

LANTERN RENOVATION

Many of the best lantern bargains to be found are those involving equipment in an advanced state of decay. We therefore hope that, despite the replacement of many of the products mentioned by modern equivalents, this series of articles by one of the most eminent of Victorian Lanternists, writing in the *Optical Magic Lantern Journal* 1892, will be of interest to our readers.

GOODWIN NORTON

No. 1.—WOOD-WORK.

Now that the lantern season is virtually over it will be well for the lanternist to overhaul and examine his apparatus during the summer months, with a view to putting it in good working order before next winter.

A lantern can, with a very little care and trouble, be made to look almost as good as new; but unless the amateur knows how to go about the renovating process, he will probably only make matters worse.

A mahogany-bodied lantern will, if used with a blow-through jet, be found to have its polish more or less blistered, especially about the top, whereas the brass-work which has been subjected to the same heat is scarcely tarnished. And as the lacquer on the brass-work and the polish on the wood are, or should be, practically the same—viz., shellac dissolved in spirit—it is reasonable to suppose that the wood has undergone some process which renders the polish more liable to perish.

With the cheaper kinds of lanterns it is often the practice to first size the wood and then apply the polish with a brush instead of a rubber, which latter is only used to finish with. This effects a great saving of time and expense, and the work looks quite as well as good French polishing until it is subjected to heat. In order to get rid of the blisters, the whole of the brass-work should first be taken off the lantern, and, if they are not numerous or deep, rubbing them down with glasspaper will be effectual; but if the old polish is much damaged, the whole of it had better be removed, especially if there are any bruises in the wood. There are several ways of doing this—by scraping with a steel scraper, and then rubbing with glass-paper; but it is difficult to get into the corners and mouldings. Another way is by washing with methylated spirit, which is a very tiresome job, and never removes it effectively; or by washing with a strong solution of potash. This is dirty work, but the colour of the wood is much improved by it.

If the mouldings are not elaborate it will be found best to use the scraper and glass-paper; and in order to get into intricate places, such as the moulding on the base, pieces of wood about 2 in. long, of suitable width and thickness, should be shaped concave or convex, on which to hold the glass-paper, so as to fit and go into the shape of the mouldings. The internal angles can be treated with a little spirit, and brushed out with a stiff shoe-brush which should, of course, be clean. The potash process will take all the polish off; but as water must be used to remove the potash, this is liable to warp the wood unless it can be done very quickly on a warm day. The woodwork of a lantern should never be exposed to the direct rays of the sun, which will, probably, split and warp it.

On the whole, it will be best to try the scraper and glass-paper first. A scraper is a piece of steel about four by three inches, the same thickness and temper as a hand-saw; in fact, broken saws are often cut into scrapers, but they can be purchased for sixpence. The difficulty is to keep it sharp; very few workmen can make them cut properly.

The edge is first filed perfectly straight and square, then rubbed smooth on a hone. A piece of hard smooth steel, such as a Bradawl, is then pressed along the edge, and if it is held nearly square will have the effect of turning it up, thus forming a burr, which is really the cutting part. The scraper is then turned round and the other edge turned over in the same manner. This can only be done properly after a deal of practice.

To use the scraper, it is held at an angle of about sixty, and drawn along the wood in the same direction as the grain. With very hard wood it can be used in any direction. Some workmen hold this tool by placing the two thumbs close together on the side nearest to them, with the fingers in front; others place it in the palm

of one hand, and hold the top edge with the fingers of the other.

If the scraper is sharp, and held at the proper angle, it should take off the polish or wood in long shavings, and not merely in dust.

Glass-paper lasts much longer and cuts better if used over a piece of flat cork; or failing that, a piece of wood covered with cloth will do as well.

If the wood of the lantern is dented or bruised the sunken parts should be covered by a piece of wet cloth, and a hot iron applied; the steam generated will cause the bruised wood to swell to its former size again. A common poker will be found convenient for this purpose; it can be made nearly red hot if the cloth is thick and well wetted.

Having removed the polish, and raised the bruises, the wood can be darkened by applying bichromatic of potash, dissolved in water in the proportion of 1 to 20. The water will raise the grain of the wood, and make it rough; it must then be rubbed smooth with fine glass-paper, taking care not to rub the stain into patches. If the colour is not dark enough, try a little stronger solution of the bichromate, or stand the lantern in a good light. It is the light that causes the wood thus treated to darken. When the wood is quite smooth it is ready for polishing.

The materials for French polishing are linseed oil, French polish, methylated spirit, cotton wool and some clean cotton rag, a camel's-hair brush, and the clean shoe-brush previously mentioned. The work should first be oiled all over, and wiped dry. A small quantity of cotton wool is then saturated with polish, and enclosed in a piece of rag; this forms the rubber, which is then passed over the whole work in regular circular movements, taking care not to squeeze out the polish too fast, and continue until the rubber is perfectly dry, when a little more polish is put on the wood, which must be removed from the rag for the purpose. As the polish is gradually deposited on the wood it will be found that the rubber is apt to drag or stick. To remedy this, apply the smallest quantity of oil to the rubber with the finger, and continue the rubbing until the pores of the wood appear to be filled, and then leave off for the day.

French polishing must not be hurried, and only the most experienced workman can polish a small job right off. The amateur will find it a good plan to go over the whole work three or four times, and then to leave it for an hour or two, or even a day, until the shellac has thoroughly hardened.

As the work proceeds the surface will look smeary. This need excite no alarm. The chief things to guard against are (1) using too much oil, which prevents the polish from adhering to the wood; (2) putting on too much polish, which will cause the surface to be uneven, or perhaps dissolve the shellac already deposited and make black spaces in the face of the polish; (3) letting the rubber rest, for even an instant, in the same place.

The mouldings can be touched up with a little polish, applied with the camel's-hair brush.

When the pores of the wood get filled, and the work has rested for a day, it should slightly be oiled all over with linseed oil, and then gently rubbed down to a smooth surface with the finest glass-paper. The oiling is to prevent the glass paper from scratching the polish too deeply, and to prevent clogging. Care must be taken not to press too hard on the prominent parts. The same process is gone through as at the commencement, but less polish and oil are used, and the rubber kept nearly dry.

When it is seen that there is a good surface under the smears, instead of adding polish or oil, put a few (a very few) drops of methylated spirit on the rubber, and go over the whole work very lightly, or all the polish may be dragged off. Continue this until the rubber is quite dry, and there is only a slight smear on the surface; add a few more drops of spirit, and rub with a

circular movement until all smears disappear.

These are practically all the directions that can be given. Experienced polishers have many little dodges of their own to attain greater speed, but it is doubtful whether these add to the quality of the work. The real test of good polishing is the bright surface which will not sweat or become spotty after a length of time. A pianoforte polished by the best English makers will keep bright for many years, but these often are in the polishers' hands for twelve months.

The lanternist, therefore, need not despair if his woodwork does not at first shine with resplendent beauty. To keep the rubber moist when not in use, enclose it in a clean lime-tin which has an air-tight lid.

No. 2.—JAPANNING.

THE best lanterns are lined with russian iron, which does not readily tarnish, as it soon becomes covered with fine dust from the lime, or with a deposit from the fumes of paraffin, either of which is a good preventative of rust.

Spots of rust, however, will sometimes appear; these may be removed by rubbing them with very fine emery powder and paraffin, afterwards merely wiping off the oil with a rag. But if the whole or greater part of the iron is rusty, as sometimes happens, and the joints are rivetted, not soldered together, the process known as blazing off may be tried.

The ironwork is well scoured with emery cloth to remove as much of the rust as possible; and is then thickly smeared with any kind of animal fat. The whole should now be heated sufficiently to set the grease in a blaze, and kept so until thoroughly consumed. This will leave a black deposit on the iron, which, while still hot, should be vigorously rubbed with a coarse cloth, a handful of shavings or paper. This process, if properly carried out, will produce on the ironwork a dull black polish, which will not smell when heated, require little cleaning, and not rust unless exposed to prolonged damp or some powerful oxidising agent.

Out of doors is the best place to try blazing off, as it creates a great deal of smoke and smell. Wood shavings, paper, or straw, will be found suitable to make the fire with. Small articles can be satisfactorily blazed by holding them in the tongs over a kitchen fire. No greater heat should be employed than is necessary to consume the grease, or the deposit will be burnt up, instead of being left on the metal. Of course, nothing but iron can be treated in this manner. Tin-plate is merely thin iron coated with tin, which would run off or form into lumps on the surface, and any article soldered would fall to pieces soon after the grease began to blaze.

To re-japan the lining, dome, and rose chimney of a lantern is not a very difficult matter, provided the lanternist has access to an oven in which to bake them after the enamel has been applied.

First clean off as much as possible of the old japan by scraping and washing in a strong solution of soda, then well rinse with clean water until all traces of the soda have disappeared, and thoroughly dry the articles in the sun or before the fire.

Black japan for the purpose can be purchased at most oil-shops. It is applied with a soft brush, just sufficient being laid on to cover; the brush marks are erased by rubbing gently all over the surface with the tip of the finger. When dry it is placed in an oven heated to a little above the temperature of boiling water, not much higher, or the solder may run.

The work should be left in the hot oven until the enamel is quite hard. The hotter the oven can be made within the limit mentioned, and the longer the japan is kept in it, the less likely will it be to chip off, or smell when heat is again applied.

One coat may be enough for old work, but for new tin-plate two or three thin ones are best.

Care should be taken when applying the japan not to put on too much, especially on the ornamental rose-top at the edges, or in the grooves where the trays slide. These grooves are often better not japanned at all, as they are never seen by anyone except the operator, and it is most annoying for the tray to jam and refuse to move, which sometimes happens when the lantern gets warm. If the

lanternist has a taste for the beautiful, he may like to decorate the top and dome of his lantern with gold or silver lines or figures, which can be done, after japanning, by lining or stenciling with japanners' gold size. This, when dry enough to be just tacky, is covered with gold or silver leaf, or bronze powder, and then again baked, or in the case of the bronze powder or silver leaf, coated with clear gold size, and put in the oven to harden.

Before putting on the gold size to which the gold, silver, or bronze is to adhere, the japan should be dusted over with french chalk, to prevent the metal sticking where it is not wanted, and the gold size, which is nearly transparent, mixed with some pigment, such as yellow chrome, in order that the artist can see where he is putting it. Any superfluous gold size may be cleaned off with a piece of rag dampened with turpentine. This must be done thoroughly, or the leaf or powder will adhere to the place. To be effective this method of decoration should be used sparingly.

Gold size can be purchased at any oil shop; a pennyworth will be sufficient for a dozen lanterns. Stencil paper may be prepared by coating thick writing or cartridge paper with turpentine. It is better to first draw the design on a piece of plain paper; lay this on the prepared paper, and cut both through together with the point of a sharp knife. Some parts of the stencil must be left to hold the paper together; for instance, in the letter O, if the lines were cut right round, the centre will fall out. In stencilling, the paper must be held close to the surface of the japan, and the gold size applied with a stumpy brush, care being taken to see that it does not get under the edges of the paper.

Gold leaf cost about 1s. 8d. per book of twelve leaves, each 3in. square; Dutch metal about 9d.; silver leaf, 1s. per book; bronze powder, either imitation gold or silver, can be had in 6d. packets from any dealer in artists' materials.

Sometimes it will be found that the japan does not dry readily; this is generally the result of the soda not having been completely washed off, or because there is some admixture of grease, most probably from the work being too much handled. Except to take out the brush-marks, it should not be touched until it is quite finished; and as the oven to be used by the lanternist will most likely be the same as the one used for domestic cooking, he should be careful not to let the work come in contact with the sides or bottom, and the door should be left open a little for ventilation.

Also, if possible, some amicable arrangement should be made with the lady, or lady-help, presiding over the cooking department of the household, as the odour of japan when baking, or being "stoved," as japanners say, is very different from that usually found in a well-ordered kitchen.

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No. 3.—BRASS WORK.

Every lanternist knows that the polish on the brass work of a lantern has nothing whatever to do with its optical qualities, but whether a lantern is to be sold or used for exhibition purposes, its outward appearance exerts a great influence on the purchaser or beholder.

Brass is capable of receiving polish equal to that of any of the metals, but unfortunately it as readily tarnishes on exposure to the atmosphere, or to the fumes of chlorine, sulphur, &c., as when oxygen gas is being made, or where there is disinfecting powder used, from badly calculated gas burners or oil lamps. To prevent this rust or tarnish, it is usual for the lantern maker to thinly coat the brass work with transparent gum, generally shellac, dissolved in methylated spirit, on which these fumes have little or no deteriorating effect.

This coating of shellac or lacquer is made to adhere to the brass by heat, but as it must necessarily be very thin, care should always be taken to prevent it being scratched or rubbed, as old brass can never be repolished and made to look so nice as when it first leaves the maker's hand.

It has been gravely advocated by some who ought to know better, that the use of somebody's soap—which, to have any effect on the lacquer or brass work, must contain a spirit, strong alkali, or a grit of some sort—is capable of polishing all kinds of photographic apparatus.

Certainly if the brass were not lacquered, some of these will procure a good shine, which would look very nice if done every few days; but few can either afford the time or take the trouble of spending a couple of hours doing work of such a dirty character as cleaning brass every time the lantern is to be used, which would certainly be the result if one depended on the soap mentioned.

The only way in which lacquered work can be kept clean, is by carefully wiping with a soft leather, and handling as little as possible.

In spite of every care, spots and scratches will appear on the surface, and if the lacquer be quite removed, these spots will become black. If they are small, and not in prominent places, it is well to leave them alone, but should they disfigure to any appreciable extent, a simple way to remove them is by gently rubbing with polishing paste or powder, such as can be obtained at any oil shop, taking care not to make the place larger, and afterwards to apply a little lacquer with a camel hair brush.

Dalton's cold lacquer will be found especially useful for this purpose, as it can be applied without heat, and any desired colour matched.

To relacquer the whole of a lantern front and stages, is rather a large order for an amateur to undertake, and cannot well be done without special appliances, such as a proper oven and a lathe for repolishing the circular parts; but he might manage some of the smaller pieces.

There are several methods of removing old lacquer from brass work. Boil it in a solution of borax in soft or rain water, or any strong alkali can be substituted for the borax, common washing soda being the most convenient. What is known as American potash can be dissolved in water and applied cold, but it is nasty stuff to use, it stains and burns the hands, and is liable to spoil one's clothing, and in fact almost anything it may happen to come in contact with. Another way is to mix methylated spirit and ammonia together, and rub a rag impregnated with this over the metal work.

This having been done, any part requiring it may be repolished with fine emery cloth or powdered emery and tallow, and afterwards brick-dust, and then a finish given with whiting. Care should be taken to rub the metal with the grain, or it will always appear scratchy, unless an exceedingly high polish be imparted. The lacquer can be purchased at an oilman's, and, as a rule, will be found more reliable than any that can be made at home, but should the amateur try to make his own, here is a good formula:—

Methylated Spirit	...	...	1 pint.
Shellac	...	...	3 oz.
Turnerac	...	...	$\frac{1}{2}$ oz.
Saffron	...	...	2 oz.
Anotto	...	...	1 drachm.

This makes a fine gold lacquer. It is, however, a good plan to mix the first two as a stock solution, and keep the latter dissolved in a little spirit separate so that any required colour may be made, other tints may be made with dragon's blood, gamboge, &c.

The following are two methods of lacquering: one is to heat the article to about 212° (boiling water), then to apply with a soft brush, taking care not to get the lacquer streaky, and let it cool gradually. The other is to apply cold or heated slightly, and then to stove or put it in an oven, the temperature of which should not exceed 230°. The brush used should be as wide as possible, and of the softest hair procurable; flat brushes suitable for the purpose may be obtained at 6d. and 8d. each, but smaller round ones from 2d. upwards.

When applying the lacquer, take as little as possible on the brush, draw it lightly over the surface, always with the grain, by this is meant in the same direction in which the brass was polished, care being taken not to get it in streaks or patches, nor to leave tears at the sides and end of the work.

The lacquer, consisting principally of spirit, dries soon, and two or three coats may be applied one immediately after the other. If the parts are likely to be much handled the lacquered brass should be stoved, i.e., placed in an oven for several hours, at a temperature of 230°, not much higher, or the coating will turn brown, or perhaps a dirty black.

The chief difficulties the amateur will encounter are, when in polishing to get the marks or grain in one regular direction, and also get rid of the polishing medium without handling the surface. To ensure the metal being at one even temperature of about 200° some authorities recommend immersing a short time in boiling water, and applying the lacquer as soon as the steam has dried off the brass. Hold the work without touching with the fingers; here the amateur's ingenuity may be exercised to advantage; most parts of a lantern have a hole in them somewhere, and a handle can generally be made with a piece of wire and a pair of pliers or hand vice, other parts may be temporarily fastened to a board with a screw or two.

No time is lost in making a secure handle or stand, as one piece may drop on the floor and necessitate the whole process of cleaning, heating and drying being done over again. If the lanternist be, fortunate enough to possess a lathe, the circular parts can be coated with the lacquer when revolving, by applying it with a silk rag or fine brush. The work first being made a little hotter than the hand can bear, by holding a shovelful of red-hot embers of charcoal underneath it, or a Bunsen's burner or common gas stove can be used for the purpose. Care must be taken not to smoke it.

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No. 4.—DULL BLACK SURFACES.

THERE are many parts of a lantern and camera which require to be painted or coated with a dull black, so as to avoid any false light being projected on the screen from one or more reflecting surfaces.

In the case of rendering dull black parts which are not likely to be touched—such as the fixed stop in an objective—they may readily be coated with a black deposit by holding them in the smoke produced by burning a piece of camphor. It will, however, be obvious that this can only be done in exceptional cases, as the smoke and heat may injure the surrounding parts which are not required to be blackened. For blacking a piece of glass upon which to make a sketch for a lantern this is an excellent method, especially if the glass has been previously rubbed over with a little bees-wax, which causes the black to adhere well.

A good dull black varnish, which will adhere to almost anything, may be made by mixing together vegetable black or gas black and lacquer or French polish. The exact proportions can be easily ascertained by actual trial—too much polish or lacquer producing a gloss, whereas too little will fail to make the black adhere. The addition of a small quantity of methylated spirit gives a still duller surface, but it is more liable to rub off.

It is essential that the mixture be smooth and free from lumps; success can be ensured in this direction if two or three buckshot be placed in the bottle with the ingredient, and the whole well shaken each time before use. The bottle should be kept well corked. It is well to keep this mixture in a stone bottle (ink bottle will do), for glass bottles are usually thin at the shoulders, and the rattling of the shot may cause them to break at this part, and the contents spread broadcast, in which case serious damage may be done, for the stain produced by it on any materials is exceedingly difficult of removal.

This mixture dries very quickly, so when applying it, it should be rapidly done with a soft brush, or marks and ridges may be formed. If necessary, several coats may be applied to the same article, letting each dry before another is applied.

Brass may be chemically stained in several ways, but perhaps the best and easiest method is first to thoroughly clean the article, then to dip into strong acid to ensure that every partial of grease has been removed, and to insert it in a saturated solution of hyposulphate of soda, to which has been added a little acetate of lead. In a short time the brass will become quite black with a dull surface. If it is required to be lacquered it should then be blacklead and polished in exactly the same manner as a housemaid polishes a grate or fender, and the brushes used for the purpose are the very thing required.

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