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.

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Notice.

Many Correspondents still forward their Communications to the Old Address. Will they please note that our Address is

56, Chancery Lane, London, W.C.

Notes.

The annual exhibition of the Hackney Photographic Society will be held at Morley Hall, Hackney, on 17th, 18th, and 19th inst. Besides many fine pictures being on exhibition, visitors will be regaled with orchestral music.

Steps are now being taken to introduce the lantern into Board Schools, so that scholars may have the subject of their studies more deeply impressed on them. This is a move in the right direction, and not only Board but all schools should be provided with a lantern. We have no doubt that all schools of any pretension will, within a few years, be provided with such. Churches will then follow suit, and sermons will be illustrated. In fact, in America a few churches have had lanterns fitted up.

At times panics will occur at various forms of entertainments, and at such times owing to the general rush for the stairs many persons get killed during the rush in trying to get down stairs. An inventor has recently patented a new form of staircase whereby all liability to such accidents will be prevented. With this style, one has only to step on one of the stairs and catch hold of the handrail, when they will speedily find themselves at the top of the landing. At the upper and lower steps of the landing are fixed cylinders, and on these there is an endless band containing steps. The handrail also
is composed of an endless band, so that when one is desirous of going either up or down, they have merely to stand on one of the steps. The bands, when not made to travel up or down, form an ordinary stair.

* * *

So-called everlasting limes, or limes which do not deteriorate by being kept in an ordinary atmosphere have been long looked for. When at Mr. Walter Tyler's establishment at Waterloo Road, he showed us a lime with which he had been experimenting. The sample shown to us, had, he said, been placed into water for many hours and then dried and submitted to a stream of gas from a jet and was found to give a good light. If these can be manufactured at low cost there is no doubt that there will be an enormous demand for them. We have been promised a few with which to try some experiments, and hope to give the result in an early issue of this journal. If our report is a favourable one, Mr. Tyler can look out for a rush, as there are very few people in the world interested in lantern matters who are not constant readers of this journal.

* * *

MESSRS. RICHARD FRERES, of Paris, have appointed Messrs. Jos. Levi & Co., Furnival Street, E.C., as their agents for their self-recording instruments.

* * *

It is stated that oxygen can be cheaply and rapidly generated by placing in a capacious retort, three parts of bichromate of potas and four parts of commercial sulphuric acid. The temperature required is said to be very low, as a large quantity may be obtained by the application of an ordinary lamp.

* * *

MESSRS. RILEY BROS., are about to supply the Lawson saturator to suit a biunial lantern, they having overcome all difficulties respecting dissolving with a saturator.

* * *

The Photo Times of New York, speaking of exhibition awards says:—"If ten bandy-legged men were to hold a race together, and one being a little better than the rest won the race, would he be entitled to a medal as the racer? A similar question may be asked in the case of exhibitions held by the small societies, consisting of a number of poor workers. Those a little above the average get the reward and become medallists. What honour is attached to such a proceeding?"

* * *

At the Conversazione given to the members of the British Association by the Mayor and Local Committee of Nottingham, Anderton's Lantern Stereoscope was exhibited. The demonstrations were announced to take place at stated times, but so great was the rush to see the stereoscopic screen pictures that the time table could not possibly be adhered to, and during the two evenings over one thousand spectators saw this development of the optical lantern. The slides projected had been printed from their ordinary stereoscopic negatives by Messrs. York and Son, Notting Hill; Messrs. McLellan, Canonbury; and Messrs. Underwood; and comprised Statuary, Animals in the Zoo, Exteriors, Interiors, Flowers, etc. A striking illusion was shown when a slide of a group of lilies was thrown upon the screen. Mr. Anderton was warmly complimented upon the complete success of his invention by many of the scientists who witnessed the exhibition.

* * *

At the Stanley Cycle Show, to be held at the Agricultural Hall, November 17th to 25th, a photographic exhibition will be held, at which twenty medals (gold, silver, and bronze) will be awarded. This competition is open to amateurs and professionals, and full particulars may be obtained from the manager of the Photo Section, Mr. W. D. Welford, 57 and 58, Chancery Lane, London, W.C.

* * *

The 38th annual exhibition of the Exhibition Photo Society of Great Britain (5a, Pall Mall) was opened by a conversazione on the 23rd ult., and will remain open to the public until November 15th. The exhibition of framed photographs upon the walls is very fine, and consists of about 350 subjects, and upon table stands are to be found nearly twenty entries of excellent lantern slides. An interesting array of apparatus is to be found, consisting of new forms of lanterns, cameras, stands, and photographic sundries, including a gigantic camera capable of extending to 15ft., and taking a plate 36 x 36 inches. On Monday, Wednesday and Saturday evenings lantern slides will be projected upon the screen, and on some of these evenings will also be shown the projection of binocular slides, which can, by the aid of an instrument described in our columns a few months ago, be seen with stereoscopic effect.
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LONDON DEPOT.—W. WATSON & SONS, 313, HIGH HOLBORN, W.C.
To Ascertain the Quantity of Gas in a Cylinder.

In reply to a question pertaining to the above, a contemporary gave the following particulars in its issue of September 1st, "Attach a pressure guage to the cylinder, turn on the gas, when the index will point to the number of atmospheres of gas contained in the cylinder. Suppose the latter to be a ten-foot, divide the indicated number by ten, and the result will be the number of feet contained in the cylinder."

The foregoing instructions, we may say, are wrong; but in measuring the contents of so small a cylinder as a ten-foot one, the error is not nearly so exaggerated as it would be if the contents of a forty-foot bottle were being computed.

Let us see how the above instructions work out, taking the size of cylinder mentioned by our contemporary, 10ft. This 10ft. cylinder having just been charged we will find on applying the guage that 120 atmospheres will be represented on the dial; this, divided by the sum stated, viz., 10, will give us 12ft. of gas in a 10ft. cylinder. According to the rule above we must divide the number of atmospheres by the capacity of the cylinder, and what do we find—Why, that when a 40ft. bottle is "full" that it only contains 3ft.

Now dismissing all these misconceptions of our contemporary, the contents of a cylinder may be ascertained either by measuring the number of atmospheres in the cylinder and computing therefrom, or it may be ascertained by weighing the cylinder.

With regard to the first method, after the number of atmospheres has been ascertained it is necessary that it be divided by some particular number, but this number must not be that of the size of the cylinder. It must be the number of times that the capacity of the cylinder is contained in 120. Thus for 6ft. cylinder it must be divided by 20. A 10ft. cylinder by 12; a 12ft. by 10; a 15ft. by 8; a 20ft. by 6; and a 40ft. by 3.

It is not our intention here to deal with the construction of the different forms of pressure guages upon the market, so we will pass on to the method of ascertaining the contents of an oxygen cylinder by weighing it.

It is necessary that the exact weight of the cylinder be ascertained when it is fully charged; this we will suppose to be 16lbs. and 2 ozs. After using some of the gas we will take it that it weighs 15lbs. and 9ozs., this enables us to ascertain that 9ozs. of the oxygen have been used. As each ounce weight of oxygen is equivalent to 0.7 of a foot, and as in this case 9ozs. have been used, we have merely to multiply 0.7 by 9 which gives 6.3 or 6,13ft. which has been taken out of the cylinder.

Why does a Condenser get Hot?

Why does a lantern condenser get hot? A little consideration of the principles at the root of the heating of condensers by raiants may be useful to those inventors who have to deal with the heating of all parts of the optical system of lanterns.

The chief factor in the heating of condensers is not light, for the invisible heat rays from luminous sources have far more heating power than those which can be seen by the eye. When a man is warmed by the sun, the invisible rays heat him a vast deal more than do those which form light. So far as men of science know, there is no difference but that of wave length and velocity of vibration between rays of heat and rays of light; the apparent great difference is in ourselves. The nerves in the hand are sensitive to heat and not to light, whilst the nerves in the eyes are sensitive to light, and in a lesser degree to radiant heat. When any rays pass through a lens without obstruction they do not raise its temperature, but directly they are obstructed the body causing the obstruction gets hot, for energy is indestructible, and never lost. The obstructed rays must do work of some kind, and that work is the heating of the condenser in the case under consideration. Waves of invisible heat obey the same laws as light; they can be reflected by concave mirrors, they can be refracted, and they can be brought to a focus.

The two ends of the spectrum are invisible. When a spectrum is projected upon the screen, the ultra-red rays are invisible, but their presence may be experimentally made evident by moving a thermo-electric pile along the space on which they are falling, and reading off the amount of current set up by means of a reflecting galvanometer. Then plenty of heat rays are found to be falling where nothing is to be seen; there is much more heat there than in the whole of the rest of the spectrum. As the thermo-pile is moved along the visible spec-
trum the deflections of the galvanometer decline through red, orange, yellow, green, blue, and violet light in succession, until the other end of the visible spectrum is reached. The radiations and the heat, however, do not cease there; the spectrum at this other end is also invisible, but has little heating power, although its chemical and photographic influence is more or less strong. The presence of these ultra-violet rays may be made evident by means of fluorescent substances, such as sulphate of quinine or fluorescein. These take up motion from ultra-violet invisible rays, and degrade them so as to throw off rays of lower refrangibility, which are visible.

The atoms in a condenser and in all other material bodies are believed to be in a state of motion, in a state of linear, circular, elliptical or other vibration, the exact nature of which is not known. Because of this motion solid bodies are continually changing their dimensions with variations of temperature. A poker, for instance, varies in its length with every change of its temperature. These molecular motions are exceedingly powerful; if a condensing lens have too tightly fitting a mount, when the former gets heated it will either crack itself or tear the mount with the pressure of molecular expansion. Water in freezing into ice expands with such force that if a bomb-shell be completely filled with water and soundly plugged, then placed in a pail containing plenty of a freezing mixture, say of ice and salt, when the former gets heated it will either crack itself or tear the mount with the pressure of molecular expansion. Water in freezing into ice expands with such force that if a bomb-shell be completely filled with water and soundly plugged, then placed in a pail containing plenty of a freezing mixture, say of ice and salt, when the water inside the bomb freezes it will burst the bomb with a dull heavy thud, breaking the shell perhaps into two or three pieces. The molecular power of contraction is also great. When the walls of a house have been bulging out, they have been pulled back to the vertical again by the contraction of long iron rods first heated and screwed up tightly to iron plates outside the house, then allowed to cool, so that as they shortened by cooling they drew the walls together.

Why is light not much obstructed by the glass of a condenser? The prevalent hypothesis is, that when the vibrating molecules of matter in glass move with the same velocity of vibration as the incident waves, those particular waves do not get through, but increase the motion of the molecules: in other words cause the glass to get hot and increase its bulk, and this is what is done with dark radiant heat. Other radiant vibrations, however, are not synchronous with the vibrations of the molecules in the glass, and these waves in large part pass between or round the molecules, and come out on the other side, so that while the dark rays are heating and enlarging the condensor, the rays of light find their way through. Glass is tolerably opaque to radiant heat, so absorbs it and becomes heated.

Rocksalt is perhaps the only solid substance transparent both to radiant light and to invisible radiant heat, hence a lens made from a rocksalt crystal will not get anything like so hot as a glass lens; the former lets the heat rays pass through instead of itself absorbing their energy. This property is of no use for the magic lantern, for the intense heat had better be chiefly arrested by the condensor rather than to pass through it to be arrested by the slide. Moreover, rocksalt is hygroscopic, and those who are fortunate enough to possess fair-sized plates of it worked from good crystals store them in closed vessels along with some substance for keeping the air dry, such as under a bell jar, and supported over a saucer containing sulphuric acid, which is Professor Tyndall's method of storing his specimens. He discovered that a solution of iodine in bisulphide of carbon, although opaque to light, is transparent to dark radiant heat, so that by filling a cell with the solution, the cell having rocksalt plates at each end, he could cut off all the light from the electric lamp, yet in the darkness outside the cell set fire to brown paper. The rays were brought to a focus outside the lantern by means of a suitable reflector placed behind the electric arc, whilst the iodine solution prevented the visible rays reaching the focal point.

After one piece of glass of sufficient thickness has absorbed most of those rays which heat glass, the transmitted rays sifted by this first piece of glass will exercise much less heating power upon a second piece of glass, and so on in succession; thus the piece next the radiant has to stand the great brunt of the heating effect. Unfortunately this piece must be thin, otherwise it will be more liable to crack under the rapid application of heat, and it may not be thick enough to exercise sufficient absorbent power.

With triple condensers perhaps it might be found advantageous to use two or three flat pieces of thin glass with a small space between each, and to place all of them between the radiant and the condensor. There should be sufficient ventilation in the mount of these to carry off the hot air. That a certain thickness is necessary to get complete selective absorption of radiant energy, may be seen in the case of coloured glass. If any piece of stained glass be sufficiently thin, it is practically colourless, but as more of these pieces of
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excessively thin glass be superposed, the true
colour due to selective absorption becomes
visible. On superposing more pieces, a point is
at last reached at which the special absorption
is fully brought into play, after which the
addition of more pieces has practically no more
effect than the adding of pieces of ordinary flat
colourless glass.

The state of aggregation of a substance may
affect its power of absorbing or transmitting
radiant energy. For instance, a plate of alum
although transparent to light, stops the greater
proportion of the heat rays from a radiant,
consequently the plate gets exceptionally hot.
Dissolve the alum in water and its power in
this way is nearly all lost; practically a glass
cell filled with water, placed in the optical
system of the lantern to absorb the heat, acts
with much the same efficiency as if a solution
of alum be used.

Substances absorbing dark heat and trans-
mitting light, act on the principle of the glass
fire screen, or the pieces of glass sometimes used
in the hands of workmen when they have to
view the contents of glowing furnaces. The
glass sifts the heat from the light and becomes
itself a hot body radiating heat in every direc-
tion, and having some of its heat carried off by
rising air or convection currents. Wherever
heat is by the absorption by glass taken up in
the optical system of a lantern, it is desirable
to get rid of it as quickly as possible by means
of a mount affording good ventilation, yet the
ventilation must not be such as to favour the
cracking of a lens by the entrance of a too cold
draught from outside, nor must it be such as to
allow light to escape into the room.

The foregoing will serve as a sort of apology
for further comment on the point of origin, rise,
progress, fall, or whatever you like! for it
must be borne in mind, that it is customary in
commencing a series of articles on any particular
subject to first say as much as you know of its
birth, and growth, and secondly, as much more
as you don’t know, and which more often than
not, is but the elasticity of an inventive brain.
I therefore disclaim any part to an argument
that would do no good to anyone, and that
would only end where it begun (like the fight
for honours, re the dissolving view question) in
complexity.

It is the purpose of this and the next few
following papers under the above heading, to
practically discuss “How to build a Biunial
Lantern.” Such as is required by the general
run of professional lecturers. It may be argued,
“Should a man want such an instrument he
has but to go to a shop and buy it.” That goes
without saying, and is perfectly true. But
when the question of L.S.D. crops up, forty out
of say fifty have either to content themselves
with an indifferent lantern for the time being,
or go without, as in consequence of the great
amount of time that necessarily must be spent
in producing what I would term the acme of
lantern perfection, places it out of the reach of
many of our readers. The value of an article
can be best formed by those who know most
about it, and the writer feels assured that a still
greater value would be placed upon an article
of our own producing, and that we should feel
less inclined to grumble at prices charged.

The first lantern I attempted was not a
success, and I could not take to it. It was
strong, and that was its only recommendation.
Ugly it was in the extreme, bulky and miserable
to look upon. But it makes a capital hutch for
the kitten to sleep in, and so she thought,
until a night or so back, when the baby shut
her tail in the door, preventing her from jumping
through the circular opening which at one time
was glazed with a 4in. condenser.

Experience makes perfect, however, as the
second attempt proved. Resolution was the
stronghold. I prepared a set of working draw-
ings, and made calipers of the chief metal parts.
A friend sarcastically said to me while on this
latter, “Some people would make their own
tobacco if they could,” “I would for one,” I
replied, “if I could, then I should know what
I was smoking, but now it doesn’t seem
twice alike.”

Notes on Lantern Construction.
An important thing at the outset is to retain
all special items of information that bears upon
the subject, and as the memory cannot always
be trusted, it will be found advisable to procure
The Optical Magic Lantern Journal and Photographic Enlarger.

Keeping it exclusively for the purpose of making any notes therein that may be deemed advisable. The names of business houses which will be mentioned from time to time, should also find a place here. It will save trouble in looking up such when wanted. Measurements, diagrams, anything that my brother builder thinks may help and be of assistance to him, should go into the book.

One thing I would impress in the kindest spirit possible, and the first that may be noted is, if at any time the student should not quite understand or see clearly the idea intended to be conveyed, he is at liberty through the post to ask for further information, and by enclosing a stamped directed envelope shall receive a reply in due course.

There are parts of a lanternist's outfit no doubt, that would be found impracticable by a large proportion of amateur mechanics to accomplish; either for lack of tools, some of which are very large and costly; but wherever a difficulty occurs in the way described, advice will be given, as to the best means of overcoming it, so that any part of the work can be purchased in a finished state from the mahogany body, to the receiving tubes for the lens jackets.

Instruction will be laid down for making the wooden body or outer lantern; the metal lining or inner lantern; the brass front in its entirety, which includes a rack-work roller curtain; the back curtain, travelling case, &c. How and where to purchase the materials and requirements, with their approximate costs.

Patience and elbow grease are essential to a long job. And 'tis impossible to complete unless we begin and proceed with determination.

Remember the old rhyme—

"Work away readily, slowly and steadily,
Making your metal toys, into coin fast;
Weighing the gold; now out—
Throwing the cross; now out—
And ne'er think of troubles, that's long ago past."

(To be continued.)

Cheap Camera and Lantern Slide Case.

By Geo. Kilburn.

Perhaps some of our readers have wished for a camera case of a lighter character than those usually sold by photographic dealers. Being in want of such an one myself, I at last decided to make one which I will describe for the benefit of those who wish to have one. First procure some strong mill-board about 1-8th in. thick, and one yard of black bookbinders' cloth at one shilling per yard. If the mill-board is in one piece, and of sufficient size, mark out a draught similar to the drawing given, with a sharp knife cut through the outside lines. Next cut the cross lines but not through, only halfway, and fold each part backwards so as to form a box. Some narrow pieces of cotton or linen must be glued on the front ends, bottom, and corners of lid where the cut pieces meet. Before fastening together as just stated, cut out of the bookbinders' cloth a piece a little larger than the mill-board, to allow for turn over inside the lid and front.

Having got the corners joined, next proceed to put on the cloth, using either a thin solution of glue or good flour paste. Begin with the lid first, then down the back, following on with the bottom and front. The ends are lastly covered; next fix on the handle, which can be cut out of stout leather to any desired shape, or one may be purchased ready cut from any dealer in photographic fittings. To hold the lid fast, a clasp such as is used on pocket purses, and pattern portfolios is very suitable. I cannot say who supplies them, as those I have used have been taken off the latter article, and are much stronger than those used on purses. A brass eyelet hole is made in the lid, as shown by dot, which fits on to a brass pin in the clasp when opened back, and which holds the lid secure when fastened. The inside can be lined with dark green flannel or baize. When the case is thoroughly dry, give it a good coating of varnish and you will have a case that you need not be ashamed of. I am about to make some cases in this form for the purpose of carrying lantern slides in as I think they will be very handy and convenient to take to meetings. Grooving can be glued to the sides if it is required. For lightness and cheapness corrugated paper will answer; but for durability, wood, rubber, or metal grooving is far the best. I have not given any dimensions as to size, but leave that to individual requirements.

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The Reflector works on an entirely new principle, and can be placed exactly in focus with the condensers, and as it is outside the combustion chamber is not liable to become discolored when in use.

The Lamp can be successfully used in rooms which become vitiated with impure air where other lamps smoke or fail to burn.

The Perforated Screen adds to the steadiness of the flame by breaking up the current of air as it enters the back of the Lantern.

The heat of the Lamp never causes the glass plates to crack.

The Lamp is admirably adapted for use in enlarging lanterns, by placing a piece of finely ground glass close to the front glass of Lamp.

Can be fitted to any Lantern in the place of ordinary lamp.

Full instructions containing practical hints sent with each Lamp.

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Price 28/-

Thin Glass Plates for front of Lamp, price 6d. each. Mica Plates for back of Lamp, price 9d. each.

CAN BE OBTAINED THROUGH ALL DEALERS IN LANTERNS AND SLIDES.
My First Experience of Development.

By Frank Warren.

After carefully reading the descriptions of the various band cameras which have from time to time appeared in the pages of the Optical Magic Lantern Journal, I eventually purchased one, and thus joined the ranks as an amateur. In due course I received a few lessons in development from the dealer of whom I purchased the apparatus, and with the knowledge thus acquired, together with a bottle of developer, a few plates, and the new camera, I set out one Saturday afternoon to take some pictures in a locality which shall be nameless.

Suffice it to say I exposed a number of plates, and came home feeling quite jubilant with the expectation of developing some fine negatives, and even went so far as inviting a few friends to assist in and witness the development of my first batch of pictures.

Not being used to such manipulation, I must confess that some of the pictures presented a somewhat startling effect during their development, especially in their earlier stages. As an example, after placing a plate (Fig. 1) in the dish, and pouring the developer thereon, an image gradually began to appear as at Fig. 2 out of a fog. In a short time, however, it began to assume an alarming aspect, and had all the appearance of a bear. Now, not having taken the picture of such an animal, I got somewhat bewildered, not to say alarmed, but tried my best to appear unconcerned, but as the developing process went on, I certainly began to think that I had taken a photograph of the devil himself, as will be seen in Fig. 4, and I must say that my feelings were not of the most comfortable, especially as my friends insinuated that I must have been taking a photograph of myself. I could not understand it, and came to the conclusion that there must be something wrong.

However, greatly to my relief, the image now began to assume a slightly less formidable character, and it began to dawn upon me that the picture was one that I had indeed taken, and when viewing it as in Fig. 5, my mind began to be restored to its normal quietude, and in a few minutes later the following picture was presented to view, which seemed to take a load off my mind. I do not know if any other amateurs have experienced results of a like nature, but this my first introduction to photography was a somewhat mentally painful ordeal.

Oils and Oil Lamps for the Lantern.—V.

By W. H. Harrison.

The chimney will need the attention of those manufacturers who seek to improve the oil lantern of the future, for, as the power and condensation of the flames are increased, extra draught is necessary to keep up the proper supply of air for these small furnaces. The air is as necessary for combustion as is the hydrocarbon used, the light and heat of the flame being due to the interaction of the two, which is well exemplified in the common chemical experiment of causing a jet of ordinary air to burn in an atmosphere of coal gas. The man who tries to get a great light from paraffin oil, with either more or less than the proper supply of air, will fail should he greatly deviate from the feeding of the flame with exactly the proper amount. Of late years some attention has been given to these matters by manufacturers, for in the days of old we had not the telescopic chimney to any lantern; still the law utilised in the construction of even the best of the oil lanterns now before the public, seems to be that known as "the rule of thumb," a law which governs the logical proceedings of the witches in the play of Macbeth. The best of the present oil lamps for the lantern now before the public, has an extra long chimney. The three-wick cylindrical oil lamp of Trinity House, giving a light of 180 candles,
has a very long tubular chimney, two or three feet in length, and but one or two inches in diameter, so far as I remember. The horizontal section of the chimneys of the magic lanterns now in use, is in all cases much larger than this. Fortunately, any maker who turns out a good lamp with a cylindrical burner can easily try experiments with different chimneys by prolonging the normal glass tube successively with tubes of metal, of different lengths and diameters, with a loose packing of asbestos between the two, as previously described in one of this series of articles.

The increased light cannot be obtained without increased heat, and when we consider the heat of a flame of 180 candle-power, reinforced as it must be by a very small properly curved and placed reflector to avoid great loss of light, the heat falling upon the triple condenser will be a serious matter; more care than at present will have to be taken in lighting the lamp much earlier than usual, and in turning up the flame, bit by bit, after the lapse of sufficient time between each increase, so that before the flame is made to reach its maximum the condenser and the whole optical system is thoroughly hot.

I know an expert lanternist who thought that he was sufficiently careful in this matter, who recently, with the lime-light, succeeded in cracking the nearest lens of a triple condenser as well as its protecting sheet of thin plane glass. A triple condenser, properly made, collects so much more radiant heat and light than does a double condenser of practical utility, that the conditions as to heating are not the same in degree as those with which oil lantern users now possess general experience. In all such lanterns as those now proposed it will probably be well that a water-trough, with parallel sides, be placed between the condenser and the slide; alum is usually dissolved in the water used, but that is a mere matter of superstition, for, although a transparent plate of solid alum powerfully opposes the transmission of heat, it is different when the alum is dissolved in water; the state of aggregation of the alum is then different, and the plain water practically does quite as well without the addition. At the Photographic Society, two or three years ago, a slide representing some of the chief astronomers in Europe, began to frizzle up under the heat for want of the protection of a water trough, and possibly the slide might have been coated with some soft varnish.

Another essential point is that all the glasses in the condenser shall be well annealed, otherwise one or more of the thick lenses will be likely to "fly." A purchaser can anneal his own lenses by suitably supporting them four or five inches from the bottom of an exceedingly large fish-kettle full of cold water, to which heat is afterwards applied, and the whole slowly brought to the boiling point, and kept boiling for a short time. Then the kettle, with the water and lenses in it, must be placed on one side to cool exceedingly slowly; the longer it is in cooling the better; in fact, it is well to surround the kettle with any suitable bad conductor of heat, so that it takes say twenty-four hours or more to get cold. Then the annealed lenses may be taken out. The lenses of condensers should always be mounted so that they can be taken out of their cells and their edges examined; if they do not come to almost a sharp edge, the lenses, as a whole, are too thick, which is specially objectionable when they have to sustain great heat in use. The edges, though nearly sharp, should be slightly rounded and well polished; should there be any chip or slight crack on the edge, a crack may start from it under heat, and gradually extend across the whole lens; everyone knows how a crack may be led across a piece of thick glass by means of a red hot iron rod with a blunt point, such as a poker worn out at the end.

With time and practical experience, cylindrical lamps, with two or three concentric rings are likely to supersede straight-wick lamps for the lantern, if alone because with cylindrical lamps a properly made and fixed reflector can be applied with telling effect. A flame radiates as much light to the back of the lantern as it does to the front thereof, and suppressing an unaided triple condenser to collect an angle of light of say ninety degrees, instead of the sixty degrees or thereabouts of ordinary double condensers, a proper reflector might be made to collect nearly another ninety degrees of light from the back of the flame, and to send much of it back through the flame to increase the light collected by the unaided condenser. The most brilliant reflector would probably reflect about eighty per cent. of the light it receives, so as to be available for practical purposes. The best reflectors, however, are of glass, silvered on the front surface, so, what with the trouble of recoating them occasionally, and what with the danger of their frequently cracking by heat, probably reflectors of copper, with a thick coating of silver will be preferred. Recently, a method has been discovered of throwing down an alloy of cadmium and silver by means of electricity, and in almost any desired proportions; some of the samples look as bright as pure silver, and are said to tarnish much more slowly under the action of sulphur and other de-
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Fig. 1 shows the Lantern closed for carriage, Fig. 2 fixed up for the projection of lantern slides and Fig. 3 fitted up with the vertical arrangement for the projection of horizontal objects.

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The alloy has been patented in this country, No. of Patent, 1391, January 23rd, 1892, by the London Metallurgical Co., and S. O. Cowper-Coles. The alloy is made with from twenty-five to ninety per cent. of cadmium. Cyanide of cadmium is dissolved in cyanide of potassium in slight excess, and a small quantity of the double salt of the cyanides of potassium and silver then added, the whole forming the electrolytic bath. The anode consists of an alloy of cadmium and silver, in nearly the same proportions as the alloy to be deposited by electricity. An alloy has been made, with some difficulty, of aluminium, with a suitable and small proportion of silver, and possessing good reflecting powers, but I am not aware of its having been introduced into commerce. Some years ago, when aluminium began to get cheap, an alloy of that metal and bismuth, taking a high polish, was turned out, and the metallic portions of some harness made thereof. For the lantern, the reflector should be small, and pretty close to the flame; fortunately, in oil lamps of the Douglass type the shape of the base of the glass chimney is such as to distinguish these object lessons from the old and dry lectures, it was found necessary to coin a new word to differentiate them, so they were henceforth christened Demonstrations.

It has been proved by actual experiment that the more senses we bring into play during the process of learning, the more easy does the task become, and the more permanent is the impression made. If an object can be seen and handled during the time a verbal description is being given of it, the task of remembering its construction and uses is rendered exceedingly easy. Now-a-day demonstrations (whenever possible) have, in a great measure, displaced the old-fashioned dry-as-dust lectures. A good example of the experimental method of teaching is found in the extreme usefulness of dissecting whilst studying anatomy. The knowledge gained from the viewing of illustrations and museum specimens is exceedingly transitory, and leads to erroneous impressions as to the true position of the structures seen. Whereas (although very few students ever attain such skill and proficiency in dissecting as to be able to produce such results as are figured in our best text-books) the knowledge gained from the actual manipulative work of dissecting (however imperfectly performed), is much more accurate and lasting than that which is simply gained from viewing the most beautiful dissections and illustrations that were ever made.

In comparing the stability of the knowledge gained through the medium of the various senses, there is little doubt but that that gained through the medium of touch is the most impressive and the most lasting. Bearing this fact in mind, latter-day teachers have (whenever possible) brought before their pupils the actual objects it is their duty to describe, so that as many as possible of the senses can be brought into play during the process of learning. It is, however, frequently impossible to bring into the class-room the necessaries wherewith to illustrate the lecture; the next best thing must then be done, and this is undoubtedly the submitting to view of well-prepared and accurate drawings and diagrams. The knowledge to be gained from these bears a direct ratio to the skill and accuracy with which they have been
produced. A roughly-drawn diagram produced by a non-artistic but learned professor frequently conveys more real and permanent knowledge than an elaborate drawing from the pencil of an artist whose knowledge of the subject drawn is nil. Some of the drawings which appear in our text-books bear no more resemblance to the object they are meant to represent, than a mole-heap does to a mountain. The cause of this is soon found, the authors not being themselves artists have had to employ others (not acquainted with the subject in hand) to illustrate their works, and the drawings have been made rather to produce artistic effect than to convey real and lasting knowledge. On the other hand, the drawings in a few of our books are worthy, both from their beauty and truthfulness, of being hung upon the line in the Royal Academy. When our text-books are illustrated with engravings made from photographs of the actual objects taken under suitable conditions, we shall have made a great step towards perfection. Photography is the willing slave and helpmate to nearly every science, and to none does she offer her help with more certainty of proving useful than in the science of teaching, especially when her wonders are demonstrated with the aid of the optical lantern. The object of this essay is to point out the true position which the optical lantern ought to hold as an instrument of education.

The magic lantern (as this now well-recognised instrument of precision is frequently, and to its detriment, called), we have good reason to believe, was first known in a crude form as far back as the middle of the sixteenth century. The first conception of it as a working instrument can with certainty be traced back to the seventeenth century, when Athanasius Kircher, a learned Jesuit, in one of his works, “Ars Magna Lucis et Umbrae,” not only gives descriptions and drawings of numerous optical contrivances, but shows in a concise manner that he understood the main principles upon which the optical lantern depends. There is but little doubt that a crude form of the instrument was used by necromancers to produce some of their wonders.

No one person has the honour of having discovered the lantern. Its development from the primitive form has been made by a process of evolution, one improvement being suggested here and another there as the science of optics has been better understood, as our mechanical skill has increased, and as our knowledge of illuminants has become greater. The oil-lamp was superseded by the Argand gas burner; this...
stage are dispensed with, a stout leather bellows being substituted in its stead. This bellows attachment should be removable, so that small pieces of apparatus and experiments may be projected upon the screen if required. The apparatus described is made, in slightly varying patterns, by most of our well-known opticians at prices ranging from seven to ten guineas. In the latest pattern of optical lantern suitable for class instruction, the space between the condenser or slide carrier and objective is left open, as it is found that there is no loss of light upon the screen, and very little escape into the room, and even this may entirely be cut off by hanging an opaque velvet curtain upon brass rods provided for the purpose. This class of lantern was first introduced in this country by Mr. W. I. Chadwick. One of the chief arguments that used to be urged against the extended use of the optical lantern for class instruction, viz., that it must be used in a darkened room, must now fall to the ground, as it has been clearly demonstrated that under proper conditions it can be manipulated in sufficient light not only to admit of the lecturer seeing his class, but of the pupils making notes during the progress of the lecture. In some of our modern schools, rooms have been specially constructed for the purpose of lantern demonstrations, and where this is not the case very little difficulty should be experienced in picking one in which, with the screen placed in a suitable position, and surrounded with curtains, the instrument could be used during the daytime with good effect.

A small screen (say six feet square) is all that is required under ordinary circumstances, and as the brilliancy of the disc obtained (from a given source of light) runs in inverse ratio to its size, a small one is a sine qua non for demonstrations in a subdued light. The screen must be shaded from the direct rays of light coming from windows or gasburners by means of curtains, and it should not only be tilted from the top, but should have a black screen projecting for about two feet so as to avoid reflection from the ceiling (see cut).

If found necessary, opaque screens may be used, projecting from the sides of the windows nearest to the screen, so as to shade that end of the room where the lantern screen is hung. A much better method, and one which is largely adopted in large schools upon the continent, is worthy of mention here, although it entails specially built lecture and lantern rooms. In the wall, at the lecturer's end of the theatre, and facing the class, is a large window eight or ten feet square, protected by two door shutters which open into the room. When open, these shutters protect the window—which contains one large sheet of ground plate-glass—from the direct rays of light from the ordinary windows. Behind this transparent glass screen is a darkened room which is used solely by the manipulator of the lantern, so that the whole of the apparatus is out of the
The Optical Magic Lantern Journal and Photographic Enlarger.

reach of meddlesome students. The lanternist can be communicated with by the lecturer either by means of a speaking-tube or by an electric bell. Pictures projected upon this ground glass show up exceedingly well. The ground glass used in this method is, of course, expensive, and also likely to be broken; for this, however, might be substituted various other semi-transparent media, such as oiled linen, paper, &c., but the results would not be quite as satisfactory.

For class demonstration, the lantern, and all apparatus belonging to it, should, if possible, be placed out of the reach of students, as interference with it is exceedingly dangerous. This is frequently possible, even under ordinary circumstances. The plan just described, however, has an additional good point, viz., that the boxes containing the slides can be always within reach of the lanternist, so that he is able to exhibit one from any series as required.

In the modern lecture-theatre, in which the seats are raised one row above another, the lantern can sometimes be manipulated from beneath them, in such a way as to be quite hidden from the view of the class. The cut will explain the arrangement.

The question may now be asked: Can the exhibition of diagrams and photographs by means of the lantern entirely replace the older and more frequently adopted methods of illustrating lectures? The answer will certainly be in the affirmative, for not only does the lantern do its work better, but it has many and distinct advantages over any other method. One of the distinct advantages which diagrams are said to possess over lantern-slides is that they can be examined for a greater length of time, and can, if necessary, be copied after or during the lecture. This is certainly an important point, but on the other hand the facility with which the slides can be exhibited both before and after the lecture in properly constructed frames, when they can be copied, and the ease with which rough photographic copies can be made from the original negatives from which the slides were prepared, in my mind carries with them a distinct advantage.

If the lantern-slides are prepared in the school or college where the lectures are delivered, copies of the more important ones can be made upon paper, and be distributed with very little trouble and at a very small cost. These can be gummed into the note-books of the students, and will act as lasting records of the chief points of the lectures.

In order to show clearly the advantages which lantern-slides possess over diagrams, I cannot do better than place lists of their respective qualities side by side:

<table>
<thead>
<tr>
<th>LANTERN-SLIDES</th>
<th>versus</th>
<th>DIAGRAMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost</td>
<td>Can be reproduced in any number, at a small cost, when negatives have once been secured</td>
<td>Exceedingly expensive</td>
</tr>
<tr>
<td>Storage</td>
<td>Take up very little room, and can easily be found when wanted</td>
<td>Require great space and care; are difficult to find</td>
</tr>
<tr>
<td>Reproduction</td>
<td>Can easily and quickly be reproduced by photography</td>
<td>Must be copied by hand or printed: photography too expensive</td>
</tr>
<tr>
<td>Wear and tear</td>
<td>Will last as long as a diagram if used with care, and will always keep clean</td>
<td>Become of necessity very dirty if much used, and quickly get torn and injured</td>
</tr>
<tr>
<td>Space required for exhibition</td>
<td>One screen of the size required</td>
<td>To be well seen must be large, a number taking up considerable space</td>
</tr>
<tr>
<td>Photography</td>
<td>Direct photographs can be used</td>
<td>Copies must be made, at the sacrifice of truthfulness</td>
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NO MORE EXPLOSIONS!
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Double £1 12s.; Single £1 10s.

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Chamber jets, with cog wheel lime turner . . . . 12/-
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New Sets of Slides—Chicago Exhibition, Canary Islands, Madeira, Greece, Athens, also Border Stories.
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Second-Hand Lanterns of all Descriptions, great bargains. Lists free.
DEAR SMITH,

So you are going in for a new Lantern. Well, I think it's time you did; what's the use lugging that Biunial about when you can do all that's required with a single Lantern and a Chadwick's Eclipse Carrier? By all means go in for either a Chadwick's "Perfect" or his "No. 2" Lantern, they are both constructed on the same lines, and provided with the same optical system and jet adjustments; the only difference is, the "Perfect" has a mahogany body, and handsomely got up, whilst the "No. 2" has a metal body with walnut base and sliding front extending to about 14 inches. The Condensers are 4½ in. triple combination in patent telescoping mounts, with interchangeable lenses to suit the focus of the objective in use, and these give from 80 to 50 per cent. more light than any double condenser, besides reducing the spherical aberration to the minimum—see Chadwick's Pamphlet on Lantern Condensers—The objectives are the very best I have ever seen. Double-combination achromatic of any focus from 4-in. to 14-in., interchangeable in a delightfully convenient raised mount, the lantern front can be extended to suit the longest focus lens, and is as steady as a rock; the space between condenser and objective can be closed when showing ordinary slides, or open in an instant for scientific projections, the vertical attachment, &c., &c., and the jet stage and jet adjustments by mechanical motions are most perfect; no beastly tin stage and clumsy binding screws to bother with. Of course, if you like to use oil, any of the Standard lamps, or a Lawson Saturator may be used in the "No. 2" Lantern. You see one great advantage in one of Chadwick's Lanterns is that they are constructed on sound, scientific principles from the start, every little detail considered, and if you wish to add either the vertical attachment or any scientific accessories hereafter, you have nothing to undo or cast aside. If you can spare the time, let me advise you to go and see Chadwick; you will find him a very nice fellow and a practical man; ask him to show you the Leach Lantern Microscope and Polariscope combined, the most perfect and complete instrument ever made, I am sure, and not only for projecting but for photo-micrography it is delightful; ask him to show you some of his own photo-micrographs, and see the new legs for his lantern box, and the little transparent screen for where you use the oil light; and, as he usually keeps a Lantern on tap at this time of the year he may show you the Kaleidoscope and a lot of scientific slides by the Lantern. Of course, if you can't go, write to him for his catalogues and pamphlets; you know his address is 2, St. Mary's Street Manchester. He is pretty liberal with printed matter, but, for goodness sake! don't fail to see his new "Scott's" Film Dark-Slides, for any sized camera.

Let me know how you get on, and write soon.—Yours truly,

T. BROWN.

P.S.—Get a shilling bottle of his Special Transparency Developer, and tell him to send me another bottle.

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"ALLENDALE" LANTERN,

(PROV. PATENT.)

Can be used on an ordinary Camera Stand. An entire novel and new style of Lantern. No loose parts whatever.

Fitted with double Lantern Carrier and novel form of Dissolver, also special new pattern powerful Jet. The

STAR LIMELIGHT JET

700 Candle Power.

THE FLYING CARRIER

The most rapid and smallest in the trade.

Telegraphic Address: Wholesale Only.

"LEVIATHAN," LONDON.
In addition to the obvious advantages thus shown, the use of the lantern possesses many others. In the first instance small experiments can be performed upon the stage in such a way that they can be viewed during progress by a large class; in the second, many actual specimens can be so prepared that their images can be projected upon the screen; and, lastly, it is possible to show a much larger number of illustrations of any particular subject than could be shown by diagrams and drawings of a size large enough to be seen by the whole class.

In preparing lantern-slides for class demonstration, photography lends us very great help. Drawings made on a small scale, book-illustrations, and paintings can be copied. Natural objects, museum specimens, &c., can be reproduced with almost "life-like" accuracy. Microscopic objects can be photographed upon an enlarged scale. Indeed, almost anything that can be seen, and a good many that cannot, may have their images impressed upon a lantern plate. Even those quite uninitiated with the photographic art are enabled to produce good and useful slides by some of the methods now adopted. Drawings in ink or lead-pencil can be made upon ground glass in a few minutes, which when rendered transparent by means of a suitable varnish, make most effective and lasting slides. These may be coloured afterwards if necessary. Gelatin and celluloid films can also be used for the same purpose. It is quite possible to make drawings upon prepared slides whilst in the lantern, and as these can be cleaned and used over again, all the advantages of a black-board are obtained.

Now that modern inventions and improvements have rendered the lantern practically free from danger, its capabilities only have to be fully recognised to place it in the very front rank of instruments of education.

---o---

Advice to a would-be Lecturer.
(An Intercepted Letter.)

My Dear Blosthrough,

At length I can find time to answer your letter of last week, in which you seek my advice concerning the feasibility of your attempting to give some lantern lectures during the coming winter. I can assure you that you have a far too flattering estimate of your own abilities as a lecturer; but still, as you rightly say, I have had considerable experience in this line, and so will gladly answer your queries as well as I can.

First and foremost, you want my opinion as to whether anyone, like yourself for instance, possessed of ordinary every-day attainments and abilities, is capable of becoming a lecturer. My answer to this is, Yes! but I hasten to qualify this assertion by reminding you that there are at least three kinds of lecturers,—the really good, the passable, and the indescribably bad.

As far as my experience goes, the vast majority of amateur lecturers belong to the last-mentioned set, and it is only a few here and there who may claim to be placed in the second class. It is difficult to understand why the post of lecturer offers such a powerful attraction to some people; an attraction, moreover, to those very individuals who are most obviously unfitted to fulfil the necessary conditions. It is a strange thing that some men, who can hardly be blind to their inability to either educate or entertain their own particular circle of friends and relations, should believe themselves capable of instructing or amusing the public at large. Wherefore, my dear Blosthrough, you certainly must not take it for granted that, just because your tastes or ambition leads you in that direction, you are bound to have the makings of a lecturer in you, and that you only require a cheap biunial and sixty slides in order to make yourself a world-wide reputation. As a preliminary, therefore, you must examine yourself carefully and critically, or, since you ask me for my outspoken opinion, shall I conduct the examination for you? To begin with, you are the right age, that is to say, not young enough to know everything, nor yet too old to learn. You neither stutter, stammer nor lisp, and of course the education you have received is a guarantee for the use of the Queen's English. Another thing in your favour is that you have served a long apprenticeship as operator, and have heard many lecturers, and have probably noted their respective strong points or deficiencies. So that from a physical point of view you are possessed of most of the qualifications for an amateur lectureship. A bald head and an expansive shirt front, (two very desirable attributes), time and tailors will provide for you. But, speaking seriously, do not fancy that it is because you happen to be possessed of these necessary qualifications of mind and body that I am willing to aid you in your efforts. I do so because I know you are capable of real and continued hard work, because you are not merely seeking your own glorification, and because, to quote the copybook, what you think worth doing at all is worth doing well. The diffidence and modesty of your letter to me proves that you do not consider yourself necessarily superior in intellect and knowledge to the two or three hundred individuals who may
chance to form your audience. I thoroughly agree with you when you say that it is nothing less than an insult for a man to string together trivial remarks, unrehearsed attempts at eloquence, drivelling egotisms, and call it a lecture. Not one man in a thousand can rightly be called eloquent, or can even be trusted to express his ideas clearly and succinctly without either preparation beforehand, or else long previous experience in public speaking. Now, as you have none of the latter, in order to be successful you must pin your faith to the former. Here, then, is my prescription for the would-be lecturer,—work, hard work! and lots of it. But, before giving you any practical advice concerning the matter, let me first of all deal with another of your queries.

In your letter you lament the fact that, although you have a fairly intimate acquaintance with the elements of two or three sciences, you have not made a special study of any particular one, and therefore do not consider yourself fitted to lecture on a scientific or educational subject. I cannot quite agree with you there, for I expect you are quite as qualified to lecture on a scientific subject as on any other. It is notorious that most specialists, with a few notable exceptions, generally fail as popular lecturers on their own subjects. Take the case of Professor Drybones, the eminent geologist. When lecturing he is bound down to absolute exactness in every detail; he is cramped and fettered by the obligation of leaving nothing unsaid because it happens to be uninteresting or technical. You and I can speak in bold but sufficiently accurate generalities; we can take sweeping views and make broad summaries of our subject; but, on the other hand, the learned professor must be exact even though tedious; minutely correct, even though wearisome. For his reputation's sake, he must deal with the most recondite and least known portions of his special science, and must discuss details hardly to be comprehended by those less erudite than himself. You and I, my dear Blothrough, cannot read papers before learned societies as the professor can, but we will show our audiences a slide of Niagara Falls on the screen, and tell them the yarn of the Irishman who "spoke Chinese," and I daresay we shall be forgiven.

Now for a few practical hints. I know that the date of your lecture is months off yet,—still, begin now! Select your subject as soon as possible, and then begin to get your slides together. Remember, you must own, for the time being, at all events, the set of slides which you intend using in your lecture. This, no doubt, comes as rather a shock to you: probably you proposed to hire them from the dealers in the usual way. This method is all very well for a semi-private show to a few friends, or for an entertainment which does claim to be more than an exhibition of slides, but for a public lecture it is out of the question. There is many a tight box prepared for the unwary and careless ones of this world, but the very tightest a man can find himself in is to be announced to lecture, say, on "Skylarks in Town," and then, a couple of hours before the doors open, to receive from the dealers a set of slides accompanied with a polite intimation that "Skylarks, etc., is out, and so we have sent the story of 'Bill the Converted Plumber.' " Please understand that I do not wish, by my last remarks, to imply that the dealers are always at fault, or that any plumber (of the kind I have come into contact with) could possibly have been converted. If it rested with the dealers alone, you would get your right set of slides, perfect and to time, but what can the dealer do if the previous hirer, living the other end of the country, does not return the set either promptly or complete? Therefore, if you cannot become the possessor, for the time being, of your slides, I strongly advise you to give up the idea of the lecture. When you have collected your slides—in number not less than fifty or more than a hundred—sit down and write out your lecture to suit them. Do not drag in details which your slides do not illustrate, and do not hesitate to leave out matter which, although interesting and apropos, does not happen to fit in. In other words, realise at an early stage of your proceedings that you cannot compress into one lecture all that could be said on a given subject. Write out the whole, from beginning to end, and then, with a ruthless pencil cut it down, contract, condense and shorten it, until its delivery takes a sharp seventy-five minutes. Next learn it off by heart, or if not actually off by heart, at all events, read and re-read it until you are perfectly familiar with the run of the words. Probably you have heard that such a proceeding as this takes some of the vigour and conviction out of your delivery; well, perhaps it does, but you must remember that this is your first lecture, and that this method does away with all hesitation, réitération and circumlocution, while the gain in terseness of matter, and in self-confidence cannot be over stated.

A word or two on the management of the voice. Of course you know that it is quite unnecessary to shout in order to make oneself heard. Articulate distinctly, in a slightly raised
tone of voice, each word clear and sharp, and you will be heard easily enough. It is not a bad plan to speak as though you were addressing someone near the end of the hall, or, as if your remarks were intended for the benefit of the lantern, supposing it to be about the correct distance off. Take pains to avoid being too noisy and you will be safe; for, if you go to the other extreme, a reproachful, "Speak up, guv'nor," from the back of the room, will probably warn you of the fact. As you are in the habit of pronouncing your words clearly and properly, do not be afraid of speaking too fast. A rapid utterance commands close attention; it is the slow droning speaker who wearies his audience. With regard to communication between yourself and your operator. The budding lecturer inevitably sees fit to provide himself with a tricky piece of apparatus called a signal reading lamp, which requires as much attention, and is as liable to get out of order as a lady's watch. Personally, as you know, I find it convenient to stand as close as possible to the screen, and I generally get sufficient light reflected from the disc to enable me to read my notes. In your case, signalling for another slide ought to be quite unnecessary, because frequent previous rehearsals will have made your operator quite familiar with the lecture, and he, as a matter of fact, will be the best judge of the exact moment at which to introduce a slide, and if up to his work, will not require you "to play at trains" with red lamps and signal bells. Even supposing your operator to be a stranger to you and your slides, still the wording of your lecture should run on so evenly and connectively from one subject to another, that there ought to be no difficulty in his anticipating the time and place for the next slide to appear.

In conclusion, let me impress upon you two things, which, for my part, I consider the two most important factors of success. First of all, be in time! I mean do not delay preparations until the last moment. Be sure and have the lantern fixed up at least an hour beforehand. Leave nothing to chance, see that everything is in its place, run the slides through the lantern, gauge the contents of the gas cylinders, see that you have sufficient light for your notes. Do not be afraid of having a small gas jet or two burning at the far end of the room; it will not dim the picture to any appreciable extent, nor, for the matter of that, will a carefully shaded candle on your table do any harm, while you will find a modicum of light useful in many ways. That is the first of my two points.

The other, and more important one is, be funny! Never mind the subject of your lecture, let it be science, temperance, or what you will, still, you must be amusing. If you cannot elaborate new ones, borrow old ones, and mind you have an impromptu ready for every incident or hitch that may occur, and let these be the most carefully prepared parts of your lecture. I know I am playing havoc with your preconceived opinions; I suppose you imagined yourself holding an audience spell-bound with the magic of your glowing eloquence and spontaneous wit; perhaps you will someday, but, my dear Blothrough, do not attempt it in your first lecture. By writing out and learning off your lecture, you will be able to avoid the pitfall of using inflated language and bewildering technical terms in order to impress your hearers. Remember that your audience has not assembled to hear how much you know about some particular subject; in fact, you will soon find out that many persons resent having it pointed out to them how superior your intellect is to theirs. If you are forced to introduce uninteresting matter into your lecture, remember that laughter will cover a multitude of dry facts, and so begin with a jest, end with a joke, and see that there are plenty of smart sayings in the middle.

This letter, my dear Blothrough, is, of course, intended for your eyes only, and I did mean to ask you to destroy it as soon as read, but, on second thoughts, keep it by you, and when you are making up your lecture, use the wording of it as a model of how not to speak in public. Notice the condescension of it, the frequent egosms, the calm superiority which is assumed, the, for want of a better word, "cocksurety" of it all, and then go and do otherwise. You may trust the facts but do not copy the style; and believe me when I say that a lecturer, who wishes to succeed, had better use bad language than the first personal pronoun.

You want to give a decent lecture, well, begin early, choose a sensible subject, i.e., one which will interest your audience as well as yourself; work hard, rehearse often, be in time, and be humorous. If you cannot fulfill each of these conditions, then take my advice and give up the idea of lecturing, and remain as you are, a good amateur operator.

Faithfully yours,
Bombastes Triple.
How to make a Lantern Slide

By Thos. Dawson.

Most amateurs who can take a negative with a fair amount of success are not always so confident when it comes to making good slides from them, more especially if they are to be reproduced by aid of the camera, for there is a wide gulf between a good copy and good lantern slides, which have to possess certain qualifications to be fitted for exhibition on the screen that are unnecessary for other purposes, and those unaccustomed to the work often plunge from the Scylla of muddiness to the Charybdis of under exposure.

There are two methods of lantern slide making, one by camera and one by contact. When contact printing is suitable, nothing can be better; it is, however, limited to producing a positive of exactly the same size as the original negatives, so far as the image is concerned, and there is always the difficulty of getting close contact owing to the uneven surface of the glass over the whole of the picture. Given the right dimensions and perfectly flat glass for both negative and positive, there is little or no difficulty about it; of course, if films are used, this objection does not obtain. In copying by aid of camera these difficulties are non-existent, the whole or part of the negative can be used at discretion, and the size can be lessened or increased without any difficulty, thus giving a wide range of variety impossible to attain by other means. To balance these advantages care is exercised in focussing and development, for it goes without saying absolute sharpness of image is indispensable, but the extra trouble is amply compensated for by the greater command we have over the results.

In making a slide there are three principal considerations. First, the kind of plate; secondly, the amount of enlargement or reduction, the negative being of a different size to the slide required; and, thirdly, if the negative will be best rendered wholly or only in part. It will be frequently found on carefully examining a negative that some special division of it will make an excellent picture if separated from the rest. To assist us in finding the exact area to be reproduced, it is a good plan to cut two L shaped pieces of cardboard, and by slipping one over the other, laid on the negative, we shall be enabled to define the exact portion of the negative most pleasing for our lantern slide. The next thing is to cut an opening out of an opaque piece of paper the exact size of the space we have selected, and gum it by the corners on to the negative, seeing that the opening comes on the right places. I may mention en passant that it is best to select a portion that will enlarge or copy, with a suitable foreground, as a foreground is the most important part of the picture on the screen, and with it insufficiently made out, there is a feeling of incompleteness that it is best to avoid. If a distance is chosen it should include some middle distance that is fairly clear in the shadows, remembering that it will have to take the place of foreground, and the subdued atmospheric effect. Quite proper, for the whole of the picture will be out of character if reproduced in a foreground, and give the impression of a slice taken out of a larger picture, which should not be the case. Exposure and development will effect this to a certain degree, but it is best to have the original as suitable as possible to start with, for I am no advocate for dependance to be placed on remedial measures when the necessity of them can be avoided by use of a little discrimination at the onset.

We will suppose the negative is prepared ready for copying by every portion except that required for the transparency being blocked out. The next consideration is the process or plates to be adopted, and if daylight or artificial light is to be utilised. Some plates that give exceptionally good results with daylight are practically useless with artificial light, and vice versa. Of all plates that give the highest quality of image, a slowest collodio-bromide plate is perhaps the best, but there are plenty of good lantern plates in the market suitable for either kind of illumination. Suppose we are using daylight, the light from a good reflector is better than pointing the camera skywards, besides being much more convenient to use by having all the apparatus on a level, and the light being more equalised by the reflecting surface than the clear and cloud variations of direct skylight. A sheet of stout white card-board or drawing paper strained on a drawing board, and brushed over with a cream made of precipitated chalk, to which a little good gela-tine has been added in order to make it adhere. When properly dry this makes one of the best reflectors imaginable, supplying a beautiful dead-white surface that absorbs very little light. As the angle of reflection equals the angle of incidence, the reflector should be so arranged that the full sky light should fall upon it, and by its position reflect the light straight through the negative. The usual plan is to reflect the light from the zenith by a reflector outside an upper window, but, providing there is a good open space towards the horizon, the camera is managed equally well, set sideways to the window, and sometimes will be more convenient.
No. 1 diagram shows the usual position of the apparatus. No. 2 if a longitudinal light is made use of.

![Fig. 1](image1)

A, Reflector for light: B, Negative to be copied: C, Camera: D, Table.

With regard to artificial light, it is of course, necessary to use a much more rapid plate; very good results may be obtained on ordinary landscape plates, having due care to the development. The light may either be transmitted through a condensing lens, or by reflectors; the condenser, of course, increases the rapidity of the action as the light is used direct. No condenser being available, the reflecting and lighting should be as planned in diagram 3.

![Fig. 2](image2)

![Fig. 3](image3)

A B B Reflectors B B set to hide the light of the lamps, C C from the Camera and reflects it on to the reflector A: D, negative: E, Camera.

If paraffin lamps are used, ortho-chromatic plates considerably shorten the exposure if used without any yellow screen; and the advantage of a reflector is that without a condenser it is very difficult to use direct light evenly. If ground glass is interposed there will still be patches of stronger light in front of the flame. A medium that would prevent this would also seriously weaken the illuminations. Now, with regard to the negatives themselves, a very thin, fully exposed, yet clear on the shadows is the best kind for copying in the camera. A very dense negative is difficult and sometimes impossible to copy properly with any reasonable exposure; there will probably be a sort of whitewash look about the position that unites it for lantern exhibitions. This sort of negative is best reserved for daylight, and possibly contact printing, to get anything like passable results. The negative properly blocked out as already described is sharply focused on the ground glass with the same sized stop as is to be used in the exposure, taking every care, and using a magnifier to get it as sharply defined as possible, for lack of definition is fatal to good results. The size must also be carefully looked to. A mask on the ground glass with an aperture the proper size is a great help when the exposure is made.

The development of course depends on the kind of plate used, but whatever it is it must work clear and bright. A developer giving a slightly veiled soft image, excellent for other work, is altogether inadmissible. The deepest shadows must be nearly clear glass, by transmitted light, although detail may be perceived when laid on a white surface. If the shadows look clear when laid on a white surface, the projected pictures will be harsh, bald, and possess little or no delicacy and refinement.

Another thing, the slides should be made for the kind of light by which they will be exhibited. This is undoubtedly a difficult condition, as the makers have no control over the exhibitions as a rule. A slide made for the lime or electric light, and giving the best results, would be heavy and dull by an oil lamp; and one of the proper density for an oil lamp would be poor and weak if shown by a much more powerful illuminant. Thinness and under-exposure are frequently used as synonymous terms; of course a mistake, but it is sometimes difficult to make the difference clearly understood that thinness and clearness does not by any means infer deficiency in detail, but under-exposure or development does. I give the preference to pyro and ammonia well restrained, for lantern work, as I fancy the colour of these positives is richer than any of the more recent introductions. Hydroquinone will give a nice clean image, but the colour is cold. If after development and fixing the image is rather too thin, treatment with mercurial chloride followed by sulphite of soda will promote excellent results both in colour and density, without overdoing the density. If it is
thought to have produced too much density, a dip in weak hyposulphate of soda will reduce it to any degree. For black colours, sulphate of iron added to the hyposulphate bath will clear the image and improve the colour, the exact quantity to be added is not of much importance. An ounce of sulphate of iron to the pint of both is a good proportion. All the positives should be flooded over with weak hydrochloric acid (after being fixed and washed) of strength of ten drops of acid to an ounce of water, of course washing off the acid afterwards. Well washing between the various processes is a panacea for most kinds of stains.

Contact printing will produce excellent results, providing the negative and positive plate can be brought into even and close contact. This is one of the greatest difficulties in printing when glass has to be laid on glass, as the greater part of it is more or less uneven, and wherever there is any irregularity there will be want of sharpness. Of course this does not apply to films, which will adapt themselves to irregular surfaces that glass will not. A want of sharpness, when limited to small spaces, is very apt to be overlooked in the slide, but will show unpleasantly on the screen; for this reason contact printing is somewhat in disfavour. Very dense negatives, when only objective in their density, must almost of necessity be printed in this fashion. In such cases it is best to use only parallel rays of light, obtained by putting the negative and plate in a pressure frame in a rather deep box, and exposing to diffused light. This plan will minimise the trouble, much as it can be, by cutting off all such light that would penetrate between the two glasses, if it had access to them from the side, and thus cause a blurring of the image.

In all contact printing a mask should be laid over the edges of the negatives, especially if artificial light is used, or the light will be reflected through the edges of the plates and produce a considerable amount of fog all round the positive; this is the case even if the plates are the same size and fit fairly well into the pressure frame, so, as a matter of precaution, the mask should never be omitted. A little arrangement for making exposures, and which will be found exceedingly convenient, is to get a board about two feet long with an upright end grooved, in which the pressure frame containing the negatives can be slipped into an upright gas burner at the other end—of such height that the flame will be central with the negative, as diagram 4.

By having the front glass of the pressure frame ground, the light is more evenly diffused with scarcely any perceptible loss of activism, and by having the distance between the light and the negative always the same uniform exposures are more regularly made, a matter worth considering when a large number of slides have to be exposed. A thorough washing after fixing is important, so that the hypo is thoroughly eliminated; the least trace left on the film will, as the gelatine gets dry and hard by continued exposure to the heat of the lantern, produce a slight veil by being pressed out to the surface of the film, which will require the unmounting of the slide, and rewashing to get rid of.

With some plates a slight veil will be noticed when they are dry, however carefully they are washed. This may be got rid of by flooding the surface with a little dilute albumen, and drying spontaneously in a place free from dust. Finally, the slide has to be mounted, a simple enough operation if the necessary conveniences are at hand; but somewhat troublesome, in spite of its apparent simplicity, under other circumstances. First an opaque paper mat has to be selected, of suitable form, and laid on the image; then a cover glass, exactly the same size, perfectly bright, clean, and free from slime or other defect, laid on this, so that the image and mat is sandwiched between two pieces of glass. Some strongly-gummed flexible paper is then bound round the edges, two small discs of which paper, stuck on the two top front corners, will complete the slide. Small instruments to hold the glass together during the binding are very convenient; in lieu of this a small block of wood about two inches high, and about two inches square, on which the slide to be bound is laid, and kept in position by a weight on top, is a method often used, although inferior to the regular holder. The gummed paper is cut into strips of about 2 in. width, moistened, and the centre of the moist adhesive surface gently pressed against the edges of the glass, the two free edges being gently folded over and pressed to the glass, where they will remain, and the binding is completed.
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Side by Side Lanterns for Saturators, and Things in General.

By New Zealand Lanternist.

It would seem that there are almost numberless points of difficulty which beset lanternists all over the world. One would think that in England, where facilities for acquiring reliable information everywhere exist, that there, difficulties would be easily and satisfactorily overcome. This, however, does not appear to be entirely the case, and I may safely say, that in a far-off land like New Zealand, where lanternists are in the great majority of instances thrown upon the resources of their own intelligence, that there little obstacles present far less trouble than in England. Of course our troubles are largely of the same character, but we cannot fly for refuge and instruction to the ever convenient and providential Editor. You can imagine, sir, that if we had always to wait for editorial information, our lantern work would be very largely made up of what constitutes music—periods of rest, and many of them pretty long ones. If our lenses get mixed, or our lamps persistently refuse to burn, except in the wrong way, or the jets get choked, or the gas bags leak, or the saturator won’t work—if indeed, the hundred-and-one incidents peculiar to lantern work occur, we simply have to rely upon our own judgment and reflection, and resolutely master them.

I have, however, to confess that our knowledge is sometimes gained in rather startling ways. Some time ago, a clerical friend of mine imported a fine bi-unial, with all accessories for the oxy-ether light. He had, of course, little or no knowledge of the working, and during his first entertainment his audience were kept in a constant and lively expectation, by the salvos of miniature artillery which were ever and anon proceeding from the immediate vicinity of the reverend operator. The climax was reached when, with a tremendous report, his oxygen bag exploded, filling his audience with unpremeditated alarm and the building with blue vapour. This, of course, was a disastrous effect in more ways than one, for, as he had instituted these entertainments to defray the cost of the lantern, the result has been to frighten the spectators away altogether. I think there can be little doubt that the accident was caused by the pressure on the bag being suddenly removed, and I have supplied him with some flame extinguitors, which will prevent these catastrophes in future.

There is in this connection a matter of some importance, which, I think, will have to be seriously considered by lanternists generally. There are those who doubt whether the use of the saturator will be permanent. The bulk of the evidence is, however, against that opinion, especially where much travelling has to be done. What, however, I wish to point out is that the usual form of bi-unial lantern when used in conjunction with the oxy-ether (benzoline or gasoline) light, does not appear to be at all satisfactory; that is where “dissolving” is necessary. I am in the habit of using gasoline in my saturator, and found it extremely difficult at first, to correctly estimate the quantity of liquid requisite for charging. This, I think, must always be the case where one is not constantly operating. If the charge is too small, as the time of an exhibition proceeds the light gradually assumes a dangerous nature. If it is too great, the oxygen pressure forces the liquid from the saturator into the dissolving tap, from which, by its weight, it falls into the tubes of the lower lantern, and any attempt to light up simply results in the tubes being blown off the dissolving tap. All this can of course be prevented by experiment before an exhibition; but where, as in many instances, tanks are used, and which have to be replenished with oxygen during an evening, the increased pressure which the making of the gas produces is almost bound to force the liquid out of the saturator, and the result is as I have stated above. I think the only preventive of this inconvenience is that the tubes supplying the jets should all ascend at the same level on a sort of inclined plane, and this can only be done with side-by-side lanterns. The advantage of this is, I think, obvious, for the tubes being necessarily all of the same length the pressure is always equal, and this would be an immense help to beginners.

Further, there is an opinion being formed that for good registration, better light, and the production of “effects,” the “Norman tower” style is unsatisfactory, and will be superseded by the side-by-side form. The lowering or raising of the front tubes to obtain coincidence of discs cannot but be detrimental to perfect focussing, and it has the further disadvantage of deflecting the condensers from their proper axis with the light. I am not aware that any manufacturer has yet constructed a side-by-side bi-unial, but, I think, such a form, with good facilities for “effect” work, would, both for
efficiency and convenience, surpass the present style.

I have frequently noticed the statement made that dissolving with the saturator cannot be done—that it can only be used with the single lantern. Surely these dogmatic assertions cannot be seriously made. My experience is, that so long as the supply of liquid in the saturator is right, dissolving is quite as easy as when using either the "blow-through" or "mixed" gases. Gasoline, perhaps, is the best adapted for the purpose, for although the light produced is slightly inferior to that given by ether or benzoline, the former has the distinct advantages of being cheaper and less liable to evaporation.

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New Apparatus, &c.

READING STAND.

A substantial and ornamental reading stand has been devised and made by Messrs. Benham and Froud, of Chandos Street, and will shortly be issued to dealers in lantern and other apparatus. It is fitted with a patented action, whereby the sliding tube is automatically clamped at any desired height, a slight pressure on a knob sufficing to enable the stand to be lowered or raised. At the upper portion of the reading desk is a socket for holding a reading lamp. When not in the apparatus folds up in a convenient hand package. The accompanying cut shows the stand both open and closed.

LIME TONGS AND BORER.

A neat combination, consisting of tongs and lime borer, has been patented by Mr. A. Wrench. The tongs are made of brass, and at the extreme end is a borer, à la penknife blade, which, when not in use, can be folded up. An ordinary pair of lime tongs have been considered a necessary adjunct to all lanternists, a pair containing an instrument for boring out limes should be hailed with delight, as in most cases there is some trouble experienced in freeing the hole of the lime cylinder.

SCIENCE LANTERN.

Many novel ideas have been embodied in the new lantern brought out by Messrs. Woolley, Sons and Co., of Victoria Bridge, Manchester, not the least being its compactness when packed. The base board is of very convenient form, and is hinged so as to fold up in front of the lantern when packed. The front is provided with a long base, which slides in the base-board proper. The space between the slide and objective is left entirely open, and, when desired, the carrier stage can be lifted off. Besides being used for the projection of vertical slides, this lantern can be quickly altered so that horizontal objects can be shown. To do this, the body of the lantern is drawn back as far as possible on its base, the hinged base turned up, and the mirror and condensing lens placed in position; the base to which the front is attached is then drawn out, and the alteration is complete.

SATURATOR FOR BI-UNIALS.

Messrs. Riley Bros. have now completed the Lawson Saturator for use with double lanterns. In principle, it is similar to the single form described sometime ago in these columns, but in this case the saturating portion is made double, the one jet being as before, at the lower portion, and the other attached to the apparatus on top as shown. The limes are now made to turn from behind instead of at the side, as formerly, and the inlet tube and controlling tap is made in duplicate—one movement sufficient to turn one tap on and the other off. These
TO LANTERNISTS.

Those requiring the most Practical Apparatus at a reasonable price, should send for our New Illustrated Catalogue of Apparatus and Slides, upwards of 350 pages, containing "Practical Instructions to Practical Lanternists by Practical Men," by Messrs. D. W. NOAKES and C. W. LOCKE.

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It is so constructed that it screws into the back of the Jet Cocks in lieu of the usual bends, or can be attached direct to the Jet Tubes.

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For regulating the turning of the lime, a spring click is provided.

This anti-glare jet can easily be fitted on all commercial lanterns. In the illustration, the jet is a mixed one, but the same adjustments are applicable to either the blow-through or eth-oxo-light.

"A L E N D A L E " L A N T E R N .

This lantern, which has been introduced by a wholesale optician, whose trade mark and telegraphic address is "Loviathan, London," is being rapidly stocked by retail dealers in lantern apparatus. The lantern, which is provided with a tripod stand, has a jet totally different from those usually fitted to lanterns, the gas connections being from underneath and through the base-board of the instrument. The back being made solid no stray light is permitted to stream out from behind. It is, however, the slide changing and "dissolving" arrangements to which we would call special attention, as they are of a most complete, ingenious, and compact order, with little or no chance of failure. The slide carrier is pivottcd in the centre, the slide being inserted right-way up, at the upper receptacle. The whole of the changing is effected by the moving of one lever placed on top. When this is moved towards the operator the translucent cut-off is lowered behind the lens, and at the same time this lever engages in a notch in the pivot of the slide holder, which quickly turns it end for end, thus placing a slide in position for projection. By moving the same lever slightly back again, the cut-off is lifted slowly, revealing the picture as from a mist. The plate holding the attachment, and which is held in place by the four milled heads shown, is provided with a spring, which has a tendency to keep it towards the condenser. If it is desired to use framed slides all that is necessary is to slide this plate forward and insert them in the space thus provided in front of the condenser.

This lantern is also made with a bellows front for enabling any focus of lens to be employed. The lantern door, it will be seen, opens upwards and is provided with two hinged wings; this affords a good means for the operator or lecturer to read his notes or lecture.

"Tis lantern, which has been introduced by Mr. W. C. Hughes, and published by E. A. Beckett, 111-3, Kingsland Road, is one which will prove of great interest. Commencing with the early introduction of the lantern, which occupies a few pages, we come to a treatise on oil illumination, followed by oxy-calcium, and other jets. The mode of connecting the tubing to the jets of bi-unials and triples, and the methods of dissolving, are dwelt upon at some length. Following this, several pages are devoted to registration, and the manner of manipulating effects. The optical principles of condensers and objective is set forth in plain language. Particulars respecting the making of oxygen and hydrogen are given, also many details connected with the employment of gas from cylinders. Quick changing carriers—a subject to which Mr. Hughes has for years devoted attention—are prominent. Many forms of scientific lanterns are described, and much valuable information given thereon, but on page 138 the author is under a misapprehension in advocating the use of a lantern and objective for illuminating a large negative, from which to make an enlargement for as described and illustrated, the rays of light will diverge and only the rays passing through the centre of the negative can be utilised. Instruction in making and painting slides completes this interesting work of 170 pages. This book is finely printed, and nicely bound, and should find a place in the library of all interested in lantern matters. The price is 3s. 6d.

CURTAIN SLIDE.—We have received a fine drawing of an original curtain slide from Mr. F. F. Weeks, 21, Thorpe-road, Forest Gate. This we shall reproduce, about six inches square, and hope to publish it in our next issue, as Mr. Weeks has consented to present the design to our readers. To photograph this design, and reproduce in lantern slide form, will be an easy matter for our photographic readers, whilst those who cannot do this for themselves can get it done at no great cost. As it will be improved by colouring, we can refer those interested to the advertisements of artists to be found in our advertising pages. We may observe that Mr. Weeks has for some years past been making the designs for many of the leading houses that deal in slides.

VALENTINE'S SLIDES AND CATALOGUE.—Messrs. Valentine and Sons, 154, Perth-road, Dundee, have sent us a parcel of slides of New Zealand, they being a sample of the numerous sets detailed in their catalogue. The slides are very brilliant, and contain a wonderful amount of fine detail, even in the deep shadows. In their catalogue we find particulars of sets referring to trips to many interesting towns, cathedrals, and rivers; also particulars of slides relating to flowers, fisher-life, and religious subjects. Humorous and artistic subjects are also to be found in this catalogue, a copy of which we would advise our readers to apply for.
OPTICAL LANTERN SLIDES
FOR EDUCATIONAL PURPOSES,
Embracing every branch of Science, as well as INTERESTING and MORAL TALES.
Many of the latter are Illustrated from Life.

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Lists for ensuing Season now ready, and may be had from all the leading Opticians, Photo Dealers and Chemists.

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CHEMICAL TANK.
For scientific experiments in the lantern; made in glass and India-rubber; not affected by chemicals; mounted in mahogany frames. Special large tank to take plate for showing development, &c., on screen.
Price 2s. Post free, 2s. 3d.

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MAKES THE NEATEST SLIDE POSSIBLE
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Temperance Sets from Drawings by F. F. Weekes, &c.:

- The Child—what will he become?
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- Tim's First Speech (Humorous)

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- No One Cares for Me
- Father, Won't You Try?

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This jet can be instantly used as a Safety, or High Pressure jet, by turning a small lever. It is fitted with cog-wheel motion, for raising and lowering Limes Lever Taps, &c., and is of first class finish.

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LAWSON PATENT SATURATOR AND LIMELIGHT.

Direct from Patentee. Price £5.

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Newton-le-Willows, Lancashire.
**Correspondence.**

**INVENTION OF DISSOLVING VIEWS.**

*To the Editor.*

September 20th, 1893.

Sir,—In the present number of this journal I find another letter from "Suum Cuique," the contents of which seem principally to contain an answer to Mr. Wilkie's letter, but as he again brings my name in, and directly implies that I claim to have invented the "Fan" dissolver, I at once emphatically deny his statement as being decidedly untrue. Never have I claimed this, nor intend doing so. If he will again refer to my former letters, he will see that it was the "Oval Opening" Dissolver, which is entirely different to all other dissolvers. If he were candid he would own to having seen my model of this (made in cardboard) which was in the top studio when I dissolved partnership with Mr. Childe, leaving that—with many other things—behind. A very good dissolver was brought out at Carpenter and Westley's, named at the time the "Crescent Moon," owing to its shape. It was a circular metal disc, with the shape of a crescent moon cut out of it, which revolved in front of the objectives. The playbills sent to your office by "Suum Cuique" for inspection in no way prove anything beyond what he has already stated. The *Magazine of Science* dated 1843, certainly speaks of the lanterns drawn therein (and used at that time in the Polytechnic) as being a decided novelty, which only bears out more substantially my former statements in this journal. The lanterns referred to were only used for a very short space of time as we found it impracticable to work effects in them, so four large lanterns were built by Mr. Collins according to our direction, and it was with these that all our grand mechanical effects were produced. May I ask upon what authority has the editor of the "Encyclopaedia" gained his knowledge re "Invention of Dissolving Views"? Was it from Mr. Childe personally? I notice that this particular book was published in 1888, and the preface notice written in 1875. Before closing this letter I should like to state that I was a pupil of Mr. Childe, and afterwards a legal partner, working side by side with him for considerably over 30 consecutive years, and never once did I hear him allude to having exhibited dissolving views (as we now understand them) before 1840, and then in a somewhat primitive manner compared with the entertainment given in 1846. When I first went to Mr. Childe as a pupil no such thing as a pair of lanterns arranged side by side, or one over the other with dissolvers in front was on his premises. There was only one large lantern with 9-inch condensor, and three breast ones, which we used in conjunction to produce the "Phantasmagoria." As Mr. Childe was always considered a gentleman of his word, I must still thoroughly believe what he always gave me to understand, and until lanterns are brought forward which can be proved to have been made as far back as 1811, or scientific books published at that time giving minute particulars, I cannot under any circumstance whatever doubt that which Mr. Childe gave me most distinctly to believe. After a careful perusal of the letters that have been published by "Suum Cuique," I am of the opinion that the names Suum Cuique and Mr. Doubell are synonymous. Might I ask you, Mr. Editor, if I am correct?

I am, yours faithfully,

W. R. HILL,
Optical Scenic Artist.

[We are unable to publish the name and address of our correspondent, "Suum Cuique," or in fact that of any correspondent who chooses to write under a nom de plume. Editor.]

**CAT-OPTICON.**

*To the Editor.*

Sir,—I really cannot see any practical use in christening the numerous offspring of the ancient parental magic lanterns by such ridiculous names, for, no matter how fine the names given may be, it is still either the "Feropticon," "Artopticon," or "Magopticon" Magic Lantern, and in nearly every case the "tail" remains unaltered.

There are many other names besides those given in No. 48 of your journal which might be used by manufacturers of the lantern.

A short time since I fixed up a temporary patched excuse for a lantern merely for the purpose of experimenting on different lenses, and a mineral oil lamp, after an idea of my own, and I called my structure "The Cat-opticon," and, as lanterns go, not a bad name, as it would, in numerous cases, take the eyes of our feline household pet to see the pictures.

It is quite possible some maker of lanterns may hereafter adopt this name for his lantern. But "what's in a name?" It is quality in lenses and lighting which is needed, not an unmeaning appellation.

Yours faithfully,

W. M. JACKSON PIGOTT,
Optical Magic Lantern Journal and Photographic Enlarger.
CUSTOM'S DUTY ON LANTERN APPARATUS IN QUEENSLAND.

[To the Editor.]

DEAR SIR,—The June number of the excellent Optical Magic Lantern Journal, which has just arrived, contains a note saying that the duty on lantern goods in Queensland is 25 per cent. This is an error; it is only 15 per cent., and if your correspondent is paying 25 per cent. he is paying more than provided in the Custom's Act.

Twelve months ago it was proposed to increase the duty to 25 per cent., and I brought the matter under the notice of the Colonial Treasurer, and got the Member for Ipswich, the Hon. A. H. Barlow, now Minister for Lands, to take the matter up, with a view of having them admitted free, but the most he could get was to have them retained at the old duty (15 per cent.), and which, in my opinion, is 15 per cent. too much for goods of such an educational nature as lanterns and slides.

If I can procure a copy of "Hansard" with the debate on the matter I will send it to you. I shall also be glad to give your correspondent information on the matter should he require it, with a view to saving him the extra 10 per cent.

I am sorry to have to trouble you so soon again after your previous long letter to me, but knowing how ready you are to help and give information, I again trespass on your good nature.

Thanking you in anticipation,

I remain, Dear Sir, your truly,
W. J. McCULLOCH,
c/o Messrs. Chinn & Foor.
Ipswich, Queensland.

[The first part of your letter which we have not published has been attended to, and the nipple has been sent to the party mentioned. There is no doubt about the flaw in the tube. The nipple itself is far too large, it being, if anything, larger than that which we commented upon in May, 1891, p. 116.]

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Notes and Queries.

Withers, Jr.—We note your letter of explanation re the particular part of lantern. The easiest plan is to make spiral springs of steel or hard brass and fit them over the pillars; this will not doubt answer your purpose.

Joseph M.—We do not keep a register for those wanting situations; try a sixpenny advertisement in General Wants.

A. L. Leswick.—To answer your first three questions would occupy several pages, but you will find very full particulars respecting the mechanical printing in the editorial article, in this year's British Journal Almanac. If you want to make one transparency from another of the same size, you can make a negative from it by contact, and then a transparency from the negative by the same process. You will find an article on slide making in this issue that may assist you.

S. W. Wood writes—I have a lot of weak negatives to make slides from which would be the better plan; to intensify the negatives, or, to expose the plate at a distance from the light and give a prolonged exposure?

Answer—This is a somewhat difficult question to determine without first seeing a sample of the negatives, you might try both methods, and then decide, or, if you send us one of the negatives, we will let you know the better plan.

Withers.—Danbury Street, N., formerly went under a different name—we think Essex Street; it is one of the turnings out of the street nearly opposite the County Court, Duncan Terrace, Islington. The name of the firm is Holmes & Watson.

E. Neil.—The body of lantern has evidently been coated with varnish, and then French polished, hence it is liable to blister; nothing will rectify it but rubbing down and re-polishing.

H. Turton writes:—Will you please tell me the name of the maker of the key mentioned in your Journal of sometime back. It is one that will fit any make of gas cylinder. Answer.—You will find particulars in this Journal for April, page 69. The address of the maker is also given.

H. Simpson.—We note the contents of your letter and will be glad to get particulars of your lantern which you are to help and give information, I again trespass on your good nature.

Thanking you in anticipation,

I remain, Dear Sir, your truly,
W. J. McCULLOCH,
c/o Messrs. Chinn & Foor.
Ipswich, Queensland.

[Several articles of interest have had to be held over for want of space, although we have added additional pages this month.—Ed.]
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Our Catalogue contains over 1000 Subjects, illustrating the Bible History from cover to cover. All the pictures are selected with special care from the works of the greatest ancient and modern Masters; and the texts (numbering about 200 additional slides) carefully chosen by an experienced lanternist, who has also given close attention to their proper display. ’

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

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MATTHEWS' NEW Portable Optical Lantern, 35, DANUBY ST., ISLINGTON, LONDON, N.

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Are the Best Toned and most carefully-selected Slides on the Market.

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COMPACTUS LANTERN This Lantern is also admirably suited for use with Lime Light. SEND FOR TRADE PRICE.

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Condensers Compound for Enlarging or Optical Lantern.

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FOR LONG FOCUS.

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Single Lenses to replace broken ones at half the above prices.

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