large window screen made, capable of holding a good supply of attractive slides.

**The Apparatus with which I make Oxygen Gas.**

*By R. W. J. Leicester (Gawler, Australia).*

I have pleasure in submitting to the readers of the Optical Magic Lantern Journal, a sketch of the apparatus which I find particularly handy when making oxygen gas. In Australia we have not got the great facilities which one has in England, where by sending, at the most, a few miles one can get their cylinder filled at short notice. Here in Australia it is a common thing for one to make his own supply, and the following is what I have found most convenient for the purpose.

Fig. I. is a round tin six inches deep, and eight inches wide. The opening (a) in the side is for the purpose of admitting a spirit lamp (Fig. II). At the bottom of the tin is soldered a piece of wire (b), which serves to keep the lamp in its proper place. (c) is a small L piece to steady the retort. Fig. III. shows the lamp and retort in position. I find that it works splendidly; the flame from the spirit lamp spreads until it covers the whole of the bottom of the retort, and this causes every particle of the chlorate of potash to be utilised. There is no rush of gas, but everything works smoothly and pleasantly. Of course the flame increases as the spirit gets warmed up, and when done with the flame can be blown out, and the whole apparatus put away in a very short time. I have tried several methods of making my gas, but find this the best. It is surprising how little a quantity of spirit is used, and, as everyone will be aware, there is neither smell or dirt with this kind of flame.

*Modern Optical Illusions.—No.IV.*

*By Edmund H. Wilkie, Of the late Royal Polytechnic Institution.*

(Continued from p. 187.)

The most effective illusions have been the result of extremely simple appliances, and those I have previously described will sufficiently illustrate this. Both the "Ghost" and "Metempsychosis" owe their origin to reflection at an angle of forty-five degrees.

This we shall find to be the case with almost all the illusions which can be termed purely and simply, optical. It is the "Mystic Angle" to which they all owe their success, and in looking over those effects I hope to treat of presently, I still find the same thing in almost every case. The reason for this is sufficiently obvious, when we consider that the object of an optical illusion is either to lead the beholders to imagine they see something which is really not before them, or to induce them to suppose that they are gazing into an empty space or room, when it contains some object hidden from their sight by illusory means.

A reflector placed at an angle of forty-five degrees answers both of these purposes; in the Ghost illusion the objects were reflected from below, in Metempsychosis from the side, and in "The Modern Delphic Oracle" an object is concealed by reflection from another quarter, which we will not enter into until after viewing the whole affair from the front of the stage. Here is a little illusion of the simplest character. In the suburbs of Brussels stands...
a picture gallery known as the Musee Wiertz, containing a collection of pictures painted by one man only. During his life M. Wiertz was very generally considered to be a madman, and when he offered the whole of his paintings to the Belgian Government, on the condition of a suitable building for their reception and exhibition being built, his offer was refused. At his death it was renewed by his executors, and the authorities this time accepted the terms, and hence the Musee Wiertz. Besides the pictures are one or two little optical effects, one of which struck the writer as worth remembering.

About five feet above the ground there is an oval hole in a screen, and above this a notice requesting visitors to put their faces into this orifice. On doing so one is surprised and indeed, for the moment, unpleasantly shocked by observing immediately opposite a very misshapen little hunchback, whose face is that of the spectator himself.

The explanation is very simple. A painting in high relief of the hunchback is placed on the inside of the screen, leaving a hole where the face should be, and the visitor unconsciously finishes the picture by placing his own features in the vacant space, at the same time viewing the whole in a looking glass placed immediately opposite.

One of the principal illusions we have now to deal with was first produced at the old Polytechnic Institution under the title of "The Modern Delphic Oracle," and when all the circumstances, such as allowance for loss of light by reflection, proper angles, and appropriate scenery and accessories have been taken into favourable consideration, the result is very puzzling.

On the rise of the main curtain in the small theatre, the entrance to a Greek building or temple was discovered (Fig. XII.) the principal portion of the scenery being flat, with small entrance porch about 12 feet square in the centre flanked on either side by columns, and approached by two or three steps. This entrance was closed by a curtain being drawn across; and presently, after a few bars of music, this was drawn aside, and an ancient Athenian nobleman walked down the steps on to the front of the stage, the curtain being drawn across again as he descended.

His appearance betokened advanced age, his garments spoke wealth, and his step was full of dignity.

After burning perfumes in a brazier, he invoked the spirits of deceased celebrities, amongst others, Socrates, when, the curtain rolling back, the head of the sage appeared floating in space in the centre of the small temple. When
Socrates had treated the audience to "a taste of his quality," the curtain closed him out and others appeared in the same place. One entertainment given by the aid of this apparatus was entitled "Shakespeare and his Creations," and consisted in the successive appearances of a number of heads of characters from the great dramatist's works.

After the exhibition of each head, the curtain was drawn across to conceal the change, and finally, the noble Greek made his exit passing through the spot where the heads had appeared, thus showing that no apparatus of any kind existed there. One peculiarity about these heads was their solidity; there was not the slightest doubt about that, and it could be plainly seen that the head cast a shadow on the wall behind.

The mode of working this illusion was very simple, and the sectional view, Fig. XIII., almost explains itself.

When the mirror was in position the spectators imagined they were looking into an empty apartment, straight to the back wall, as the mirror reflected the ceiling in that position, and the actor's head, having been previously thrust through the opening in the glass, appeared to be floating in space, as his body was invisible, being hidden by the reflector.

To enable the Greek to walk in and out of the Temple, the mirror was built on runners at the top and bottom and was pulled off the scene, out of the way, while the curtain hid the small apartment from view, and when again withdrawn, the space being clear, the actor could walk through. The shadow of the head was not brought about by any cunning contrivance, but was simply the result of natural laws.

If we throw a diffused light on a mirror at an angle, a patch of light will be reflected at a corresponding angle exactly the same shape as the mirror, and if we spread out our fingers over the glass we shall see a dark mark exactly corresponding to the shape of the hand upon the image of the reflector. Therefore, if we throw a light upon the large mirror used in the illusion, the light will be directly reflected on to the ceiling illuminating the whole of it with the exception of a small round spot in the middle corresponding to the spot in which the piece is cut out in the mirror, for as this portion possesses no reflecting quality no light can be reflected by it.

The ceiling being then reflected to form the back of the Temple the small spot of darkness appears in the centre just behind the head, and if a light is moved to and fro in front of the head the shadow follows it and produces a natural effect sufficient to throw the most expert illusionist off the scent.

One of the subjects illustrated by this form of apparatus was known as "The Cherubs floating in the Air" and represented five cherubs grouped according to the celebrated picture by Sir Joshua Reynolds, the little heads and wings apparently floating in space. Unlike most optical illusions, all these effects were produced on a brilliantly illuminated stage, and I think I may safely assert were extremely popular.

At various times we have seen at shows and various places of public entertainment an adaptation of this principle, which, although in the main is a copy of our last illusion, goes yet still further and possesses an important improvement, which renders it very puzzling when first viewed.
In the room of exhibition a barrier is placed about eight or nine feet in advance of a handsome gilt picture frame, which apparently hangs upon the wall, but which instead of containing a picture is closed in by a curtain. After an introductory discourse by the exhibitor explaining illusions generally, which is carefully worded to distract the attention of visitors and confuse their ideas generally, the curtain is drawn aside and the interior of the frame appears as in Fig. XIV.

It contained a small oblong square chamber across which from side to side extended three brass rods, the centre one being quite in the middle of the wall, the top one a little higher up and slightly in the rear, and the bottom one a little below and in advance of the middle row. Thus the three rods formed a shelf sloping downwards towards the front, and upon this arrangement rested the head or rather the bust of a young lady, beautiful as flaxen wig, rouge, blanc de perle, false teeth, skin tightener, etc., could make her, from which you will gather that she presented a very charming appearance indeed, and had in all seriousness done her very best to render herself as illusory as possible; and

Is the Lantern Played Out?
No.

PRACTICAL SUGGESTIONS.
By Amy Johnson, LL.A. (Author of "Swishine.")

Many writers in recent issues of the Magic Lantern Journal have spoken of the decline of lantern exhibitions in the public esteem. A change of attitude we all admit, but I am far from believing the lantern is played out. It is part of that wave which is passing over every department of life: we must either ride upon the wave, or be swallowed up. "The old order changeth." The lantern is not now in the position of some new idea which has never "caught on"; on the contrary, it has hitherto enjoyed a most successful career, and now entering upon a new period of existence, may be said to be cutting its wisdom teeth. While slide-exhibitors pure and simple are deploring the want of interest in the old lantern shows, it is winning its way into the day schools and evening classes, with what result remains to be seen.

The mere purchase of a lantern by no means ensures success. "Exit the showman—enter the lecturer," by no means covers the case. A lantern lecture may be made quite as dull as the driest of school-books, but the field is open to the man or woman who can strike the happy medium. We must move with the times. Already the coloured daubs which we laughed at in infancy have given place to the highest productions of photography. The lantern has been redeemed from the taunt of plaything to rank with the microscope and telescope.

Having read and heard so much about the decline of the lantern, I lately interviewed an East End lecturer as to his experience. "I can always get a crowded house in the East End,"
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success, you must take a little trouble and must to how the experiments are to be made while subjects, but am not sure that this is the best sermon. Some lecturettes for the lantern on scientific to raise the status of his entertainment. He cannot bridge the gulf between the story-slides and, say, an experiment which can perform equally well.

What we want is a middle course between (say) "Dick and the Donkey" and the scientific lecture, where the slides are regarded by the lecturer as a sort of compromise required by the democratic nature of his audience in order to distinguish it as a "Popular" lecture. But, say, our would-be lecturers, "We can't do anything scientific in an hour or so." Granted; then make a popular course of not more than three or four lectures, and it will be found that the interest will grow with each lecture. Don't go in for diagrams and technicalities. We have no democratic nature of his audience in order to raise the status of his entertainment. He cannot bridge the gulf between the story-slides and, say, an experiment which can perform equally well.

I have frequently been asked to draw up some lecturettes for the lantern on scientific subjects, but am not sure that this is the best way. If you want to make your lecture a success, you must take a little trouble and must not expect to get up the whole thing in the half-hour before the lecture, referring to the book as to how the experiments are to be made while the audience is waiting. You cannot read your lecturette as you would a story; and to those who have to hire a lantern and possibly receive it the last moment, my advice is—Don't attempt anything of the kind.

Every exhibitor should have a lantern of his own, even if it be of the most homely description, so long as it will answer to try over the various experiments at home ere they are shown in public. Without some such practice it is impossible to become an expert operator. Then as to choice of experiments. It is scarcely possible to go wrong; there is not a branch of science which does not lend itself to this method of presentment; therefore select the one in which you take a real interest. Probably Natural History would offer the easiest course for a beginner, as so many slides are already in the market. So much is known by the public generally about plants and animals, and so much more is within easy reach of both as to information and slides (including micros), that a fund of information, not forgetting anecdotes, could readily be put in shape for illustration.

Physical sciences. Here a little more preparation is necessary; a little more skill also is required in manipulation, but the gain even to one's self is greater. Matter in its varied forms, and under the action of various forces. Chemistry, sound, light, heat, magnetism and electricity, are excellent subjects; but above all things do not follow the order of the text-books; take cross-sections as it were, which will bring in various sciences in their interdependence. This as a general rule, however, in isolated lectures is not always practicable.

Another suggestion I would make is, always be up to date. Take a wrinkle from journalism. For example, there has been much talk of late about flying machines. Now an "up-to-date" lanternist would have taken advantage of the occasion to have obtained from the periodicals or other source, slides of the latest forms of these, and would have worked backwards through the rude attempts of man to fly, to the principles upon which aerial flight depends, comparing the flying machine with the balloon, and showing in what respects the former has the advantage, and how the same general principles are better exemplified in the flight of birds, pointing out the hollow bones and their admirable adaptations, which we can but faintly copy. He would have designed to notice in passing the boy's kite and the details upon which its success depends.

(To be continued.)
The Optical Magic Lantern Journal and Photographic Enlarger.

The Enlarging Lantern of the Manchester Amateur Photographic Society.

One of the two rooms occupied by the Manchester Amateur Photographic Society, in Brazennose Street, is fitted up as a dark room in a manner luxurious enough to cause infinite envy to any amateur, being supplied with all the necessaries, and even temptation of a free "hypo" supply. In this room—says Mr. J. H. Seed, in the official organ of the Society—opposite to the sink, a bench is permanently fastened to the wall and floor, and serves as a stand for the enlarging lantern. At the right-hand end, a small gap intervening between the end of the bench and wall. On the wall is fastened a board, lying vertically with and transversely to the plane of the bench, and the plane of which is at right angle to the axis of the optical combination of the lantern, and which fulfils the purpose of an easel to support the bromide or other paper, etc., to be operated on.

On the bench are a couple of wooden rails (RR) of an inverted V section, which allow the lantern to be moved easily, and without disturbing any of the extensions that may have been made.

The lantern itself is externally a massive mahogany case, or, to be more correct, a couple of cases standing about 16 inches high, one of them, the smaller, about 12 inches long and about 12 inches wide, and the other about 17 inches long and 14 inches wide. The small portion contains the illuminant (B) and a plano-convex lens (D) of five inches diameter, and the other a double plano-convex condenser of 11 inches diameter (CC), and the enlarging objective (O). The two portions are attached to each other by a couple of hooks and eyes, and this, together with the board supporting the objective (which is removable) permit the interior to be easily cleaned of dust, etc.

In theory the illuminant should be a point; in practice, in this case, it is an argand burner, giving a flame of about half-an-inch in diameter. There is also provision for the use of a blow-through jet, but if this is used the need of the five-inch condenser should be dispensed with. The light may be moved nearer to or away from the small condenser, raised or lowered, or moved transversely. At the front end of this section a plano-convex (D) lens of five inches diameter is fixed, with the plane side to the light. The lenses of the larger condenser are two plano-convex lenses, mounted with the convex side facing each other, and measuring 4½ inches from one plane side to the other. Immediately in front of this condenser a carrier (A) to hold the negative (or positive) to be enlarged, slides in grooves, and is lifted out by a small projecting rib on the top end. The carrier will hold negatives from 8½ by 6½ down through all the intermediate sizes to 3½ by 2½. Attached to a board, which fits in the front of the lantern and is fastened by a couple of screws, is the enlarging objective—a photographic symmetrical combination of the rapid class—of 10½ inches equivalent focus.

The lantern is constructed to allow of the back portion (BD) and the front portion (O) being moved backwards and forwards, the front having an extension of 13½ inches and the back 10 inches. By this means, the light, condensers, and objective are all capable of adjustment to each other without disturbing the centres which are all in the same axis (XX). The purpose of this triple condensing system (DCC) is to enable a larger cone of rays from the light to be collected and passed through the objective. It would be possible to enlarge with the argand burner and no condensers, but the light would have to be placed so far from the negatives to obtain even illumination that the exposure would take days. Placing the light at two yards distance, the relative proportion of the light on the centre and the margin are in the ratio of 1:005.
to 1, a difference which may be disregarded; but when the condensers are brought into use, the amount of light that can be utilised is more than 1,000 times that given by the light by itself—a difference that makes the condenser a necessity. The cone of light rays, which up to the time of reaching the condensers is diverging, passes through the condensers and then converges. The objective must be placed in such a position, or must be of sufficient diameter to allow the whole of this cone to pass. If otherwise, the disc on the easel will be imperfect, either spoiled by colour or dark shadows.

The law of conjugate foci, governs the position of the condenser and the objective. There is only one correct position for each degree of enlargement. The number of times the enlargement fixes the foci from the lens to the easel, and from the lens to the condenser, which gives the position of the objective. The focus from the condenser to the light is conjugate to that from the condenser to the lens; and thus decides the position of the light.

Applying these points to practical purpose, the negative is given and also the degree of enlargement required. As an example, say from ¼-plate to 15 by 12.

The argand in the lantern is lighted and adjusted to burn to its brightest, and should be pushed as near the five-inch condenser as it will go. The negative is placed in the carrier with the film upwards, and when placed in the lantern this will bring the film side facing the objective.

It is presumed that the rails on which the lantern slides, are parallel with the edge of the table, otherwise the image will be larger at one side than the other. The front is now moved backwards and forwards till the image on the easel is distinct, it will probably be the wrong size, in which case, if too small, the whole lantern must be moved away from the easel, if too large, nearer to—the objective requiring re-focussing after each movement of the lantern. It will be found that the front of the lens will be about 36 inches from the easel and the extension of the front portion 44 inches. The distance between the double condenser and the small one and the light has still to be regulated. This is best effected by removing the carrier and then centering the light, so that it is brought into the axis of the optical portion, moving it up or down or sideways till the disc shows an equal amount of colour fringe or darkness circularly. The negative is removed from the carrier and the carrier replaced, and the back portion (BD) is moved backwards and forwards without disturbing the position of the central portion till the illumination on the easel is at its best.

The extension of the back portion will be found to be six inches. In enlarging from ¼-plate to 15 by 12, the various distances are: front of lens to easel, 4 feet 2 inches; front extension, 3 inches; back extension, 4 inches. By manipulating the parts in this order the foci of the objective are arranged, and then the focus between the light and the condenser is proportioned to the focus between the condenser and the objective.

Some small improvement in the disc may be made by moving the light to and fro. The negative is replaced in the carrier and inserted in the lantern, and a final touch given to the sharpness by inserting a stop if necessary, and a final delicate focussing. The stop numbered 16 or 20 appears to give the best result. All that remains is to put on the yellow glass cap, pin up the bromide paper, etc., withdraw the cap so many seconds or minutes, re-cap, remove the paper, develop the image, and the production of the “beauty and joy for ever” is accomplished.

No data can be given for the exposure. The trial of a few sheets or strips of paper will give experience.

A screen to assist in focussing can be made by taking an old negative, as dense as can be got, and ruling a series of lines with a penknife, both lengthways and across the plate, cutting the film so as to show clear glass. This is inserted in the carrier, and, when focussed, is taken out and replaced by the negative.

In final, determine first the position of the objective and the large condenser, and then adjust the light and small condenser to their best position.

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Our Visits.

WALTER TYLER’S NEW PREMISES.

A short time ago we announced the fact that Mr. Tyler had purchased the lease of new premises at 94, Waterloo Road. On the eve of their completion we were shown over the various rooms, and the special departments which were to be relegated to each pointed out. This branch of the large business at 48 and 50, Waterloo Road is intended principally in connection with the compressed gas department, although a number of lanterns and an exceptionally large supply of slides will also be on view.
Entering from the street we come into the shop proper, in the back portion of which is set out a fine slide gallery. Along one side of this are run rows of gas pipes with burners at short intervals, and in front of this a selection of coloured and plain slides are arranged. With such good lighting the effect is one which it would be hard to describe.

Down stairs in the basement is a very long room which communicates by means of a lift with the street, and in this is stored a supply of filled and empty compressed gas bottles, which causes one to wonder where they can all possibly go to. Telephonic communication exists between this branch and the head offices at number 48. Mr. Tyler will now have an opportunity of reducing his weight below twenty stone, as it is necessary that he take frequent trips between the two places, and the journey being too short to indulge in his usual method of locomotion (riding in a hansom cab), the exercise will doubtless have a tendency to reduce his avoirdupois.

The British Association at Oxford.

At the late meeting of the British Association at Oxford, M. A. Cornu, the celebrated French Physicist, read a paper before section A, entitled "A New Lecture Experiment, illustrating Babinet's Principle," which paper the Council afterwards resolved to publish in full in the annual volume of the proceedings of the British Association. Papers are so numerous at the British Association that they are usually officially published only in abstract form.

The accompanying cut shows the arrangement of the apparatus. A is an electric lantern with or without condensers, throwing a diverging beam of light through the small orifice in diaphragm (b). The diaphragm (c) with its larger orifice, helps also to cut off scattered light outside the beam; the light of the beam is then collected by the lens (d), and thrown upon the round opaque black disc, pasted on the left hand side of lens (e); this black disc receives and cuts off all the light of the image of the aperture in b.

r is a projection lens, which however casts too small an image; this small image is then magnified by the double combination projection lens in the tube (g), and is received upon the screen (h), where the image is seen as a dark disc about a foot in diameter, surrounded by a thin ring of light. One of these projection lenses may sometimes be omitted.

The conjugate foci of the lens (p) are the aperture in b and the opaque black disc on the lens (e). The conjugate foci of the combination (b f o), are the left hand surface of the lens (p), and the screen. The distance from the lantern to the screen was apparently between twenty and thirty feet.

Little luminous points were seen on the dark disc on the screen; these were due to particles of accidental dust on the left face of the lens (d). Small objects, such as fern leaves, when stuck upon the face of p became luminous as represented upon the screen, especially at their edges. M. Cornu cut a large piece of paper into a rough representation of a mountain with adjacent trees, and stuck it upon the face of the lens (p); upon the screen, as he remarked, the image resembled a mountain and pine forest, with the sun rising behind them.

Mr. R. B. Clifton, Professor of Physics at Oxford University, congratulated M. Cornu on the way in which he had objectively illustrated his subject, and Mr. Glazebrook said that although Babinet's principle had long been taught in the colleges, he supposed that not anyone had previously seen the phenomenon so brilliantly illustrated as to be visible to a large number of people at one time.

"Angling" the Lantern.

By A. M. Hiddon.

At first sight it would not appear that the relative positions of the lantern and the screen in the lecture-room is a subject capable of affording much matter for discussion or experiment. To a certain extent this is true, because there is but one position for the lantern in which wholly satisfactory results can be obtained. Unless the lantern is placed exactly in the centre of the screen, equidistant from its sides and midway between the top and bottom, or, to put it technically, with the axis of the lenses perpendicular to the centre of the screen, some distortion, trifling in many cases but still always present, must necessarily take
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place. In the vast majority of cases the proper central position for the lantern is easily obtainable, and is naturally taken advantage of; but here and there cases will occur in which a departure from the usual procedure is necessitated. With a view of ascertaining the utmost limits to which, in exceptional cases, a lantern could be moved from this central position, the writer lately conducted a series of experiments; and some of the results thus obtained are here set forth.

The room in which the experiments were carried out was an ordinary lecture hall, measuring 40 feet long by 25 feet in width, dimensions which approach closely enough the average size of those halls in which lanternists are generally called upon to operate in. The screen was hung exactly in the centre of the end wall, and in the first case was not tilted or angled in any way, but was permitted to hang straight down.

The various distances from the screen at which the lantern was worked need not be commented upon—the relation of the size of the disc to the distance of the lantern is one which has been frequently explained in this Journal—the question as to how far right or left of the proper central position the apparatus could be worked was the matter on which information was sought.

When using an objective of 9 inch equivalent focus it was found that practically neither distortion nor bad definition resulted from moving the lantern some yard and a half to right or left of the mid line of the screen. Some slight distortion of the disc must have been present, but it was negligible quantity, and probably would not have been noticed by the most observant critic. When the lantern was moved still further towards the side of the room, the distorting of the disc became decidedly marked, and when placed at a distance of four or five yards from the central line, the picture projected on the screen assumed such a one-sided and irregular shape as to be quite impossible, even with the most indulgent audience. Contrary to expectation, however, the loss of definition was but very trifling; a fact, perhaps, with which the excellence of the objectives used had much to do.

The same process was tried halfway down the room, using a lens of 6 inch equivalent focus; but, as would naturally be expected, the moving of the lantern to the right or left produced more distortion than the same amount of side-movement did when the longer focus objective was used. It was evident that with a short focus lens every care ought to be taken to insure the lantern being placed centrally with regard to the screen; and, also, that if circumstances necessitate the lantern being placed a little on one side, between one or two yards is quite as much as is wise.

With a 12 inch objective greater latitude was found to be allowable, and as a rough and ready way of reckoning the distance to which a lantern may be moved sideways, and yet give passable results, we might say that the measurement in feet from centre line of the room to the lantern must be rather less than the number of inches of equivalent focus of the objective used. Thus a 5 inch lens would give unsatisfactory results if worked at six feet right or left from the usual position, though with a lens of 12 inch focus a distance of ten feet would not produce excessive distortion of the picture. In other words, a lantern will give fairly satisfactory results when the angle its axis makes with the side wall of the room does not exceed ten degrees.

The cause of the distortion of the disc is obvious, and a comprehension of the facts connected with it aid the operator in bringing about its cure. Every lanternist, however inexperienced, is aware that the further the lantern is from the screen the larger the picture will be. Bearing this fact in mind, let us, in imagination, set up our lantern at the side of the room instead of in the centre. By turning the lantern in a slanting direction towards the screen we can get our disc on the latter, but because the rays which light its further side have a greater distance to travel than those which fall on the part of the screen nearest to the lantern, it results that the portion of the picture which is on the far side is on a larger scale than that on the nearer part, and that therefore the disc, instead of being square, oblong or round, is more or less fan-shaped or irregularly oval.

If the screen is hung perpendicularly, and at the same time the lantern is tilted to an excessive degree, the same distortion occurs, for then the rays which travel to the top of the screen will be longer than those which reach the lower part, and consequently the image at the top will be proportionately increased in size. If now the upper part of the sheet be inclined forward to the proper extent, so that its opposite edges are equidistant from the lens, the disc will become symmetrical.

In working from the side of a room all distortion can be avoided by "angling" the screen, that is by slanting and tilting it until its face is at right angles to the axis of the lantern. Thus theoretically, by manipulating the screen it is possible to work the lantern at any moderate angle, but in actual practice it will be found no
easy matter to accomplish this slanting and tilting of a large screen in the brief time usually allotted to operators to get their apparatus and accessories ready. Moreover, if the screen is angled to a considerable extent, the views will be presented more or less from a side point of view to nearly half of the audience, who will probably move over in a body to that side of the room where they can sit directly facing the screen. However, in spite of these disadvantages, the writer would not hesitate to set up his lantern several feet from the centre of the room, or even to work it from the extreme corner of a hall of the dimensions given, if the entrance doors, central gangway or other circumstances of any sort rendered the usual position undesirable. Under such conditions, satisfactory results may be obtained by the use of long focus lenses, and by erecting the screen as far towards the side of the room as possible, and also by "angling" it to a moderate extent.

Soap Bubbles and Films.

BY E. D. BARTLETT.

There are few who know how numerous are the experiments, both instructive and amusing, that can be included under the heading of Soap Bubbles. The beautiful colours exhibited by the soap bubble and other phenomena have been the subject of frequent observation, and have occupied the minds of some of our most distinguished philosophers, amongst whom may be mentioned Savart, Plateau, Brewster, and at the present day Professor C. V. Boys.

A great amount of patience is required in the successful working of some of the experiments, but the results will always amply repay for the trouble taken. Although soap bubbles can be blown with the simple soap and water and clay pipe of our early days, for the experiments I am about to describe, a solution giving a much stronger film is required, and this can be obtained by adding glycerine to the soap as recommended by Plateau. The solution recommended by Professor Boys, is a modification of that used by Plateau. A clean stoppered bottle is filled three quarters full of water and to this is added one fortieth part of its weight of oleate of soda, this will most probably float on the water, but by leaving it to stand for a day or two it will soon become dissolved. When dissolved add Price's glycerine so as to nearly fill the bottle, shake well and pour from one bottle to another alternatively, cork the bottle and leave it to stand for about a week. With a syphon formed of a piece of bent glass tube draw off the clear liquid from the scum which will have collected at the top. Add one or two drops of strong liquid ammonia to every pint of the liquid. The water used must be either distilled or pure rain water, and the soap solution must be kept in the dark, taking small quantities from the stock bottle, and after having used it for blowing bubbles or forming films, it must not be put back into the stock solution.

Soap bubbles can be blown with much greater ease by using this solution. The most suitable form of pipe for blowing bubbles is that used by Professor Boys, and a small sketch of it is shown in Fig. I. It consists of a short piece of tube \(a\) fitted at each end with corks \(bb\), into which are pierced two tubes \(c\) and \(d\); the tube \(d\) is a short bent piece and formed at the end \(e\) into a smaller orifice, this portion of the tube serves as the bowl of the pipe, and the small orifice \(f\) partly regulates the pressure in blowing the bubble. The other tube \(c\) is the mouthpiece, and a convenient length is about nine inches. The cavity or chamber \(f\) formed in the larger tube \(a\) between the corks \(bb\), serves to prevent any of the soap solution as it runs down the tube \(d\) from entering the mouth, the soap solution collects in this chamber or trap and is arrested. Bubbles blown by this solution and by means of the pipe when brought into the beam of light from a lantern show most beautiful iridescent colours. One of the drawbacks to obtaining good results is the draughts which soon cause the bubbles to burst, but this difficulty can be overcome by blowing the bubble in a glass globe. The bowl of the pipe is inserted into the globe and the bubble is then blown. Bands of colour soon begin to form round the globe and gradually change. When blown and protected in this way they have been known to last for a considerable time without breaking. Who has not heard of the South Sea bubble which created a sensation over a hundred years ago.

The colours of the bubble shown in this way can only be seen to advantage by a limited number of persons, and the colouring of the bubbles cannot be very well shown upon the
The Optical Magic Lantern Journal and Photographic Enlarger.

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screen, so that to obtain a good picture of the colours of the soap bubbles upon the screen to be seen by a large number of people, a film of the soap solution on small metal rings has to be resorted to. Wire of about the diameter of a common pin is bent into the form shown in Fig. II., and is soldered at the part (G) so as to form a complete ring; thin iron wire twisted at the point (G) will serve the purpose very well. The ring is then dipped into the soap solution which is best poured out in small quantities in a saucer; when a film is obtained it is then clamped on a stand or support (H) as shown in Fig. IV., such as is used in chemical experiments. An almost parallel beam of light (3) is thrown upon the film from the objective of a lantern, the reflected beam of light from the soap film (K) is focussed by the lens (L) on to the screen. Sometimes the heat of the beam of light from the lantern will be too great, and if so an alum trough placed in front of the lantern must be used. The film (K) should be placed at about an angle of 45° to the beam of light. This experiment is always well appreciated by the audience and amply repays the trouble taken with it. When once the experiment has been successfully accomplished, the position of the apparatus should be carefully made a note of for help when showing the same experiment on any future occasion. The pleasing effects produced by the last experiment can still further be enhanced by blowing a small jet of air upon the film in a slanting direction from a small nozzle. When the nozzle is placed in the position shown in Fig. II., a number of concentric rings of colour is produced, and when placed as in Fig. III., the concentric ring is broken up into two elliptical concentric rings, forming a still more beautiful effect than the last. The necessary force of air should be obtained by means of a weighted bladder, or any other means by which a steady current of air can be obtained. Blowing with the mouth is not advisable, as the moisture condensing in the tube and being blown through is likely to break the film.

Bubbles blown with hydrogen or common coal gas upon being detached from the pipe rapidly rise in the air, and if a small ring with a piece of cotton tied to it be attached to the bubble, having previously fixed a small paper figure of a man, the bubble when it rises will give the appearance of a balloon ascent, and when the ceiling is reached, the bubble bursts, and the ring falls to the ground, accompanied by the miniature aeronaut. The bubble blown with hydrogen can be lighted, and when blown with hydrogen and oxygen mixed, upon being lit, a small report is heard.

Owing to the density of ether vapour, bubbles blown with air can be floated upon it. To do this take an inverted bell jar, and pour a few drops of ether upon some blotting paper placed at the bottom of the bell jar; a bubble is then blown and dropped into it, when the bubble will appear to float upon nothing. There are many other experiments connected with soap bubbles, but these will be sufficient to initiate the reader into this branch of lantern work.

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Copying Printed Matter for the Lantern.

By Duncan Moore.

There are many whom circumstances may prevent from taking their walks abroad for the purpose of securing pretty landscape bits or architectural chef-d’œuvre for their winter lantern entertainments. Should they be anxious to make slides they need not despair, as some kinds of printed matter will make exceedingly attractive ones.

Engravings and prints bound in volumes, or separate, form an inexhaustible store from which to draw if due care is taken in the selection. In the first place, it is just as well to be on the safe side and not make copies of copyright pictures; but the numbers of suitable things that are not protected in any way form an ample store, without incurring the danger of copying doubtful subjects. In selecting prints or engravings for this purpose, there should not be any letterpress on the back, as the
indentations formed by the type give unnecessary trouble. Providing the would-be slide maker is not possessed of prints or engravings of his own, or under his own control, for a very moderate outlay most secondhand booksellers would supply as many as wanted.

A thoroughly good line engraving copies splendidly, and looks far better on the screen than many a direct photograph from nature. We may safely conclude such a picture is artistic, to say the least for it, and in all probability well composed. Good woodcuts also lend themselves well to photography and make surprisingly attractive pictures on the screen; as a rule, the finer the work the better it is for enlargement, although mere sketches are often very amusing or interesting. Suppose we have some bound volumes of engravings and desire to make a copy of some of them, there is, like everything else, a right and wrong way to go about it. We want the engraving perfectly flat when placed in a suitable position, and also to avoid damage to the binding of the book. When the book is large and heavy, there is often some trouble in securing both these conditions, especially if it has not been much examined and the back stiff and springy, with a tendency of the leaves to bend when opened to its full extent. A little simple apparatus should be put together to facilitate the work in this way.

Procure a board about nine inches wide and five feet long. At one end fix an upright piece of board same width and about eighteen inches high; it will be convenient if this upright board is made removable, fitting by a couple of pegs into corresponding holes in the longer board and supported additionally by triangular pieces, like buttresses at the back, ensuring that the upright is at right angles with its support. The diagram will show the arrangement; a few nails are driven into the back of the upright, and our apparatus is complete.

The book being laid down and opened against the upright, a piece of cord is passed round the page below the picture and another piece above it, and secured to the nails at the back. Sometimes it is better, instead of passing the cord over the front of the picture to use a couple of smooth flat pieces of wood, attaching the cord to the ends of them, the wood keeping the page in its proper flat condition without any risk of injury to the paper. A few blocks of wood varying from one to several inches thick and of the width of the board will be found useful to raise the book in order to get the picture to be copied in a line with the centre of the lens; the camera being placed at the other end of the board, which now forms a copying table. The next thing is to so arrange the lighting that the black lines look clear, black and distinct as possible. Sunlight must be avoided, and a quiet moderate illumination used, preferably from one side.

If a screen is moved about cutting off the light from different points it will soon be seen how the light falls to the best advantage. Now proceed to focus and get the image sharp as possible on the focussing glass, using a magnifier for the purpose. Stop down the lens well, because in subjects of this kind the utmost flatness and definition possible is required; also shade the lens from diffused light by a sort of tunnel made of brown paper, or what is better, a box blackened inside and from which both ends have been removed; this is a thorough protection to the lens and increases the brilliancy of the image wonderfully, much more than would be expected by those who have not tried it.

Use slow plates and give a moderate, but by no means excessive exposure. Over-exposure is bad, and under-exposure creates a good deal of unnecessary trouble. The developer should be fairly strong and well restrained, so that the process of development is well under control and can be stopped before the dark lines get any perceptible veil over them. Clearness in the shadows and density in the light is our endeavour. By adopting the expedient of restraining the strong developer instead of diluting it, we get a strong image with rapid development. Pyro-soda or pyro-ammonia is, I think, preferable for this work, although some prefer hydrokinone. By making the addition of sulphate of iron to the hypo-sulphite of soda, both in the proportion of about one ounce of iron salt to the pint of both, we get a brighter and blacker image than by using the hypo-sulphite alone, the iron acting on the pyrogallic acid in the film which darkens the colour as well as clearing up the shadows. If these rules are adhered to a strong brilliant negative should be the result, which will make excellent lantern slides by contact printing.

With pictures containing half-tone, produced by tints or granulation, very much the same procedure is required, but the negatives are better less dense than in the case of line engravings. The exposure should be full and the development not forced or the light will be rendered hard and chalky. Coloured prints are best copied on orthochromatic plates with a screen, and less dense than in the previous instances.

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contact, an opaque mask should be placed over the negative, well covering the edges of the plate with an opening of the size required for the slide; this prevents light passing through the edges and blurring the image, which it will be sure to do unless this precaution is taken, very much to the detriment of the slide. If it is required to copy a print with letterpress on the back, probably little indentations will be found that show through the paper on the face of the picture; to neutralize their objectional presence, recourse must be had to diffused light for the illumination, which may be managed by making a shade of tissue or waxed paper for the light to penetrate before falling on the print.

Loose prints can be fixed with drawing pins to the upright board, strips of stout card being interposed between, thus giving a regularly even pressure along the whole edge and doing away with cockling, much better than using the pins alone. If it is thought desirable, the title of the subject may be neatly written on the print in such a position that it will just show on the slide, or it may be so arranged that an opening cut in the mask will permit it being read below the subject. With clean, neat manipulation, slides of printed matter become sources of pleasure and satisfaction.

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Tank for Vertical Attachment.

By B.

Obtain from a dealer in glass shades a ring of glass cut from a tall glass shade of about 4½ in. in diameter; this can be obtained for a few pence, and I believe they are glad to get that, as the glass shades are made much longer than is necessary, so as to allow of being cut down to the required size. The ring can be cut to any suitable depth, a convenient one being about 1¼ in. Having obtained the rim of glass, procure from a sheet glass cutters a circular piece of sheet glass 1½ in. larger all round than the rim. This costs about the same price; if, however, a specially flat bottom for more exact experiments be required, then polished plates should be used, which will cost more, but for all practical purposes a piece of moderately flat sheet glass is sufficient.

The glass rim will most probably be found to be not quite level so that it will be necessary to grind it so, which can be easily done by rubbing it upon a flag-stone which must be wetted, and if it does not cut, sprinkle some fine sand on to it. When ground flat the rim must be cemented to the glass disc, any of the well-known cements for glass can be employed, or if it is to be used merely for water I have found Canada balsam to serve the purpose. To evaporate the oil in the balsam and make it set hard, put the tank upon an iron plate and gently heat, when cold it will be found to have set thoroughly hard.

A tank made in this manner will be found very useful for many other purposes besides what I have hereinbefore mentioned.

Colour Contrasts by Optical Projection.

By W. H. Harrison.

Among the more striking experiments which it is possible to perform with the lantern are those relating to the optical illusions due to colour contrasts, and these experiments have the advantage of being simple, easy to perform, and cheap withal. The following is a method by which Lord Rayleigh once exhibited them at the Royal Institution.

The accompanying diagram is a plan of the arrangement; that is to say, the reader is supposed to be looking down upon the apparatus. A B is the screen, K is a candle standing near the corner of the lecture table (W X). The candle is enclosed in an opaque chamber, except that through a large round hole (v) in front, light falls upon the screen so as to cover approximately the same area as the disc of light thrown upon the screen by the lantern (H); the opaque chamber (k) serves also to screen the direct light of the candle flame from the eyes of the observers. The lantern is fitted with the usual condenser and projection combination, although their presence is not absolutely necessary. The lantern can be about 12 ft. from the screen, and the candle possibly 6 or 7 ft. from the same.

Suppose now a piece of coloured glass, not too deeply stained, is placed into the lantern, it is evident that the screen will be illuminated from the two sources; firstly, with what we will assume to be red light, because of a piece of red glass having been selected to place in the lantern; and, secondly, with the light from the candle, which somewhat deteriorates the brilliancy of the red disc upon the screen. If now the lecturer walk a little in front of the screen in the direction X Y, two shadows of himself will be cast upon the screen, the one of
a brilliant red colour where the red light alone falls upon the space, and the other of a kind of green where the light of the candle alone falls. The green colour of the silhouette of the lecturer is an optical illusion, due to contrast with the red of all the rest of the disc. Glasses of other colours may be placed in the lantern in succession, and shadows of various colours will apparently be thrown by the mysterious candle. Of course, any opaque objects may be used wherewith to cast the shadows.

In repeating these experiments some preliminary trials should be made, to find out what coloured glasses, what relative intensities of light from the two radiants, what size of disc, and what distances of the two radiants from the screen, give the most striking effects. The plain stained glasses used should not be so deeply coloured as to prevent the casting of a brightly illuminated disc, neither should they be too pale in tint.

These phenomena can be seen to some extent in a far simpler way, but not in such a striking manner; hence, for performing scientific experiments by simple means, with homely appliances to be found in nearly every house, the English translation of Weinhold's Experimental Physics is an excellent guide. Weinhold says that if a strong impression is created by some definite colour, the eye perceives the complementary colour, although it has no real existence. If a candle flame be placed near a white sheet of paper not far from the window, so that nearly equally dark shadows of a pencil held in front may be thrown upon the paper by means of the candle-light and daylight, one shadow will appear slightly blue, and the other slightly red, due to the causes already mentioned. He adds that the name of "accidental colours" has been given to those which appear under these circumstances, without their having an actual existence. Lord Rayleigh mentions that Brewster was led into considerable error over a controversy which occupied his attention relating to a theory in optics. He had been misled by apparently real colours due to the above contrast.

How to Start Making Wet Collodion Slides for 5s.

By the Doctor.

The wet collodion process has always been regarded as "the process, par excellence" for the production of transparencies, so that it is surprising that it is so little utilised by amateurs and others who require slides possessing the important qualities of clearness and durability. The facility with which wet collodion plates can be intensified is another important point in their favour.

This neglect is probably due to the prevalence of an erroneous idea that the wet collodion process calls for a considerable amount of apparatus and expense. Nothing could be farther from the truth, and in proof of this, the following list of necessary materials and appliances is given before proceeding with the manipulatory details. It is assumed that the ordinary dry plate dishes, ruby lamp, etc., are already available:

- 2 ozs. collodion ........................................... 0 9
- 1 oz. nitrate of silver ..................................... 2 5
- 1 lb. sulphate of iron .................................... 0 2
- \( \frac{1}{2} \) lb. glacial acetic acid .................................. 0 4
- 1 lb. hypo ................................................. 0 2
- 5 ozs. methylated spirit ................................... 0 2
- 1 \( \frac{1}{2} \) pl. glass tray ........................................... 0 8
- 1 vulcanite plate lifter ..................................... 0 2

It is, of course, distinctly to be understood that if wet collodion be used, the slides must be made by copying in the camera, and although this is slightly more troublesome, it is a question whether it is not the best way of proceeding even when dry plates are employed. It permits of either portions or the whole of negatives being enlarged, reduced, or copied the same size, so as to yield the most artistically arranged pictures on the one size of plate the lanternist is compelled to adhere to. Years ago, when wet collodion was the process universally employed for transparency work, slides were occasionally made by placing the sensitive plate almost in contact with the negative, thin slips of card placed between the edges preventing the two actually touching. There was, however, a slight loss of sharpness, and a very considerable risk of injury to the negative, owing to the presence of nitrate of silver solution in such perilous proximity to the film, so that this proceeding may be dismissed as unsafe and unsatisfactory, except in very experienced hands.

It is hardly necessary to detail the simple means of supporting the negative while copying, as this has been done in every photographic manual. The apparatus required need not cost twopence. A small soap or cocoa box, blackened inside, and stood on end, has a hole cut in the bottom the size of the negative, while a sheet of white card, placed at a suitable angle, forms an efficient reflector. Excellent cameras and negative holders for this purpose are to had
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from Smith, Jones, Robinson, and other large dealers, but our readers are supposed to be economical, and the soap box will do. If the dark slide is of the ordinary dry plate pattern, it will be as well to provide it with a special carrier to hold the lantern plate. This may be cut out of cigar box wood, and should be thoroughly varnished. The plate should rest on wire corners, and not on a rebate all round. Silver wire is recommended, but brass wire will answer well, if also well coated with a varnish which will resist the action of the nitrate of silver solution. The writer has, for temporary frames, coated the corners with Prout’s elastic glue, and found it answer perfectly.

These preparations having been made, we can now proceed to make the necessary solutions. Their use will be explained hereafter.

THE SILVER BATH.

<table>
<thead>
<tr>
<th>Material</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitrate of silver</td>
<td>1 oz.</td>
</tr>
<tr>
<td>Water (distilled if possible)</td>
<td>12 ozs.</td>
</tr>
</tbody>
</table>

Dissolve and add

Iodide of potassium, 1 grain (or, if preferred, a plate may be coated on both sides with iodized collodion, and allowed to remain in the silver solution all night).

Although 12 ozs. is a much greater quantity of solution than is required to cover a lantern plate, it is the smallest amount that should be used. In practice it has been found that the greater the bulk of bath solution the less likely it is to get out of order.

THE DEVELOPER

should not be mixed more than a day or two before it is required, and is composed of

<table>
<thead>
<tr>
<th>Material</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sulphate of iron</td>
<td>1 drachm</td>
</tr>
<tr>
<td>Glacial acetic acid</td>
<td>1</td>
</tr>
<tr>
<td>Methylated spirit</td>
<td>½ to 1 drachm</td>
</tr>
<tr>
<td>Water</td>
<td>10 ozs.</td>
</tr>
</tbody>
</table>

Some photographers prefer a pyro developer, made thus:

Pyrogallic acid          | 10 grains |
Glacial acetic acid      | 3½ drachms |
Alcohol                  | 1 to 3 drachms |
Water                    | 10 ozs. |

This will necessitate rather a longer exposure than is required with the iron developer, but the deposit is somewhat finer and the colour better.

THE FIXING SOLUTION

is composed of

<table>
<thead>
<tr>
<th>Material</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hyposulphite of soda</td>
<td>4 ozs.</td>
</tr>
<tr>
<td>Water</td>
<td>16 “</td>
</tr>
</tbody>
</table>

We may now proceed with the most important preliminary operation of

CLEANING THE GLASS PLATES.

The beginner is recommended to use new glass, as glass which has been coated with gelatine is only cleaned with great difficulty, and is likely to yield discouraging results; the kind sold as cover glasses will answer every purpose, and are quite cheap. The glass plates should be well washed in plain water to remove any adhering dirt, and then each plate should be rubbed with a mixture of dilute nitric acid and tripoli, say,

<table>
<thead>
<tr>
<th>Material</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitric acid</td>
<td>½ oz.</td>
</tr>
<tr>
<td>Water</td>
<td>10 ozs.</td>
</tr>
<tr>
<td>Tripoli</td>
<td>½ oz.</td>
</tr>
</tbody>
</table>

While still wet this should be washed off under the tap, and the plate polished with a clean linen cloth until perfectly dry and bright. The clean plates should then be placed in a grooved box, and are ready for use.

COATING WITH COLLODION

is an operation which is easily performed with a little care. In the old days one was directed to pour the varnish over the plate in the same way as when collodionizing. Now, it will, perhaps, be better to say, pour the collodion on the plates as if varnishing. It is necessary to rock the plate, so as to prevent lines forming while the collodion is setting. The coating may be done in daylight, and is conveniently accomplished near the open door of the dark room. When the collodion has “set,” that is to say, when the lower corner is sufficiently gelatinous to receive the impression of the finger tip, the door of the dark room is closed and the plate is immersed in the silver bath, where it must remain until the solution flows evenly over the surface and all trace of ”greasiness” disappears. It is advisable to move the plate up and down in the solution by means of the plate lifter while sensitizing; this will hasten the process, and will remove any particles which may have settled upon the surface. When the surface presents an even and creamy appearance, the plate should be slowly withdrawn from the silver bath and stood on edge upon blotting paper to drain for a minute or two. The plate is then transferred to the dark slide and is ready for exposure which should take place within a few minutes from the time of sensitizing.

THE LENGTH OF EXPOSURE

varies according to the age of the collodion, the state of the silver bath and the temperature, so that only experiment will show what may be necessary in any particular case. As a rough guide it may be indicated that an exposure equal to that given to a “slow” gelatine lantern
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plate will usually be found sufficient. Under and over-exposure are more easily recognisable on wet collodion than on gelatine plates. As soon as possible after exposure, within a minute or two if practicable, development must be proceeded with. An ordinary egg cup answers well for a developing cup, and should have about a teaspoonful of the developing solution poured into it ready for use before removing the plate from the dark slide. The plate should be held in the left hand, much in the same way as when collodionizing, and the solution poured evenly and gently over it, taking care not to spill any over the edges, as this would wash away the free silver necessary to form the image and cause thinness in the slide. Nor must the developer be poured on in one spot, or there will be a thin patch caused by the free nitrate being washed away from that particular portion of the plate. Gently rock the plate to equalise the action of the developer, and the image will quickly appear. Development is complete in from half-a-minute to a minute, and the density is judged by the appearance of the plate by transmitted light. When development is complete, the plate is rinsed under the tap and immersed in the fixing-bath, in which it is rapidly cleared. Five minutes washing under a gentle stream of water is ample to remove every trace of hyposulphite. The transparency may then be placed in a rack to dry, after which the process of varnishing may be proceeded with. This calls for no special description, as the same varnish as used for gelatine negatives, thinned a little with methylated spirits, will answer perfectly, the manipulation being precisely the same as in the ordinary dry plate work. The effect upon the plate is, however, much more marked, a quite appreciable fog: often entirely disappearing when the plate is varnished.

Masking and binding are, of course, effected in the ordinary way.

In conclusion, the following cautions may help to keep the beginner off some of the rocks which he may encounter in his first voyage in this (to him) new direction:

Avoid dust in the darkroom.
The vapours of ammonia or turpentine (fresh paint) cause fog.
Do not collodionize plates near a lamp or fire.
Do not use the developer after it has turned a pale sherry colour.
Do not allow too strong a jet of water to play upon the film when washing.
Do not fail to dry the dark slide with blotting paper after each exposure.

If it be found impossible to get pictures free from fog, add a drop or two of dilute nitric acid to the silver bath. The latter should be slightly acid, to give clear transparencies. If blue litmus paper turns pink after three or four minutes' immersion in the silver solution, there is sufficient acid present.

The foregoing is a bare outline of what twenty years ago was practically the only process in use for the production of negatives and transparencies. It is still largely used for both purposes by commercial slide makers, and is considered to be the only process by which sufficiently clear negatives can be obtained for "process work." The process is fully and scientifically treated of in Hardwick's "Photographic Chemistry" and Abney's "Instruction in Photography," and those workers who may be induced by this article to start on this very interesting work, will find in those books much information which it is impossible to compress within the limits of what is necessarily only a sketch of the process which for thirty years held the front place in photography.

The Lanternist's Den.—XVI.

By C. E. Rendle.

HOW TO BUILD A BI-UNISIAL.—IX.

(Continued from p. 167.)

There are two or three other pieces of brass work to be done before we can dispense with the tools.

The roller curtain can be made with or without the racking arrangements. The plain simple diaphragm no doubt will be found sufficient for ordinary lecturing, but where many effects are shown, the racking will be more effectual, inasmuch as its regularity is more perfect. However, that I leave to the discretion of the worker, as the method of procedure in both cases is identical. Prepare a sheet of flat brass 17½ in. long by 4½ in. wide. In the upper part of this cut a rectangular opening (A, Fig. XXVII.) 5 in. by 3½ in., first marking its centre 4½ in. from top of sheet. To cut out the piece cleanly it is best to drill a small hole in each corner, when a metal piercing saw can be used; keep the cut well inside the lines, and afterwards finish with a smooth flat file. The corners (b, b) will next have to be pierced away and trimmed, and afterwards bent semi-circular on a round stake, which forms a lip by which it can be held in moving it up or down. Any sharp corners or
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edges should be removed. The diaphragm is now complete, and ready to finish.

To add the rackwork proceed as follows:—

About ¼ in. from bottom of rectangular hole screw a couple of 4½ in. lengths of flat ¼ in. rack (A A, Fig. XXVIII.). These can be 3½ in. apart. A 5 in. length of pinion gearing into this is to have turned at one end a pivot ¼ in., and at the other end a pivot ½ in. long. This done, lay the pinion in the rack while making the bearing, the holes being drilled to correspond with the pivots, allowing just sufficient shake to give a free run. The bearings may be screwed between the large nuts on centre plate. One-half of the long pivot should be squared, and a small crank key handle fitted to it, so that it can be taken on and off at will.

The object of having a dark curtain round the back of the apparatus is to obscure the light from the audience, which, as is well known, proves most objectionable. For this purpose make a couple of sockets, to be screwed on either side of the lantern body, to receive the semi-circular rod upon which the curtain travels. Make them from plates 1½ in. long by ¾ in. wide, in the centre of which is soldered a piece ¼ in. brass tube (see Fig. XXIX.). The curtain rod and rings, I think, want no further explanation.

A screw and nut can be fitted to each side of body, near the front, such as is used in base board of camera work. Let these be strong, and as they will have to be bought, a ½ in. or ¾ in. diameter of thread is not too thick. A slotted arm piece must be made and fitted to each side, viz., right and left. Fig. XXX. will show what is wanted. The line A represents bottom of body, B a brass plate 3 in. long by ¾ in. wide, which is let into side of plinth and fixed with brass screws; c a curved slotted arm 3 in. long and ¾ in. wide, and which swivels on a shouldered screw (d); e is the milled head of screw affixed to body as above-mentioned. When making be particular that they are finished, so that when the slotted arms lay on plate (b) reverse to each other.

A few words here on finishing the front plates and any other parts that may have been overlooked. The one rule applies to each and all. Presuming the entire front is unshipped, as the sailor says, we'll take one of the largest plates. Find a piece of flat hard wood, a trifle larger than plate, and fix in the vice. Lay the plate on the wood, front uppermost, which can be kept in position by putting pins through the bolt holes. It can now be filed flat, first with a flat 12 in. bastard file until all imperfections in the metal have been removed, when the file may be changed to a 12 in. smooth. This latter can be used until the marks made by the first file have disappeared. Be sure and keep the work quite flat, that is if you can, for to those whose first experience this is in a job like the one in hand, difficulties will show themselves, and many, no doubt, will begin to exclaim before they are half way through, "By Jove! this is hard work." But stick to it, having got so far, and forget, if possible, that part of your elementary grammar, which treats of an adjective being a word placed before a noun, etc., etc. After the smooth filing take a sheet of No. 1 emery paper, lap closely round the file, and continue the process until none but the paper marks are seen, when the paper may be changed to a 12 in. smooth. This latter can be used until the marks made by the first file have disappeared. Be sure and keep the work quite flat, that is if you can, for to those whose first experience this is in a job like the one in hand, difficulties will show themselves, and many, no doubt, will begin to exclaim before they are half way through, "By Jove! this is hard work." But stick to it, having got so far, and forget, if possible, that part of your elementary grammar, which treats of an adjective being a word placed before a noun, etc., etc. After the smooth filing take a sheet of No. 1 emery paper, lap closely round the file, and continue the process until none but the paper marks are seen, when the paper may be changed for a sheet of No. 0. The front and sides of work having had a good dressing with this, should now look spic and span, and when dusted with a soft brush may be lacquered. Each piece in its turn should be similarly treated, with the exception of the spring plates.
These, together with the backs of condenser plates, should be given two or three coats of matt black. The best the writer has tried for this purpose is that sold by Messrs. Platt and Co., and will be found useful for a variety of things.

To be proficient in lacquering is to be a master of what appears to be one of the most insignificant of the mechanical arts. Much has been written on this apparently unimportant subject; much more will be written no doubt. Be that as it may, all who have worked in metals will admit that there are very few indeed who are perfect in this particular. We read in the life of Rubens of how with “a single stroke of the brush he turned the laughing child (which was on his canvas) to a crying child.” The writer, also, kind reader, remembers his paternal parent turning a joyous child into a child of sorrow, and that, too, by a single stroke; so if a doubt exists in the mind, don’t spoil the appearance of your already good work with an inadvertent stroke of the lacquer brush. Rather than that, take the parts to the firm recommended in a former chapter, and let them put on the finishing touch. But there are those who will at all hazards have their way, and it is to them I offer this simple and safe receipt. A small tin box with a wire soldered across the top serves well for a lacquer pot. A 1 in. flat camel-hair brush is best, and procure some pale gold lacquer. Pour about 2 ozs. into the tin pot, and if the brush has been used for the purpose before, it will be necessary to lay it in the lacquer for a few minutes, so that it gets soft. It is a good plan to keep a special bottle for this purpose. When taking brush from the lacquer squeeze out so as just to leave it saturated with the liquid. Hold one of the plates by the extreme corner, and warm it over a small spirit flame, not more heat than what the back of the hand can bear without flinching. If the temperature is higher than this allow it to cool down to it, when the brush may be drawn across from side to side until the whole has been covered. It can then be warmed again over the flame; this, of course, is done from the back of plate, and not on lacquer side. When the several parts have been thus treated, the whole can be put together. First put on the four screwed washers on top and bottom pillars. The back plates are then screwed to hinges, and the eight long bolts put through their respective holes. Next try the roller curtain through the apertures in wood blocks, and if any easing be required now is the time to do it. This done, put the blocks in their places, and then place on each bolt one of the spiral springs. Pass through front plate of each the four small screwed bolts, screwing in their turns into spring plates. Next place a runner between the bottom bolts of each stage, place the front plate on the bolts, and screw on nuts while holding in position, as the springs are apt to jump it off. All the nuts can now be screwed down, and then the roller curtain put into the top slot and racked into position. Screw the tubes into their places, and also the objective jackets, and our bi-unial lantern is finished.

The lantern being completed, should next be measured, and a travelling case constructed. The extreme outside must be taken as a guide; and the timber recommended for the purpose, of course studying economy in the matter of cost, is well-seasoned yellow pine; 2 in. boards, when planed up, are most suitable, and a sound job made by bringing them together by dovetailing. It will be found most convenient to arrange the lid or door at one side, instead of top, using take-off hinges, which allows its removal. Handles for lifting can be attached at each end, and, if nicely lined with green baize, gives a good finish. The outside can be blacked or painted to suit the taste. In making the case the worker would do well in having it weather-tight.

There are two or three other little hints I have left unsaid, but have here exceeded the space allotted, so must defer to another article in the near future.

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TO LANTERNISTS.

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South London Optical Works, Greenwich, London, S.E.

ANOTHER NOVELTY.
NOAKES' New Combined TRAVELLING CASES & STANDS for CYLINDERS.
10 ft., 5/6; 12 ft., 6/6; 15 ft., 7/6; 20 ft. 8/6, and 40 ft., 9/6.
lantern stage a special form of block is inserted, this block into which the carrier is inserted is provided with springs whereby the carrier is pushed close to the condenser, leaving room for the insertion of another at the side of the first. The two detached slide holders have ends shaped as in Fig. I., excepting that in the other the projecting end is towards the bottom of the slide holder. For use, unframed slides are placed in the holders, one of which is then inserted in to the carrier (previously placed in the lantern stage); one spring pushes it towards the condenser, and on the insertion of the second slide holder, this second one becomes locked and the first is ready to be withdrawn, when the second immediately springs into its place at the focal plane. Fig II. shows the carrier with both holders inserted.

EDUCATIONAL LANTERN.
A convenient form of lantern has been devised by Mr. John Trotter, 28, Gordon Street, Glasgow, for use in schools and colleges. The instrument can be used either for showing slides in the ordinary way, or for vertical subjects.

When tank or similar experiments are shown, provision is made in the former arrangement for erecting the image by means of a prism fitted in front of the lens. By lifting up the front, as shown, inserting a mirror and adjusting the prism, the lantern lends itself for vertical work. The condenser is composed of three lenses, two of which are \( \frac{4}{4} \) in. diameter.

"STAR JET."
This jet, which has been brought out by the wholesale firm "Leviathan, London," is said to give an exceeding bright light. As will be seen in the cut, there are two nipples placed side by side. The lime used is flat and circular, this being rendered necessary by reason of the size of the spot of light. For general illumination this form has many advantages.

"REGULATING JET TAP."
This tap by the same firm is for screwing on the back of a jet, and is provided with a screw-down valve for fine adjustment. Having been adjusted to the desired point, the tap may be then turned completely off without interfering with the adjustment.

SYSTEMATIC LANTERN SLIDE BOX.
Messrs. Butcher & Sons, of Blackheath, have hit upon a happy idea with regard to this box. Each groove is provided with numbers (see cut) from 1 to 50, and a tablet is placed in the inside of the lid similarly marked, together with spaces for the name of the slide. Each slide can be thus relegated to its own position with ease, and the contents of any such box can be readily ascertained.
MASON'S LANTERN MICROSCOPE.

Mr. R. G. Mason, of 69, Park Road, Clapham, has made a number of minor improvements on his patent lantern microscope, and at the late Cornwall Exhibition it was awarded the silver medal. This microscope possesses the advantage that with it are supplied extra fittings, which quickly enable it to be used as a table microscope; so that the one instrument answers the two purposes.

The Optical Magic Lantern Journal and Photographic Enlarger.

VEVER'S PHOTOGRAPHIC PRIMERS.—Mr. C. C. Vever, of Leeds, has lately published four useful primers, these being for the most part papers which he has delivered at photographic societies at Leeds. No. 1 treats on Beginner's Errors; No. 2, Optics; No. 3, Printing Dodies; and No. 4, Enlarging. The particulars given are very useful, especially as the author enters into minute details on some points that will materially assist even the somewhat experienced hand, whilst the tyro will consider that those primers at twopence fill the proverbial "want."

Editorial Table.

"SILVEROID."—From the Silveroid Co., 90, Northcote Road, Walthamstow, we have received a bottle of solution named as above. By applying a few drops on brass, copper or worn electro-plate, and then polishing, a coating of pure silver is imparted to the article. The company guarantee the solution to be free from mercury.

ANTWERP AND ITS EXHIBITION.—The reading of this popular set of sixty-six slides which is advertised on another page is written in a particularly interesting strain by Mr. Edmund H. Wilkie, late of the Polytechnic. The interest is kept up to the very end, and, the happy knack that Mr. Wilkie possesses, each picture is led up to in such a manner that no signal is required between the lecturer and operator, for the latter on following the lecture knows the precise moment to change the slide without the lecturer having to resort to signals. After seeing the pictures and hearing the lecture one might well imagine that they had travelled for a week instead of comfortably sitting on a chair for a couple of hours.

CARBON PRINTING. By E. J. WALL. (LONDON: HAZEL, WATSON & VINEY), 1/-.

Nearly one half of this book of sixty-eight pages is taken up with an interesting history of the permanent process of printing in carbon. Commencing with the year 1798, when chromium was discovered, Mr. Wall traces and gives the experiences of investigators bit by bit until he brings it down to the present day. Particulars are given respecting the preparation of the non-sensitive tissue in a variety of colours, then to the mode of sensitising the same.

After chapters on Drying, Keeping, and Printing, the mode of development is treated upon, which in turn is followed by methods of transfer. The making of lantern slides by this process is fully dwelt upon, after which comes a very important chapter on Failures, by reference to which the student is enabled to ascertain what he has done or left undone should his results not be satisfactory. The book is written concisely, and is full of information.

THOMAS'S LANTERN PLATES.—According to the samples of these plates which we have received, it is quite evident that they hold their own as to quality and ease of working. Messrs. Thomas have come to the conclusion that the best results are obtained with an exposure by magnesium wire when making contact slides. In the instructions issued full details are given respecting the requisite exposures (for reductions) for producing any desired tone, using in each case a particular developer of which each box of plates contains full particulars. Proportions are given for both pyro and hydroquinone developers, so that either black, brown, purple, or red tones may be obtained on these plates.

The following list, relating to current Patent Applications, is compiled expressly for "The Optical Magic Lantern Journal" by a registered Patent Agent. For further information apply to S. Dicker, c/o "The Optical Magic Lantern Journal," 56, Chancery Lane, London, W.C.


18553. 29th September, 1894. Frederick Bartlett. Improvements in optical lantern slide carriers, and the hanging of slides therein.


20095. 23rd October, 1894. W. H. Tomlinson. Improvements in or relating to magic lanterns.

21011. 23rd October. George Davenport. Improvements in slide carriers, and apparatus for optical or magic lanterns.

21164. 5th November. John Francis Hall Edwards. Improvements in lantern slide binding clamps.

21240. 5th November. Charles Goodwin Norton. An improved form of cut off for dissolvers for use with optical lanterns, specially relating to bi-unial and triple lanterns.

COMPLETE SPECIFICATIONS PRINTED.

Copies of the following specifications may be obtained by remitting 1/- for each specification to S. Dicker, "Optical Magic Lantern Journal," 56, Chancery Lane, London, W.C.


21890 of 1893. Clifton. Producing enlarged copies of photographs.


24038 of 1893. Cresswell. Stage, etc., lighting.


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DISSOLVING EFFECT WITH A SINGLE LANTERN.

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4. Acril.
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7. Childhood.
8. May Queen.
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The most Practical Lantern in existence.

A Double Mechanical Curtain Effect supplied gratis with
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LEVIATHAN, LONDON.
The Optical Magic Lantern Journal and Photographic Enlarger.

Correspondence.

EASTMAN'S FILM.

To the Editor.

Sir,—There is a firm in London advertising Eastman's Transparent Film at a quarter original prices. A few months ago we had a quantity of films and bromide paper damaged by sea water; these were abandoned to a marine insurance company. Some of the material may be good, but, for the benefit of the users of our products, we think it right to state the above facts.

Yours faithfully,
The Eastman Photographic Materials Company, Ltd.
George Dickman.
November 22nd, 1894.
Managing Director.

THE GRIDIRON SATURATOR VERSUS LAWSON'S SATURATOR.

To the Editor.

Sir,—With respect to the letter which appeared in the Optical Magic Lantern Journal, of December last, from Messrs. Morgan & Morgan, re the alleged infringement of Lawson's Saturator, I beg to inform your readers that Mr. Lawson thought fit to lodge an opposition to the sealing of my patent for the Gridiron Saturator, and that the case was heard before the Comptroller of Patents a few days ago, and he decided that the Gridiron Saturator does not contain any infringement of the above, and that all those lanternists who were afraid to purchase or use it on account of above threats, may now do so without the least fear or hesitation.

Thanking you in anticipation,
I beg to remain,
Yours respectfully,
J. G. Parvin.
47, Whittingstall Road, Fulham, S.W.

INCANDESCENT LIGHT FOR LANTERN.

A SUGGESTION.

To the Editor.

Sir,—Now that a substance has been discovered which gives a very fine light for ordinary purposes with a mixture of air and gas, it would seem to me that there is a good field for further experiments by the inventors to adapt it for the lantern, so that a really good light of 200 or 300 candle-power might be obtained without the use of oxygen, which in out of the way places adds very considerably to the cost of lantern exhibitions.

If the mantles could be made, say in sets of three, and fit one inside the other with a suitable burner and aided with a good reflector to collect all the back light, there would appear to be no reason why a very powerful light could not be obtained— or if the material of which the mantles are composed could be rolled up into a ball or cylinder and rendered incandescent by a blow pipe somewhat similar to the ordinary blow-through jet, but using air instead of oxygen, a body of light equal to that given by limelight perhaps might be obtained. At all events experiments in that direction are worth trying, as a rich harvest would accrue to the discoverers of such a light.

Many amateurs have no doubt a number of spoiled films which they are unable to utilise; these could be very easily converted into excellent lantern slides, made by the carbon process, by simply squeegeeing the tissue on to them instead of to glass.

Yours, &c.,
PROGRESO.

16th November, 1894.

THE DECADENCE OF LANTERN LECTURES AND ITS CAUSE.

To the Editor.

Sir,—I am glad to see the notes by Mr. Chadwick and others on this and kindred subjects, and as a lecturer who has run considerably over a thousand exhibitions, may I add a few remarks.

There are, no doubt, more exhibitions of lantern slides than in days gone past, but owing to several causes they are not looked up to as they used to be—and it is natural that this should be so, when the rubbish in the form of slides is taken into consideration. Since the advent of dry plates everything in connection with photography has grown cheaper, slides included; and the very facilities which these plates allow, has brought a lot of cheap (and nasty) productions in this way into the market.

Then comes the colouring (?) of these same slides; it might be poured on them from a jug for all the artistic skill which is used—cheap, cheap, being the order of the day, and nothing really good or artistic wanted. More than half the slides used by us during a series of lectures by several professors this past year, I should have put under my foot, as they were in every way utterly bad. Most of them dry plates, perhaps the work of amateurs, so thick that in some cases it was nearly impossible to force any light through them, the subjects not fitting the centres of the slides, some up, some down, and all sorts of sizes and shapes; it is little wonder that the audience grew tired before the end of the lectures and plainly showed it by leaving the room.

Nor was this the only failing. Slides shown without any rehearsal, not even looked over in some cases by the lecturer at all; his lecture therefore only imperfectly fitting them, and now and then quite at sea, added to poor reading and a dry subject.

The firing of slides is perhaps one of the causes of this, and at the cheap rate at which they are lent it is quite impossible to supply good slides.

Readers dependent on the readings sent, which they have not seen before, on a subject perhaps of which they have no personal knowledge, no break in the monotony of the lecture except to call back some wrongly placed slide, and so excite the ridicule of the audience; everything of a level dulness depressing in the extreme.

A hired lantern, worked by a volunteer who has never used one before, operator and lecturer never having seen this, and at the cheap rate at which they are lent it is quite impossible to supply good slides.

The niring of slides is perhaps one of the causes of this, and at the cheap rate at which they are lent it is quite impossible to supply good slides.

Any of these, or a combination of them, is enough to spoil the best audience, and make them decline, even out of charity, to face a lantern lecture in the future.

This class of entertainer goes to a small town, introduced by some influential inhabitant, a fashionable and numerous throng is gathered to meet him, and then they go home entirely unsatisfied, if not thoroughly disgusted, with the whole affair.

There is no reason why this should not be entirely obviated. A quick, bright lecture, with good, varied, well-coloured slides, a joke (not a chestnut) now and then, some fitting music or song, an interlude of fun, but not the vulgarity which is sometimes mistaken for it; these are the qualities which a lantern lecture requires and which will make it a success. But, above all, the slides must be good and well shown, changing as the lecturer proceeds without the slightest open sign from him to his assistant.
Nothing is more annoying than to hear the lecturer at the end or even at the middle of some sentence say "next please," or the sharp ring of a bell spoiling the thread of the subject, and calling off the attention of the audience.

And the matter of the lecture should in a great measure be original, or gathered from every possible source and condensed. How pleasant it is to receive well-earned applause, to hear at the close of a journey entertainment, "Why, sir! you must have enjoyed your trip through the country you have been taking us through to-night," when the lecturer had never been perhaps within a thousand miles of it. It is often possible to get a few local touches from someone who has been, and the introduction of some legends of the place, or poetry by a resident in the locality visited will give all that is needed.

I am really afraid, Mr. Editor, I have trespassed too much on your kindness, but should be sorry to see lantern lectures die out. But I should like to see the cheap and nasty entertainer die out—the man with a 25s. lantern and some horrible lithographed or other abominable slides; who cuts in with a very low price at which it is impossible to live—drags down the status of the lantern and levels it to the dust.

With best wishes for the coming season to you, Sir, and all lanternists who try their best to raise the tone of the whole show,

I am very truly,

HENRY W. TAUNT.

Oxford, Nov. 1894.

Notes and Queries.

S. Good writes:—"Last season I purchased one of Butcher's lime-cylinders, and put it away at the end of season with a hard and soft lime in. When I went to it this season both the limes had turned to dust. Can you tell me the reason?"

Ans.—Either the limes were not perfectly dry when put away, or the cylinder not being hermetically sealed, they had absorbed moisture.

W. S. R.—Asbestos tipped wicks can be obtained from Philip & Co., Fleet-street, E.C.

Geo. Kilburn.—We learn that "Soap Bubbles" is not published by Longmans, as stated in last issue, but by the Society for the Promotion of Christian Knowledge, London, W.

Novice writes:—"(1) A 40 ft. gas bottle fully charged is used twice, each exhibition with single lantern, blow-through jet being used, lasting one and-a-half hours. Gas remaining in bottle 11 feet. What can be the reason of such an escape of oxygen for I hold that it could not have been used. I cannot see any apparent escape either. (2) Use a lens of 10 inches equivalent focus; see the "Lanternists' Ready Reference Table," which may be obtained from this office, post free for 25d. (3) The proprietor of the lamps spoken of is Mr. A. Wrench, and it is from him that dealers, and dealers only, can get their wholesale supplies.

John Tradlock.—Your friend is quite correct, you can use a blow-through jet with both gases from cylinders, or if you like you can use both a blow-through and a mixed jet from the same cylinders at the same time, only you will find that it greatly simplifies matters if you use an automatic regulator on each bottle, and then adjust at the taps."

J. Crombie.—It is simply nonsense and shows that the party did not understand the subject about which he was trying to instruct you.

A. Wrench.—We have tried the gauge and find that it does work. You say that it will not show anything on your cylinder, which has not been used since it was filled and which must consequently be full. We have returned the gauge, and if it shows nothing when it is attached to the bottle and the valve turned on, it is simply because there is little or nothing in the cylinder to show. It is not an uncommon thing for people to think that because the gas makes a good noise, rushing out when the valve is turned on, to think that there must be plenty of gas. You may not have more than half-a-foot of gas in the cylinder. If you have had it standing by for any length of time, an escaping small leak will tell materially on the contents of the cylinder.

B. J.—"Turn the gas taps off before turning the cylinder on and see if the regulator will then act. You have evidently been regulating with the key only, and have not being given the regulators a chance of working. Turn a good head of gas on before opening the jet taps."

P.S.D.—Had you read this column you would have learned that we will not recommend any one Saturator in preference to another, we even in the way you suggest by naming them A.B.C.D. You will find them all advertised in this journal. Write to the makers of the particular one that strikes your fancy, and make the best terms you can, and if you can get it on approval well and good.

F. H. Benham.—We know nothing of it.

Saturator writes:—"(1) Is the Gridiron a good Saturator? (2) Is the Timberlake a good Saturator? (3) Is the Optimus a good Saturator? (4) Is the Lawson Saturator a good one? (5) Is Sutters 'Reliable' Saturator reliable? (6) Which of the five do you think is the best?"

Ans.—(1) Yes. (2) Yes. (3) Yes. (4) Yes. (5) Yes. (6) We believe it was withdrawn almost as soon as it was introduced. See reply S. D. in last issue.

W. C. H. J. writes:—"Would it not be a good idea to have a limelight flash lamp for signalling purposes by means of flashing?"

Ans.—If you mean would it be a good idea for you to possess one, you are the best judge. If you mean it as a new idea, it has been in use for a long time past.

W. H.—(1) Perhaps the leather washer has come out from your Clarkson regulator. See that the leather used is free from grease. (2) For the bull-nose form a thin washer of lead may prevent leakage.

Bi-uniat.—(1) 40, Hanover Square, W. Subscriptions 10/- per annum. The hon. secretary is Mr. W. Bashall, 21, Holland Villas-road, London, W. (2) To remedy the dissolver—seeing that screwing up will not do—take out plug, smear over it grease with a little fine emery, replace and grind it in, but remove it every few moments in order to equalise the grinding. (3) Probably blacklead is what was put on previously.

Messrs. Riley Bros. write respecting a "note" that appeared in last issue, that they have had samples of oxygen from various makers analysed, and from the certificate they send us we learn that the difference in quality amounts to merely a decimal. We are unable to publish the certificate of analysis of the different brands, as we declined to enter into names in the case of the "note" mentioned which had reference to a letter received from Mr. Hepworth.
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Stocks' patent 4-wick lamp, gives a beautiful light; chimney fits
into body of lantern.

Each lantern is provided with a
place at bottom of lantern to
hold the carrier
when done with
also a drawer
for matches
and leather.

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Lantern Season, 1894-5.

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The Author of "The Book of the Lantern" says:—"The most complete and perfect projection apparatus ever devised."

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Can be worked by any Lanternist.

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