

---

# The Association of Historical and Fine Art Photographers

---

ISSUE NO 5 OCTOBER 1989



The Portland Vase photographed in visible and UV light by Trevor Springett of the British Museum Photographic Service who will be describing the photography of the reconstruction of this object in the next issue of the *Journal*.



# Polaroid

## INSTANT FILMS AND CAMERAS

JESSOP PHOTO CENTRE  
67-69 NEW OXFORD ST  
LONDON WC1  
TELEPHONE 01-240-6077



### CONTENTS

Editor's Letter.....	Page 1
Site Photography... Peter Dorrell.....	Page 3
Coin and Medal Photography... Charles Howson.....	Page 13
Comparative Ageing Tests on Colour Film.....	Page 23
Photography at the National Gallery.. Jill Dunkerton..	Page 25
Notes to Contributors.....	Page 42
Forensic Photography.....	Page 43
Constitution of the A. H. A. F. P. ....	inside back cover

# The Association of Historical and Fine Art Photographers

ISSUE NO 5 OCTOBER 1989

## EDITORIAL

Welcome to the fifth issue of the Journal and the first one I have edited. This issue contains the reports of the talks given at the conference last year with the exception of John Larson's talk on the uses of photogrammetry in the restoration of sculptures which I hope to cover in the next issue.

As you will have read elsewhere the arrangements for this year's Conference at the Zoological Institute are well advanced and it promises to be even better than last year.

I am still looking for contributions for the Journal, if you have developed any techniques or modified an existing one I would like to hear about it. If anyone wants to write about their work I would like to hear from them. Remember that the Association has a wide range of members and you may have a solution to a problem that other members have. I would also like any comments about the Association or on anything else connected with our work.

Jerome Perkins

Editor

Published by the Association of Historical and Fine Art Photographers

Printed by the British Museum Litho Section  
Great Russell Street, London, WC1 3DG.





The site photographer M.B. Cookson [on the right] with Sir Mortimer Wheeler at the St. Alban's excavations, 1929. In 1954 Cookson published the first-ever book on archaeological photography and until quite recently the Gandolfi camera shown here was still in use at the Institute of Archaeology.

Peter Dorrell is lecturer in Archaeological Photography at the Institute of Archaeology, University College, London. He has worked on many digs and surveys in Europe and the Middle East as photographer, archaeologist, and geologist. His book 'Photography in Archaeology and Conservation' is about to be published by Cambridge University Press.

#### Site Photography.

Peter Dorrell  
Institute of Archaeology  
University College, London.

Any competent photographer should be able to undertake excavation photography without difficulty. It is really very little different from architectural photography, together with a certain amount of object work. However, although the camera work may be straightforward enough, the circumstances are often far from ideal. They can be uncomfortably hot, cold, wet or dusty, darkroom facilities are usually makeshift, and excavators are always anxious to continue digging and therefore impatient of re-takes. In addition, few digs can afford a comprehensive array of equipment, and materials may have to be used in a miserly way, either because of a tight budget, or if the dig is in a remote part of the world, because of difficulties of supply and transport. On the other hand digs are usually interesting and enjoyable places to work, often in delightful surroundings, and archaeologists usually make pleasant, if eccentric, colleagues.

Questions of material and equipment are quickly dealt with. The primary record on most digs is taken in black and white, and given the present cost of publication in colour, this is likely to remain so. On a few digs everything is recorded on colour negative stock and black and white or colour prints and colour slides are derived from this, but on most sites colour is used only for transparencies, duplicating at least the most important black and white shots. For the sake of convenience, only one type of black and white film is normally carried—medium speed and medium contrast. However, if both high and low subject contrast is likely to be



encountered, common enough when some photographs are in bright sunlight and others at the bottom of shadowed, mud-coloured holes in the ground, there is much to be said for using two camera bodies or filmbacks, keeping one for subjects of high contrast and the other for low, and processing the film accordingly. For 35 mm colour positive many workers prefer Kodachrome- in spite of the cost- both for its keeping qualities and because the rather warm result seems to suit excavations.

As far as equipment is concerned, few digs, if any, can afford an ideal outfit, and there is often a good deal of borrowing and improvisation. There is no doubt at all, of course, that for black and white the bigger the format the better- at least up to 5"x4". This is not only because of the inherently better resolution of a large negative, but also because of the facility for camera movements afforded by a large-format camera- particularly important on an excavation involving standing architecture, and for the flexibility given by single-sheet development. If large-format is not available, or if it is judged too expensive or cumbersome, or sheet film too difficult to process, the next best is medium-format with the caveat that any advanced SLR is vulnerable to knocks and dust, and if it looks expensive, to the attentions of thieves and customs officials. Colour is usually confined to 35 mm. Any solidly built camera will serve, obviously avoiding any unnecessary or limiting refinements like fully-automatic or shutter-priority-only bodies, DX coding only, and automatic focussing.

Standard and wide-angle lenses are the only ones needed for large-format work. For medium-format and 35 mm, a reasonable selection would include standard, (fast lenses are quite unnecessary), medium

wide-angle, (anything wider than about 80° gives too much distortion at the edge of the field), and a long lens of about 12'. A macro lens, or tubes, is often needed, and a shift lens is useful if not vital, especially if the camera-movements possible with large-format are not available. A solid tripod is indispensable, preferably one with legs that can be angled independently, and with a reversible head or column for close shots. U.V. and, occasionally, contrast filters are useful, and lens-, back-, and body caps, and lens hoods, should always be carried and used. Except in wet weather, the greatest enemy on a dig is dust, and great care has to be taken to protect equipment.

All this is no more than commonsense and predictable enough, but the aims of archaeological photography need a little more consideration. The ideal end-result, rarely achieved, is an archive of negatives and slides which covers every aspect and viewpoint of every level and structure excavated, together with a complete record of all artifacts, both *in situ* and after excavation, and a further series of photographs showing the site in its setting, the surrounding country side, people at work on the dig, and sometimes the local population if they don't object.

On some rescue digs photography may constitute almost the whole of the visual record, but more commonly it is considered to be in partnership with drawing and surveying as a component of the record of the site. It is important to bear in mind that the drawn and photographed records, and for that matter the written account, are complimentary parts of the whole, but not interchangeable ones. The drawing of a structure or artifact is primarily a record of shape, size and proportion, while in a photograph, although



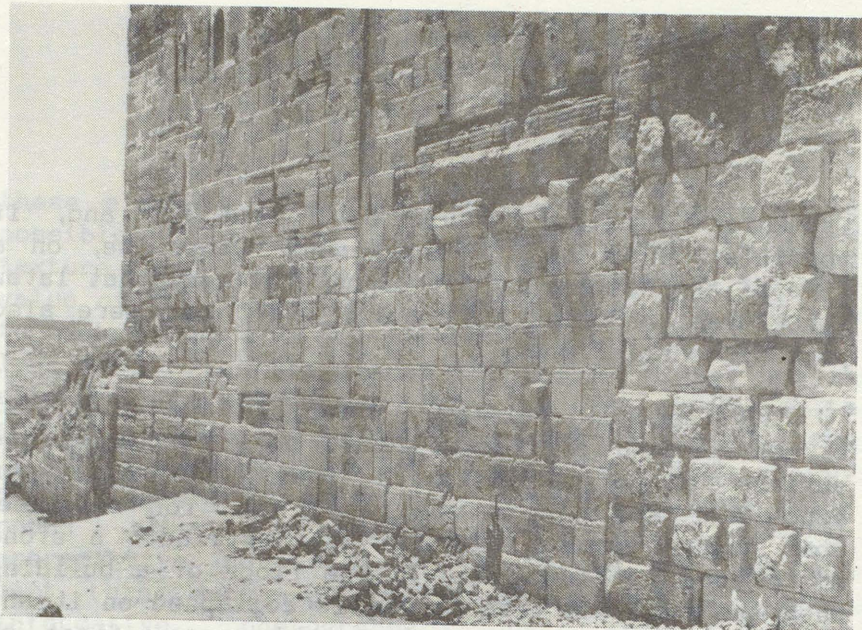
these elements should be rendered as faithfully as possible, much more attention is paid to tone, texture, and to the rendering of colour. But the value of the photograph is beyond this. The best way to understand a site, without doubt, is to go and look at it: to walk around the place, to see how it sits in the landscape, how one part relates to another, how it was built, used, and destroyed. There is no real substitute for doing this, which is why archaeologists on their days off are forever going round other archaeologists' sites with an appreciative, not to say critical, eye. But the next best thing to a personal visit are good, clear, informative photographs. In this setting 'informative' implies not only that the observer can see and comprehend whatever was in front of the lens, but also that viewpoint, light, and technique should combine to reveal the structure's context. The spatial connections of any structure or surface should always be clear: how one wall connects with another, or how an occupation-surface runs up to the side of a cave. But more than this, it is equally necessary to avoid suggesting false contexts. On nearly all sites, except the simplest, levels and structures have vertical, stratigraphic, connections. Surfaces lie upon earlier surfaces, walls may continue the line of their predecessors, or their foundations may cut deeply into, and across, earlier structures. The study of this stratigraphic matrix is, of course, the stuff of archaeology, and its primary record is not a photograph but a measured drawing of the vertical section. But in any photograph showing structures and levels of different periods this stratigraphical relationship should be clear- or at least not ignored. If the foundation of a wall is cut through earlier levels, somewhere there must be the line of the trench in which it was built, cutting through and truncating earlier levels, and it

is this line that should be looked for and, if possible, shown in the photograph. Otherwise, on a site of any complexity, it might well seem that later structures were not only built over, but were also part of, earlier ones.

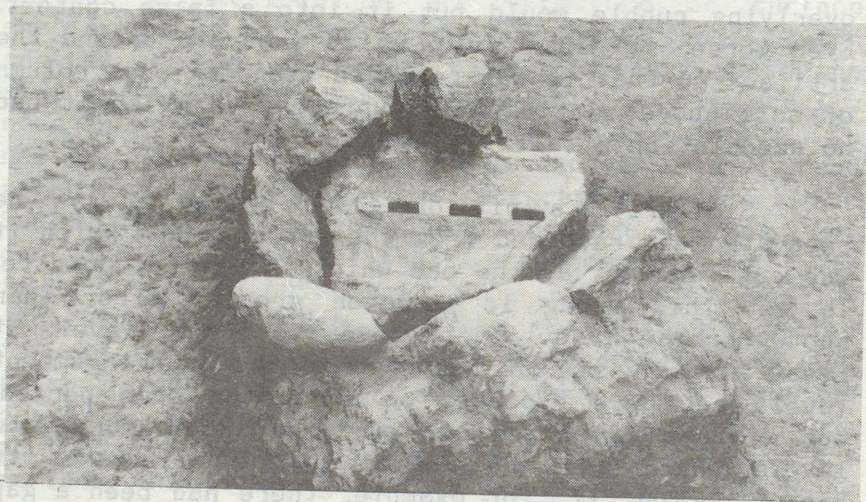
A second, related, principle is that all structures and artifacts should be recorded on the surface on or from which they were built or deposited, and not on any other. If, for instance, some heavy, almost indestructible artifact- a stone mortar or a statue- were on the floor of a building when the roof and then the walls collapsed on it and around it, its upper parts would appear first on excavation, amid the collapse levels. Its association, however, was with the floor, and it is on this surface that it should be photographed. To record it as being, apparently, a part of the overlying rubble would put it into a false context. Even worse, perhaps, would be to excavate around the artifact so that it was recorded standing on a column of soil above some earlier surface with which it had no association at all.

Similarly, a pit or grave should always be excavated and recorded from the surface from which it was cut, and not at the one which it was cut down to. To get this wrong is an even greater error than photographing an artifact above its proper level: at least with the mortar recorded in the superincumbent levels both are probably of about the same period, but a grave may have been cut a metre or more into levels which have no connection at all with its proper period. If, for example, there had been a gap in occupation before the grave-bearing occupation surface, the skeleton and grave goods may appear to be associated with others centuries or even millennia older- a cardinal archaeological sin.





The need for a scale. The figure is scarcely adequate to give an idea of size - certainly a ranging rod by itself would have been lost - but it is difficult to think of anything better.



How not to do it. A stone-lined bin photographed only after the accompanying surface had been cut down by nearly half a metre. Such a photograph gives a quite deceptive impression of the position and surroundings of the artifact.

Every site photograph should include a scale- a clean, 2m ranging pole is the standard scale for any photograph big enough to contain it- arranged at or near the main plane of the structure and positioned to appear either upright or horizontal on the negative. For a structure or area of any size, a whole building or a stretch of courtyard for example, by far the best scale is a human figure. The purpose of the scale is not so much to enable objects in the photograph to be measured- for that one goes to the plan or drawing- as to provide something of easily recognisable size so that the eye is given a clue to relative sizes and positions within the photograph, and for this purpose a human figure is unbeatable (always provided that the figure is not so obtrusive- nor so attractive- as to divert attention from the archaeology). If the scene has considerable depth, looking along a building or a trench for example, there should be scales, whether human or ranging rods, front and rear. This is especially the case if a lens of other than standard length is used; without the scales the eye might be deceived by the steeper or flatter perspective.

Perhaps the most time-consuming part of site photography is cleaning the site. All surfaces have to be scraped, brushed, and free from detritus; corners and sides of trenches squared; and such things as trailing roots, footprints, and odd tools cleared away. The purpose is to ensure that there is nothing in the frame to distract from the subject; to present, as it were, an absolutely neutral background to the structures and surfaces.

The same regard for a standardised image against a neutral background is important in the photography of artifacts not *in situ*. The ideal



should be a series of photographs with the same range of negative contrast, all against similar backgrounds, from similar viewpoints, and with similar lighting. Thus any difference between the images should reflect real difference between the artifacts and not just the vagaries of the photographers. The main light should always come from the top and, by convention, from the top left; with a fill-in or reflector on the unlit side to show detail in all shadowed areas. For black and white the background should be either over-lit, i.e. completely blank white, or solid black (black cotton velvet seems to be the only satisfactory material, in spite of its infuriating tendency to mark indelibly). A completely square-on, profile viewpoint is usually thought to give less information than one slightly above or slightly to one side. By convention the handle of a pot is always shown on the right of the picture, as viewed, and a spout on the left. Attention should be paid to recording the shape accurately, e.g. the viewpoint of a bowl should not be so high that the base is obscured, to texture, e.g. wheel-marks on a pot or the surface finish of a bronze, and to tone and colour. Object photographs should always include a scale, of a size comparable with the object and positioned, upright, roughly in the plane of focus. In sum, what is called for is an accurate, standardised, undramatic record of all the finds. Unexciting certainly, but for an archive of this sort these qualities come a long way before aesthetic considerations.

There are always a number of close-up photographs to be taken, usually of finds of the size of coins or beads, and much the same rules apply as with larger artifacts. With these, of course, more attention has to be paid to resolution and to arranging an absolutely rock-steady vertical stand

Charles Dawson joined the British Museum 15 years ago after studying at the Poole College of Art and Technology. He has been a Senior Photographer for the past 10 years during which he worked in the departments of Prints & Drawings, Medieval & Later Antiquities and Egyptian Antiquities before

and, within the possible limits of the depth of field, to achieving as much of the necessary magnification as possible on the negative.

Finally, it must always be remembered that negatives and slides form a vital part of the dig record, and that this record is of a site wholly or partially destroyed by excavation. All the negatives should be regarded as archival and should be processed and stored to that standard. No doubt archaeologists in a hundred years time will find it incomprehensible that when digging we missed or destroyed so much evidence, just as now we think about diggers a hundred years ago, but at least we should see that a photographic record will still be available for their inspection.

Peter Dorrell

IMAGE ASSURANCE





Professional

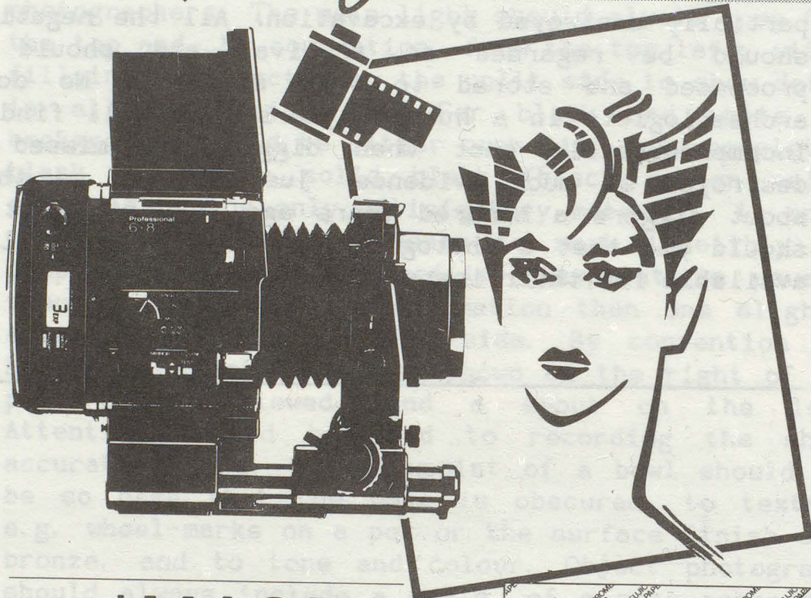
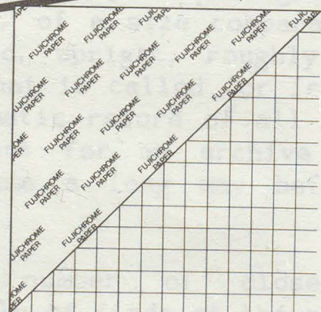


IMAGE ASSURANCE

FUJI PROFESSIONAL DIVISION

FUJIMEX, DORCAN, SWINDON, WILTS SN3 5HW TEL: 0793 26211



Charles Howson joined the British Museum 15 years ago after studying at the Poole College of Art and Technology. He has been a Senior Photographer for the past 10 years during which he worked in the departments of Prints & Drawings, Mediaeval & Later Antiquities and Egyptian Antiquities before Coins & Medals.

Some Techniques for the Photography of Coins and Medals, as used at the British Museum.

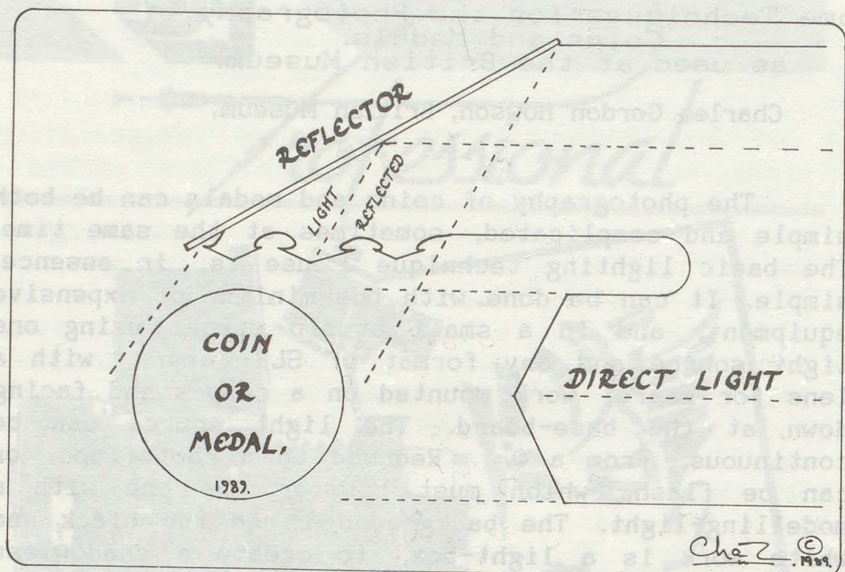
Charles Gordon Howson, British Museum.

The photography of coins and medals can be both simple and complicated, sometimes at the same time. The basic lighting technique I use is, in essence, simple. It can be done with the minimum of expensive equipment, and in a small studio space, using one light source and any format of SLR camera, with a lens for macro work mounted on a copy-stand facing down at the base-board. The light source can be continuous, from a Q.I. Redhead to a Photoflood, or can be flash, which must however, be one with a modelling-light. The background I use for black and white work is a light-box, to create a shadowless background, although you could float the objects being photographed on glass over white paper. Reflections can be a problem with this latter method.

What I try to give the customer, or client, is a clear picture full of the information and detail they wish to see, but at the same time a picture that I feel is attractive and exciting to look at. The basic method I use is suitable for perhaps 90% of all the objects I photograph, and works for medium-tone, dark bronze, and dirty silver coins and medals, even, sometimes, for matt-surface gold.

Firstly you need to decide how big on the negative you want the image. I feel it best to work to a set of constant scales; 1:1, 1:2, 1:3, 1:4 etc. This will make it easier to print the enlargements later on. For colour slides of course I try to fill the frame, at least up to life-size. The basic lighting technique is quite simple. It





Lighting diagram

requires one light and one small silver-coloured reflector held in a Bowens clip though for difficult objects you could use more reflectors. With these two you can turn what is essentially a 2½ dimensional object into a 3 dimensional one.

Since most coins or medals have a head on the obverse I consider the problem as one of portraiture, therefore I light the face from the front (it is surprising how many coin and medal photographs do not). The main light is directly in front of the face, ie if the face looks to the right the light is from 3 o'clock, and raised about 40° above the plane in which the object is lying flat. The secondary reflector is placed so as to bring light down from above the portrait head to light the hair, shoulders, robes or any horizontal details, this reflector being placed at between 12 o'clock and 1 o'clock, and also reflecting the light down at around 30° to 40°. This use of an approximate right-angle between the main and secondary light sources I call the "90° Rule", although like all rules it gets broken to a greater or lesser extent all the time. It is merely a point to start from. For the reverse use the same set-up to match.

When you have a coin, not usually a medal, with very low relief due to wear, corrosion or other damage, the problem is one of trying to exaggerate what little detail there is so as to be able to get it to register clearly. This can be done principally by lowering the light sources to cast their illumination at a very low, raking angle. You will need to give a little more exposure too and sometimes I find it useful to put in a black velvet reflector to separate the shadows from the dark detail. This I use as close to the coin as possible on the side away from both light sources and can give you up to a

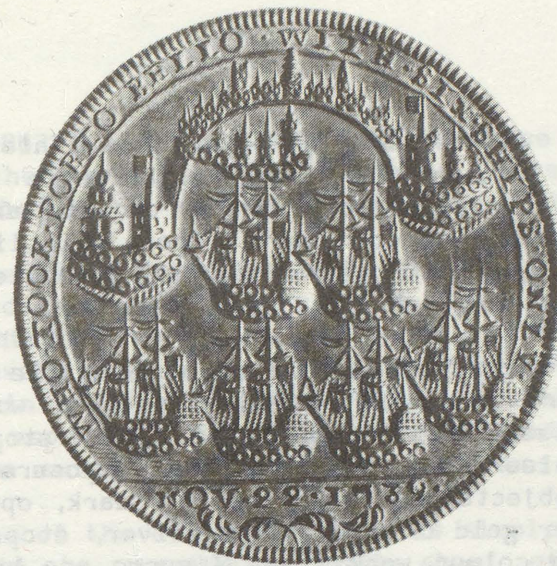




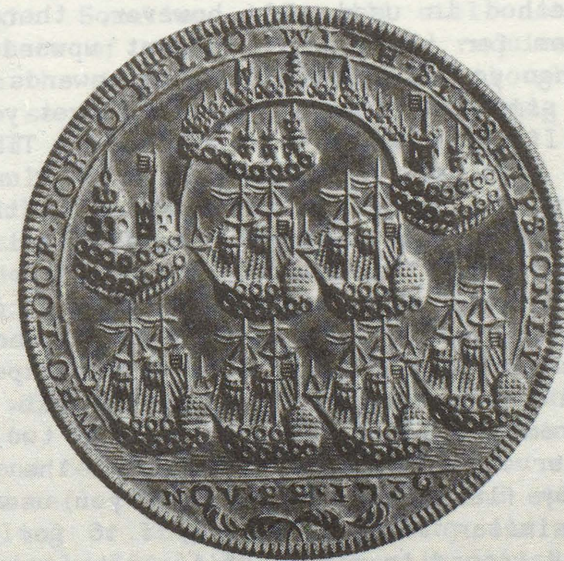
Medal - Obverse, lit from left.



Medal - Obverse, lit from left plus reflector above.



Medal - Reverse, lit from right.



Medal - Reverse, lit from right plus reflector above.



grade of improvement in contrast. This can be important because the basic right-angle technique tends to lower the contrast of objects anyway. To photograph a white coin-cast I use a main light only, no fill in, at a very low raking angle as the contrast is very low.

The exposure calculations are simple for most work. Apart from the compensation for working at large scales, ie 2 f.stops for 1:1, 1 f.stop for 1:2 etc, we also calculate the basic exposure as: for mid-tone objects, as per meter; for dark, open up one f.stop; for gold or very clean silver, stop down one f.stop. In colour work these figures are halved. In black and white we allow the background to just burn out white but carefully mask off the unused area of the light box to prevent flare. Colour is usually done on black velvet. For metering the incident reading method is used. If, however, there is not enough room for the meter to point upwards to the camera, then you can meter pointing towards the main light and simply open up one f.stop to get your basic exposure. If using continuous light and a TTL meter a grey-card should be used if possible to avoid the meter being fooled by the blank areas in the frame. Even a centre-weighted meter can be deceived.

If you are using flash, but have a continuous source light-box for background then you should take readings separately. First calculate the exposure for the object and note the f.stop. Then take a direct reading from the light-box and open up two f.stops. The shutter speed indicated against the aperture required by flash exposure is what you use. It may come out similar to what we use; f.16 for a copper coin with  $\frac{1}{4}$  second to give a white background. If you have a camera with mirror lock this will prevent the edge of the coin being blurred, or if you use a

Mamiya RB67 Pro S, a double cable release allows you to do the exposure in two stages; first pressure raises the mirror, second pressure fires the shutter.

There are techniques for lighting gold which range from simple to very complex. Gold is one of the most contrasty materials there is in our work and almost every time we have to lower that contrast. The other main problem is that it tends to behave like a mirror, especially if it has a polished finish as with some modern, mint condition specimens.

One of the easiest methods is simply to diffuse the light by draping a large sheet of diffusing material between the light and the object, preferably nearer the object than the light as this gives a broader light source. The secondary reflector should reflect light from this and not directly from the main light. Sometimes this will still not be enough and a piece of white card may be required directly opposite the diffused light source, though at a fair distance so as to prevent the image being completely flattened off. The effect should be almost subliminal. With all of these, although the right-angle rule is the starting point, the lights and reflectors should be raised further above the object to broaden the light source also.

Where you have a mirror finish to deal with you have to make a choice. If the detail is in frost finish with a polished surface surround you may prefer to let the detail stand out and let the background remain dark- in this case you will have to suppress reflections of the camera and stand, and of the ceiling or they will go patchy and confuse the image detail. If all the surface is polished, as with some East European medals, what you may find it best to do is to avoid using any direct light at all,



diffused or not. What I do in these circumstances is to use a white reflector round the lens, tilted at 45° and bounce the light off this so that it arrives at the object more or less on axis with the lens and is reflected straight back into the camera, giving a bright surface. A reflector at 12 o'clock provides the fill-in and disguises this technique making the object appear just like all the others, yet with the same impression of brightness the client would get as he held the object in his hand.

If, however this still gives you a dark spot in the middle, the dreaded "Black Hole", then you may need to resort to using a large sheet of optically flat glass also at 45° as your reflector. In this case you must diffuse the light source near the glass, well away from the actual light or you will get a "White Spot" highlight smack in the middle of your image. Again, keeping the most part of that diffused light off the object until it has been reflected, and again with a secondary reflector at about 12 o'clock, you should, after a little experimenting, produce such a nice, natural looking photograph that the customer would never guess how much effort had gone into it. Beware of reflections from across the studio in the upper, back surface of your glass, which need not be semi-silvered.

Colour work, for the most part can be done using exactly the same techniques. The only things I get asked to do that are different are lecture slides showing both obverse and reverse of one object together in the same frame.

This is fairly simple but very tedious to do. You require a 35mm camera on which you can do double exposures- we use an old Nikon F2, and a Cokin Mask Kit. The obverse is always photographed with the head

facing the light and is done first. It is always done on black of course as any errors in aligning the mask are invisible. The image is lined up in the middle of one half of the picture and the mask conceals the other half. The exposure is made, the rewind button is pressed and the shutter re-cocked without winding on the film. The mask is rotated exactly 180° and the coin is turned over into the other half of the frame. The 2nd exposure is made and then the camera is wound on as normal. We always bracket our exposures of course, and I try always to use my basic "Lighting Plus Reflector" technique even for lecture slides as, especially if it is to be for the public, you only have a few seconds on screen to attract their attention to something about which they may know little, and you want them to notice and remember it.

If you always think of these objects as things that the customer may well want to see much larger than life, and always keep that in mind when you are lighting them, and remember to blow the dust off (it looks like boulders at large magnifications!), you should be able to really impress them and produce pictures you yourself are really pleased with.

Finally, if none of these suggestions give you the result you and your client want. **DON'T PANIC!!** Just ignore them and try **SOMETHING COMPLETELY DIFFERENT!!**  
Good luck.

Charles G. Howson.



# Milcare (London) Ltd S.O.C. Equipment

6, Pavilion Parade, Wood Lane, London W12 0HQ.

## Telephone:

Day no : 01-749 7301

Home : 0895 672551

Telex : 8954029 Typers 'G'

Fax : 01-749 7302

## NEW LIGHT TABLE WITH BUILT-IN FLASH

Viewing area 30,25" x 23,7"

Colour Correction tubes fitted if required

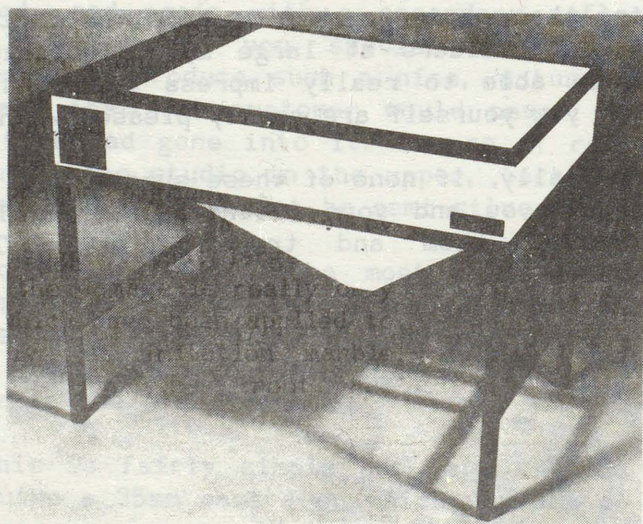
Dimmer switch available

Flash output 264 Joules variable from quarter power

Recycling time 2-3 sec

Copying facility available

All controls and fuses conveniently positioned



ALSO NEW IN, AN ULTRA-THIN SOLID STATE LIGHT BOX  
Telephone for details.

## Comparative Ageing Tests on Colour Film.

A paper on the above subject was presented by Bob West of the Philatelic Department of the British Library, in which he said that the B.L. was faced with finding a suitable 35 mm reversal colour film that would have good ageing and light fading qualities for a conservation filming project producing some 500,000 images.

He briefly outlined the technique used - 33 days exposure to a 500 watt lamp for the light fading test and 16 days exposure to a humidity of 40% at 61.5°C in a dessicator.

The conclusions drawn from the comparative densitometric readings made before and after the tests were said to be only indicative of what could be expected from the particular emulsions tested and would probably have to be repeated every time a new batch was produced.

The actual films tested were Fuji 50 and 100 ASA, Agfa 50 and 100 ASA, Konica 100 ASA, Ektachrome 64 ASA, 3M 100 ASA, Kodachrome 50 and 64 ASA.

Mr West would not be drawn to divulge the film the tests showed to be "best", however suffice it to say that it was Fuji who invited Mr West to speak!

I have spent some time with Bob and he has explained and given me copies of all his tests and I am sure would be only too pleased to do the same for anyone else who was interested enough to contact him.

Brian Tremain.



TCL extend their continual support to

## The Association of Historical and Fine Art Photographers



# TCL

TECHNICAL  
COLOUR  
LABORATORIES

1-3 BERRY STREET  
CLERKENWELL ROAD  
LONDON EC1V 0AA  
PHONE 01-253 1614  
FAX 01-251 0144

Jill Dunkerton has been a Restorer in the Conservation Department at the National Gallery for the past 9 years. She studied Painting at the Winchester School of Art and the History of Art and Conservation at Goldsmiths College, the Courtauld Institute and the Tate Gallery

### The Use of Photography in the Examination and Conservation of Paintings at the National Gallery

Jill Dunkerton, National Gallery

The Photographic Department at the National Gallery is an extremely versatile department supplying photographic services ranging from prints and transparencies of paintings for countless books and publications to photographs of guests at an ever-increasing number of receptions and fund-raising events. However, I think that they would agree that the most important (and I hope the most interesting) part of their work is that associated with the examination and treatment of paintings in the Conservation Department. Certainly it is the most time-consuming, taking at least half of the department's time.

These demands on the Photographic Department are made for three main purposes. The first of these is the use of various photographic methods as an aid to the diagnosis of a painting's condition before it is treated. The best known of these methods is X-radiography. Providing the X-radiograph is not masked by something like the layer of lead-white sometimes used in the past as an adhesive in the transfer of paintings to a new support, it should supply information on all parts of the picture, the support as well as the paint layers. For example, X-radiographs of Ruben's panel paintings show how they have been constructed from many small pieces of wood with the grain often running in contrary directions and extra pieces sometimes being added in the course of painting (illustrated by Rubens 2924).

Sometimes they show that new pieces of timber have been added not by the artist but by a later restorer. In 'The Virgin and Child before a Fire-Screen' by Robert Campin (No 2609) the false extension added to



the right edge in the nineteenth-century is easily recognisable: it appears much lighter in the X-radiograph and the restorer has used a worm-eaten piece of wood to give the impression of age. Ironically the original panel has remained unaffected by woodworm. In the X-radiograph of Andrea Solari's 'Man with a Pink' (No 923) the false pieces of wood around the edges (again probably added in the nineteenth century) can be detected by their lighter colour and by the thick line of glue joining them to the original panel. A sequence of slides shows the removal of the overpaint and the extensions, returning the picture to its original dimensions. The composition may seem a little cramped but is entirely characteristic of the late fifteenth-century when this was painted.

The reason why the paint layers produce an image on an X-radiograph is that certain pigments used in so-called Old Master paintings contain atomically heavy elements which absorb X-rays, preventing them from reaching and blackening the film (in the X-radiography of paintings the painting is placed between the film and the X-ray source). These pigments are the bright red colour, vermilion which is based on the heavy metal, mercury; the pale yellows, lead-tin yellow, which as its name implies contains lead, and the closely related Naples yellow; and, most importantly, lead white, the main white pigment used until the introduction of titanium white in the present century. As lead white was added to most of the other colours to obtain the tonal range necessary to model forms and represent light and shade, the X-ray image of a painting is usually closely related to the visible image. This is demonstrated by the X-radiograph of 'A Virgin in Prayer' by Sassoferrato (No 200). Here we are seeing the distribution of the lead-white which the artist has added to his colours to model the flesh and drapery folds. The vermilion in the red dress must also be contributing to the image.

It follows that if any of this X-ray absorbent paint is missing due to loss and damage the X-rays will pass through the hole and blacken the film revealing the condition of the painting even if the losses have been disguised by previous restoration. When the discoloured varnish and old restoration was removed from the face of Tura's 'Allegorical Figure' its somewhat ravaged state was not unexpected, thanks to the preliminary diagnosis of its condition by X-radiography. Sometimes losses and damages show up as white on the X-radiograph rather than the more usual black. This is because the holes have been puttied to bring them level with the paint surface using a filler containing a great deal of lead, usually in the form of lead white, but red lead was sometimes used as well (illustrated by Masaccio No 3046).

To avoid mistakes in interpretation X-radiographs should be studied alongside the paintings themselves and the restorer should always remember to examine the back of the painting as well as the front. A typical error is to assume that a circular white mark on an X-radiograph represents a loss filled with a lead-based putty whereas it frequently turns out to be caused by a red wax seal on the back of the painting, the red colour of sealing wax being due to the X-ray opaque pigment vermilion. Similarly the X-radiographs of 'A Man' and 'A Woman' by Robert Campin (Nos 653A and B) suggest that large areas of paint have flaked away when the damage is really only to layers of paint and ground which have been applied to the back of the panel to give an imitation marble effect. In fact the portraits on the front are exceptionally well preserved.

A better known use of X-radiographs is to reveal alterations made to the paint layers. Often the changes are relatively minor, perhaps an adjustment to the position of a hand or foot or to the fall of a fold of



drapery, but they can be of considerable art-historical interest. The X-radiograph of Lotto's portrait of 'The Protonotary Apostolic, Giovanni Guiliano' (No 1105) shows that originally, in the place of the clock in the bottom left corner, there was a small handbell. This change was probably made at the request of the sitter since in the sixteenth century a clock would have been a more expensive possession, indicative of his wealth and status. Occasionally an X-radiograph discloses that a picture has been painted on top of a completely different composition. A well-known example of this is Goya's portrait of 'Dona Isabel de Porcel' (No 1473) which is painted directly over a portrait of a man in uniform. Goya has not even blocked out the first, presumably unsuccessful, painting before embarking on the famous and beautiful picture that we see now.

If an X-radiograph shows features which are not visible on the surface of the painting it does not always mean that they have been obliterated by the artist. In the eighteenth and nineteenth centuries restorers were often practising painters as well and some could not resist the temptation to alter and to "improve" the paintings. Documents and letters suggest that they were often encouraged to do this by collectors and even by museum curators. Before this 'Martyrdom of S. Stephen' attributed to Antonio Carracci (No 77) was cleaned there was no sign of the celestial figures of Christ and God the Father which can be detected in the X-radiograph. A sequence of slides shows the gradual removal of the overpaint and the re-emergence of the figures. Similarly X-radiographs first revealed that the angels sitting on the parapet in 'The Entombment' (No 3084) by Andrea Busati had not been removed in the nineteenth-century (as implied in a letter written at the time) but had simply been painted out.

Very occasionally an X-radiograph will reveal a

painting to be in such poor condition that cleaning and restoration would be ill-advised. An example is 'The Sultan Mehmet II' (No 3099) attributed to Gentile Bellini. The painting was bequeathed to the National Gallery by Sir Austen Henry Layard who was proud of the fact that he had bought it in Venice in 1865 for the equivalent of five pounds. The X-radiograph shows why. It can be seen to be a patchwork of torn and ragged canvas, some of it not even original, and most of the surviving paint is badly abraded. Little original paint is evident beneath the confident repainting of the nineteenth century restorer. Conversely, a visual examination of this very dirty and much repainted 'Christ Driving the Traders from the Temple' (No 4778) by Bernardo Cavallino suggested that insufficient original paint had survived to justify cleaning. Only when it was X-rayed did it become clear that although there were tears and fairly large flake losses most of the picture was in reasonable condition. It is now undergoing cleaning and restoration and has been revealed as a very beautiful example of a painter whose works are rather rare and seldom well-preserved.

The extent to which a painting has previously been restored or repainted can sometimes be determined by other photographic methods, principally ultra-violet fluorescence and infra-red photography. The former is most useful in showing the existence of retouchings on a painting which has been restored relatively recently: for example, Renoir's 'Water Nymph' (No 5982) had evidently been restored just before it was sold to the National Gallery in 1951. In the ultra-violet fluorescence photograph the retouchings show up as dark marks against the original paint. However if the painting has an old and degraded varnish the very strong fluorescence of the varnish tends to obscure any retouchings which may be hidden beneath it. This opaque, almost foggy fluorescence identifies the patches of old varnish which



remain on this ultra-violet photograph taken during the cleaning of Velasquez's 'Philip IV of Spain'.

To take ultra-violet photographs it is necessary to submit the paintings to a fairly long exposure to ultra-violet light, particularly in the case of colour photography. Ultra-violet light is one of the prime causes of the deterioration of many of the materials which make up a picture, including the fading of pigments based on dyestuffs, so we are reluctant to take ultra-violet photographs unless they demonstrate features of condition and technique which can be shown in no other way. Instead we find that infra-red photography is at least as useful in showing the amount of previous restoration.

Retouchings usually show in infra-red light because the pigments used absorb and reflect infra-red slightly differently to those used in the original paint. This is particularly the case with blue pigments. In infra-red photographs taken before the cleaning of 'Christ taking Leave of His Mother' (No 6463) by Altdorfer wide bands of retouching can be seen along the joins of the planks which constitute the panel. The retouchings on Tura's 'Allegorical Figure' (No 3070) are very obvious, showing dark streaks and splodges. They are no longer present in an infra-red photograph taken after the picture was cleaned.

The second reason for making such extensive demands on the time and skills of our photographic department is the very important need to document fully all conservation treatment carried out on the National Gallery paintings. Each painting in the collection has a Conservation Record in the form of a book or series of books. Into these go written details of its conservation history (often going well back into the Nineteenth century) and every photograph ever taken of the

painting. The large format of the volumes is determined by the size of the X-radiographs. The information has to be assembled in this way because the Conservation Records are consulted not only by the National Gallery's restorers, scientists and curators but also by large numbers of visiting scholars and experts. This sequence of slides showing the various stages in the treatment of 'The Virgin and Child Embracing' (No 740) by Sassoferrato illustrates the type of photographic material which might be used to document a perfectly straightforward cleaning, restoration and relining.

Before the treatment begins 8"x10" colour transparencies, black and white photographs and 35mm colour slides are taken of the whole picture together with close-up details of any areas which are of particular interest or may present problems to the restorer. The condition of the back of the painting may also be recorded particularly if it is on a panel or on a canvas which is to be relined. At some stage during the cleaning more colour transparencies, black and white photographs and colour slides are taken, again of the whole and of special details. These record the alterations to the appearance of the painting caused by the removal of the discoloured varnish and any old restoration and overpaint. On completion of the cleaning, treatment to the support of the painting is often carried out. This is documented with slides and black and white photographs. As the painting by Sassoferrato had to be relined (i.e. the re-backing of the fragile and embrittled original canvas with a new canvas), it was necessary to photograph the back of the original canvas with its indecipherable painted numbers before it was covered up by the new lining canvas. When the cleaning and structural work are finished the painting is photographed yet again. This is to record its true condition before the restorer sets about retouching and inpainting the losses and damages. Arguably these are



the most important of all the photographs in the Conservation Records. Finally the painting is photographed in colour and in black and white once the restoration is complete.

The third purpose for which the various forms of photography are used is the study of the history of painting techniques and materials. Here the photographer is collaborating with art historians, restorers and specialist scientists to produce results which are now recognised as greatly increasing our understanding of works of art. As this aspect of gallery photography is becoming more accessible, results being published annually in the national Gallery Technical Bulletin and more recently in a series of technical exhibitions, only a few examples are illustrated. These show how fragments from a dismembered altarpiece by Ugolino da Siena can be reconstructed on the basis of the grain of the wood of their panels as revealed by X-radiography; how preliminary underdrawing in early Netherlandish and Italian paintings can be revealed by infra-red photography and reflectography; and how X-radiography can help in the interpretation of the multi-layered paint cross-sections from this much altered painting by Cosimo Tura (No 3070). However the contribution of the Photographic Department to this subject is best appreciated in the catalogue of the first technical exhibition, "Art in the Making: Rembrandt". This is to be followed in the late autumn by a similar exhibition on Panel Painting in Italy before 1400 where their work will be equally in evidence. Indeed it would be quite impossible to stage these exhibitions without them.

Jill Dunkerton

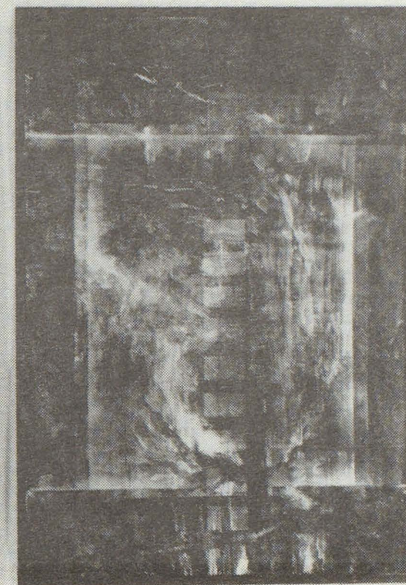


Fig 1 Rubens 2924 ↑

↓ Fig 2 Robert Campin 2609





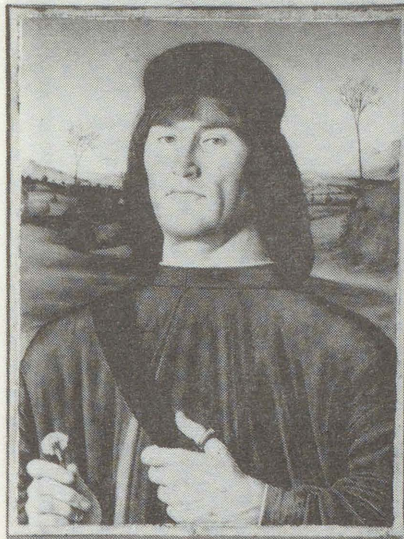


Fig 3 Andrea Solari 'Man with a Pink' 923 ↑

↓ Fig 4 Sassoferato 'Virgin in Prayer' 200







Fig 5 Tura 'Allegorical Figure' 3070 ↑

Fig 4 Gessolotto 'Virgin in Prayer' 500

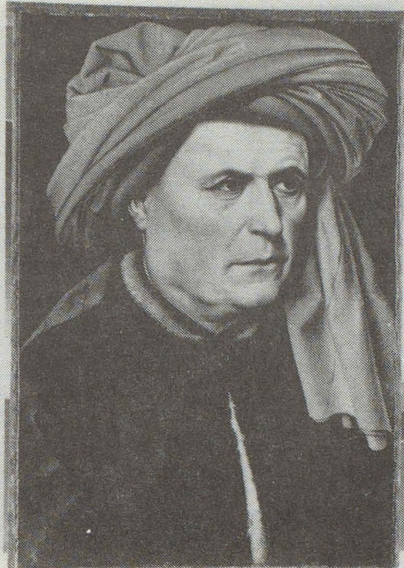
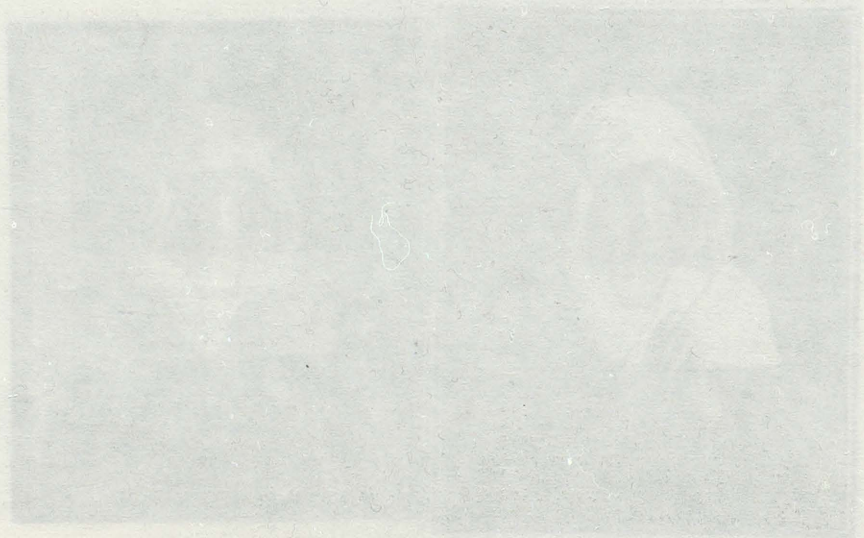


Fig 6 Robert Campin 'A Man' 653A ↑

↓ Fig 7 Robert Campin 'A Woman' 653B







Fig 8 Lotto 'Protonotary Apostolic, Giovanni Guiliano'

1105 ↑

↓ Fig 9 Goya 'Dona Isabel de Porcel' 1473

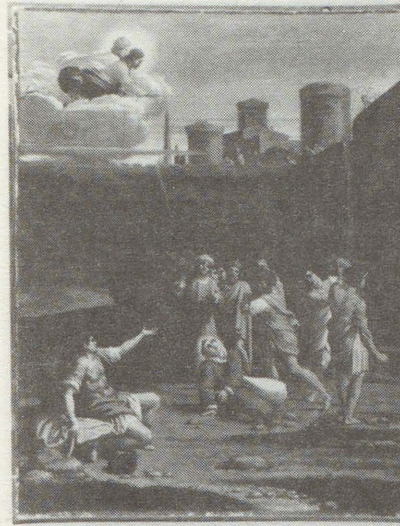


Fig 10 Antonio Carracci (atrib) 'Matyrdom of S. Stephen 77 ↑

↓ Fig 11 Andrea Busati 'The Entombment' 3084





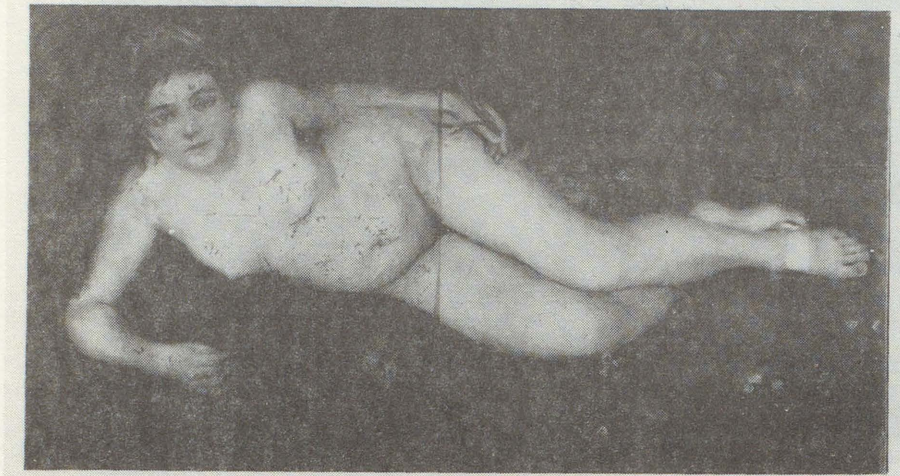


Fig 12 Renoir 'Water Nymph' 5982↑

↓ Fig 13 Velasquez 'Philip IV of Spain'



Fig 14 'Christ taking Leave of His Mother' 6463 ↑

↓ Fig 15 Sassoferrato 'The Virgin and Child Embracing' 740





## NOTES FOR CONTRIBUTORS

I welcome contributions on all aspects of associates' work but it would be helpful if contributors would bear in mind the following guidelines;

All contributions should be typewritten in double spacing on one side of the paper.

give wide margins, at least 1 in on the left and 1 in on the right.

Those of you using word processors, would you please use either 10 or 12 pitch non-proportionally spaced with no right hand justification. (If anyone has an *Amstrad* with 3 in disks and would like to submit on the disks it would be most appreciated).

Put your name and address on the top right hand corner of the first page, number each page as 'page x of y' and type 'end' or your name at the end of your article.

I hope that these points will not deter any would be writers but they will make life easier for your hard pressed Editor!

If anyone has any problems or ideas and they would like to get in touch with me, I am at the following address

Jerome Perkins  
British Museum  
Photographic Service  
Gt Russell St.  
LONDON  
WC1 3DG  
Tel 01 323 8642 (Direct line)

Ken Creer did not have a transcript of his talk and, due to pressure of work, was unable to write an article on it, I have produced this report which I hope covers the main points. (*Jerome Perkins*)

## Forensic Photography

Ken Creer  
Metropolitan Police Laboratory.

Ken Creer gave a very interesting and, despite the sometimes grisly subject matter, humorous talk on his work with the Serious Crimes Unit at Scotland Yard. Ken Creer has worked this field for twenty-seven years during which he realised that a lot of evidence was being overlooked because visible light was used. When a crime is committed a wide range of impressions can be left behind, fingerprints, shoe marks even ink residues from plastic bags. If the material is washed or solvents are used to try to destroy these images use of ultra-violet, infra-red or laser light (which is an extremely monochromatic light source) will make them visible

One example of this was the use of infra-red luminescence to identify the owner of a set of keys found in a stolen car. The keys had a tag on them which was worn and dirty. The processed film showed a name and telephone number.

The Forensic Science Laboratory started to use lasers in the early 1980's, the use of which meant that more details could be resolved leading to a greater chance of a positive matching of unique characteristics of the evidence. A big advantage light has over other methods is that the evidence is undamaged. In the past it was possible to identify a bloody fingerprint or the blood type, now it is possible to do both.

Every camera has it's own "fingerprint" in the border of the negative. Each camera puts it's own



markings on this edge. Using this fact Ken Creer was able to prove that a large number of negatives were taken with a particular Nikon camera belonging to a child pornographer.

The Serious Crimes Unit was set up following an armed robbery on a security van in Hertford. The van had been held up and the money in a special box, taken. The box sounded an alarm after 30 seconds of tampering and sprayed orange dye over it's contents. The robbers shot the lock off, grabbed the money and ran. A fingerprint was found in the dye remaing in the box when the dye was made to fluoresce. The same dye was found on the hands of a suspect, even after repeated washings. His defence was that a van stopped near him on the street, someone shouted 'here catch' and threw a box at him. He was convicted.

In one case Ken was required to photograph a policeman's wrist. The policeman had noted the number of a Dutch lorry believing it to be on involved in a hit-and-run incident. The lorry was the the one sought. However the next day another Dutch lorry was reported hijacked with a half million pound load. The policeman was called in but by now he had washed his hands several times and the number was no longer visible. The policeman was brought into the lab and his hand placed upwards on a padded cloth beneath a verical camera. In total darkness his wrist was painted with light from a spread laser beam which brought up the number.

In one macabre case the body of an Englishman had been found in an American hotel but an autopsy by the FBI could not establish a cause of death. The body was then embalmed and returned to England. The embalming fluid had reacted to the body and using laser light bruises where revealed under the chest

showing that the man had died of cardiac arrest. His murderer when caught, was found to be a karate expert.

Future developments include electronic imaging systems with 4000 line resolution and thermal imaging systems capable of resolving differences of 0.001°C

To finish Ken put forward the idea that laser photography might be able to detect artists finger prints on old paintings, therefore aiding attribution.

- Archival Filing Systems for all Formats ●
- Library Accessories ● Presentation Systems ●
- Abodia Storage/Viewing Cabinets ●
- Slidex Viewer/Projectors ●
- Ennascop Print Projectors ●
- Lightboxes, Light Tables ●
- Transparency/Neg/Film Viewers & Sorters ●
- Film Processors ●

*Call us for a detailed brochure & price list*

**Image  
Management  
Systems**

**Viewpacks<sup>DM</sup>**  
Limited

Unit 7/8 Peverel Drive, Granby  
Milton Keynes MK1 1NL. Tel: (0908) 642323 Fax: (0908) 640164



ASSOCIATION OF HISTORICAL AND FINE ART PHOTOGRAPHERS

Committee Members 1989.

Name & Address:	Department & Telephone	Office & REgion	Year:
<b>003</b> Derrick Chiverrell Exhibition Road South Kensington London SW7 2DD	Science Museum 01 938 8151	Treasurer Greater London	1989
<b>008</b> Terry Dennett Regents Park London NW1 4RY	Institute of Zoology 01 722 3333	Greater London	1990
<b>001</b> Michael Duffett Millbank London SW1P 4RG	Tate Gallery 01 821 1313 x287	Chairman Greater London	1989
<b>006</b> Sara Hatrick Trafalgar Square London WC2 5DN	National Gallery 01 839 3321	Greater London	1990
<b>009</b> Simon Hill 1 Pavement York YO1 2NA	York Archaeological Trust 0904 643211	Yorks & Humberside	1990
<b>010</b> Trevor James 7 Tokio Road Ipswich Suffolk IP4 5BE	0473 718 807	Eastern	1989
<b>002</b> George Nicol Edleston House Queens Road Aberystwyth Dyfed SY23 2HP	Royal Commission on Historic Monuments in Wales 0970 624381	Secretary Wales	1989
<b>011</b> Jerome Perkins Great Russell Street London WC1B 3DG	British Museum 01 323 8642	Journal Editor Greater London	1989
<b>005</b> Marie Richardson Ellery Cottage Leigh-on-Mendip Somerset BA3 5QQ	Reflexions 0373 812 941	South West	1989
<b>004</b> Brian Tremain Great Russell Street London WC1B 3DG	British Museum 01 323 8632	Greater London	1989
<b>007</b> Catherine Wyatt 20 Portman Square London W1H 0BE	Courtaulds Institute of Art 01 935 9292-5/ 486 5913-4	Greater London	1990

Photography in archaeology and conservation  
(Cambridge Manuals in Archaeology series)  
Peter Dorrell  
CUP £27.00

This book is based on a series of lectures given to students at the Institute of Archaeology, London University and, as a result, spends some space on, what to many experienced photographers may seem extremely basic matters of equipment and techniques.

However the inclusion of this material completes what is a very thorough summary of basic techniques in archaeological photography. It is often useful to go back to basic principles particularly if one is moving from studio work to work on digs.

The areas covered are: basic principles and practices; equipment; lighting by flash; photographic materials, processing and printing; architecture and standing monuments; survey and site photography; principles of object and close-up photography; ultra-violet and infra-red photography; photographing finds; flat copy; preparation of material for publication and a short summary of what the future may hold. This latter piece contrasts well with the introduction giving a brief summary of the early days of archaeological photography.

There is an useful index and bibliography which makes this a valuable reference book which every photographer working in this area would find useful.

The book may be rather expensive but it can replace several other books, and for the specialist archaeological photographer, I think it will become a standard text.



# LEEDS

SERVING THE PROFESSIONALS



A Quadrant  
Group plc Company

Suppliers of Fine Photographic Equipment to:

## The Association of Historical and Fine Art Photographers

Leeds Camera Centre, Birmingham  
Telephone: 021-200 3139

The Flash Centre, London  
Telephone: 01-837 6163

Leeds Camera Centre, Leeds  
Telephone: (0532) 456313

Leeds Camera Centre, Manchester  
Telephone: 061-872 9118

Leeds Camera Centre, London  
Telephone: 01-833 1661/1641

Leeds Film & Hire, London  
Telephone: 01-833 1661/1641

# ILFORD PHOTO

wish the

## ASSOCIATION OF HISTORICAL AND FINE ART PHOTOGRAPHERS

continued success and look forward  
to supplying photographic products  
and equipment to all members

### Constitution.

1. That the Association shall be called "The Association of Historical and Fine Art Photographers".

2. That it shall exist for the furtherance of photography in the field of History, Fine Art, Archaeology, museum and gallery display and related fields.

3. To encourage the interchange of ideas and general support amongst photographers practising in these fields and to promote access to departments thereby increasing wider opportunities for experience.

4. The membership shall be available to those who predominantly practise in the above fields of photography.

5. The business of the Association shall be conducted by a committee, comprising a Chairman, Secretary, Treasurer, plus up to seven other committee members with a facility for co-opting other members as required.

6. That this committee be voted to serve for a thirty-six month period for the officers and twenty-four months for committee members. The officers shall be elected at an annual meeting open to all members.

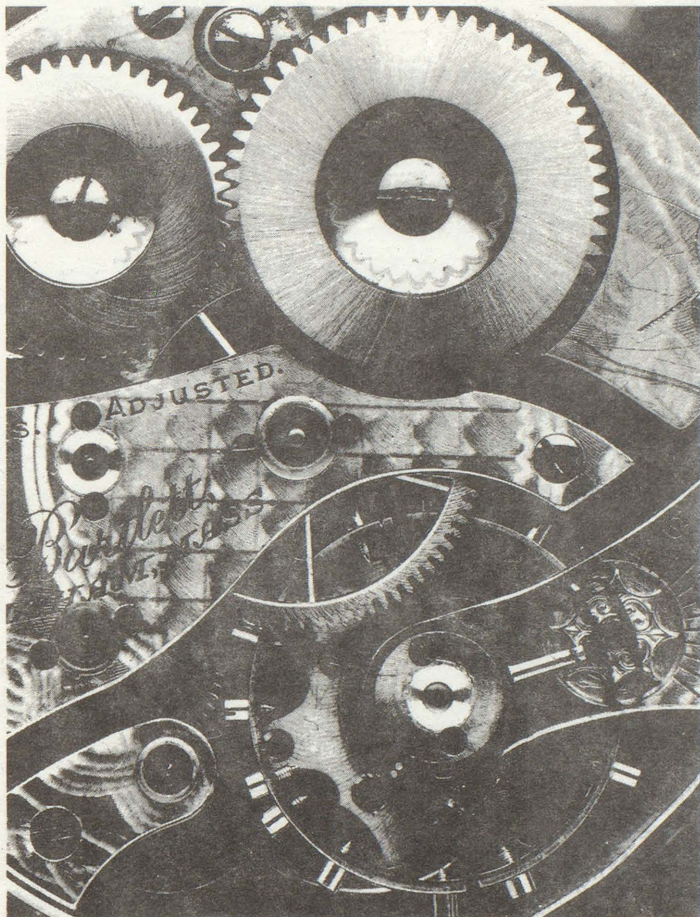
7. That the management committee require a forum of five members, two of whom shall be office bearers to convene a meeting.

8. That the Chairman shall have the power of vote and that he shall have also the power of casting vote.

9. A quorate committee shall have the power to dissolve the Association upon notice of one month, with any funds being held, distributed to a charity or organisation named within the same notice to dissolve.

AHFAP, 89, 001





Photograph by Steve Rees

## T-TIME

Until now, a photographer working in black and white had a choice. Extremely fine grain or high speed. Now 'Kodak' T-MAX Professional Films have taken the choice away.

For the first time, Kodak have applied their state-of-the-art T-grain emulsion technology to black and white camera films.

It's been hailed as the greatest breakthrough in emulsion science in fifty years. It's certainly the greatest breakthrough in black and white photography.

'Kodak' T-MAX Professional Films exhibit a very wide exposure latitude: they can be pushed one stop with no need for compensation. They also give you the best of both worlds—extremely

fine grain and high speed. You no longer have to choose. So, whatever the subject, there can be no other choice than 'Kodak' T-MAX Professional Film.



Kodak and T-MAX are trade marks.

**KODAK T-MAX PROFESSIONAL BLACK & WHITE FILM**



**400**  
 (See the Black and White Page)  
 Film over Exposed 100 in Black  
 Exp. 135-36  
 36 EXP.



**100**  
 (See the Black and White Page)  
 Film over Exposed 100 in Black  
 Exp. 135-36  
 36 EXP.