ASSOCIATION *of* ARCHAEOLOGICAL ILLUSTRATORS *&* SURVEYORS

Technical Papers

AAI&S TECHNICAL PAPERS

The Association has had requests from both individuals and organisations for a chance to obtain Technical Papers which have sold out. This folder has been compiled using photocopies of AAI&S Technical Papers 1-7 (edited by Richard Bryant). These papers are now out of print although some are presently under revision.

The reader should be aware that some of the advise is now very dated particularly as work on information technology and computer aided design has advanced at an enormous pace. However even the old information is of considerable interest in the history of archaeological illustration in general and of the Association in particular. Paper 4 was a joint publication with IFA (their Paper 10) and was assigned this number at a later date as Technical Paper 4 was never produced
The papers are as follows:

1.　**The Preparation of Archaeological Illustrations for Reproduction**
　　by A.S. Maney (1980)

2.　**Computers in Archaeological Illustration**
　　by J.D. Wilcock (1982)

3.　**Drawing Ancient Pottery for Publication**
　　by C. Green (1983)

4.　**Preparation of Artwork for Publication**
　　by C. Philo and A. Swann (IFA Technical Paper 10 1992)

5.　**The Archaeological Illustrator and the Law of Copyright**
　　by M. Vitoria (1984)

6.　**Photogrammetry & Rectified Photography**
　　by R.W.A. Dallas (1981)

7.　**Drawing for Microfiche Publication**
　　by R. Bryant (1984)

Mélanie Steiner (Technical Papers Editor 1999)

added 2006

12. The Survey and Recording of Historic Buildings
by David Andrews, Bill Blake, Mike Clowes and Kate Wilson

The Preparation of Archaeological Illustrations for Reproduction

A. S. Maney

To avoid the danger of any subsequent misunderstanding I will commence on an elementary level by explaining some terms which are essential to our understanding of the subject. These terms are 'line' and 'half-tone' and 'letterpress' and 'lithography'.

A line illustration is a drawing or print which has no variation of tone or shade but consists only of monotone lines and solids. Normally it is a drawing in black ink.

The half-tone process is used for the reproduction of illustrations such as photographs and wash drawings which have graduations of tone between black and white. Illustrations of this type are photographed through a glass screen ruled with a fine grid which breaks up the image into dots of varying size, thus simulating the variety of tones in the original. If a printed half-tone illustration is examined through a magnifying glass the dot pattern will be clearly seen. Half-tone screens range from very coarse (used for newspapers) to fine screens suitable for use on coated art paper. Since archaeological photographs are almost always reproduced on art paper the most commonly used screen is 133 lines to the inch (or its equivalent in centimetre measurements). The finer 150 screen very rarely gives a better result, indeed it may well be inferior in practice.

Letterpress is the process of printing from raised surfaces such as type and engraved blocks. It is the traditional method of printing from Gutenberg's day and probably still accounts for half the total product of the printing industry but it is fair to say that there has been an enormous growth in the use of lithography during the last thirty years and that growth is likely to continue.

The advantages of letterpress in relation to the kind of work we are considering are that it can readily produce a dense black image; it employs for typesetting the well-tried and very versatile Monotype machine; good proofing is possible, and the line blocks can be incorporated with the text at the page proof stage; corrections to the type (though not cheap) can be effectively done without having to reset a whole line for each correction. In particular good proofs of both line and half-tone blocks can be submitted to the editor for his approval.

Lithography is a printing process based on the mutual repulsion of grease and water. The printing surface is not raised, as in letterpress, but is a flat image laid down on a grained metal plate. This image is imposed on the plate by a photographic process; it is attractive to grease but repellent to water. On the lithographic printing machine, water is first applied to the plate and this is rejected by the image but covers the remainder of the surface of the plate. Then the plate is inked and, since printers' ink is a greasy substance, the ink adheres to the image but is rejected by the remainder of the plate which is now covered with a film of water. Thus only the image prints.

It used to be impossible to obtain by lithography as dense a black as one could obtain by letterpress, but technical improvements have been such that it is now possible to obtain an almost indistinguishable result. One advantage of lithography which is relevant to our present interest is that it will reproduce very fine line work exceptionally well.

A disadvantage of litho is that it is not possible (without considerable expense) to submit proofs of the actual plates. Therefore proofs of illustrations are submitted in the form of cheap bromides (or other forms of reproduction) which do not give as accurate a picture of the finished result as do blockmaker's proofs of letterpress blocks.

The relative cost of letterpress and litho is a much debated question these days and one cannot simply say that one process is cheaper than the other.

Litho machines run faster than letterpress and require less make-ready. also litho plates are much cheaper (for an equivalent area) than letterpress blocks. Therefore if a book or journal is very heavily illustrated it would be cheaper to print by litho. If, however, the greater part of the work is text which has been set in type, a decision to print by litho would mean that plates must be made for the whole of the book, and the cost of these might well exceed the savings made on blocks and on shorter machine time.

For work which is primarily textual the economies accruing from savings in machine time are only likely to exceed the additional cost of plates where runs are in excess of 10,000 — and this is rare indeed for archaeological publications. As I have suggested, the critical factor where smaller runs are involved lies in the proportion of illustrations to text: the greater the number of illustrations the more likely it is that litho will be cheaper than letterpress. The question might be further complicated by a consideration of film-setting instead of hot-metal typesetting, but that is a complexity which I would do well to avoid for the moment.

If a publication is to include half-tone illustrations bear in mind that these are likely to be printed on art paper, that is to say separately from the text. Therefore, though the body of the book may be printed by letterpress, the half-tones might well be printed by litho — thus achieving a worthwhile economy since there would be very little text on these pages and the cost of the litho plates and printing would be much less than the cost of letterpress blocks and letterpress printing.

By the lithographic process it is possible to print half-tones on almost any paper, though art paper is usually preferred because it gives the best possible result. Nevertheless. if a volume is to contain a very large number of half-tones. and it is desirable for these to be distributed amongst the text. the whole book might well be printed on a blade-coated

cartridge paper. This is stronger than art paper, but not glossy, and therefore not trying to the eyes when reading continuous text. However, half-tones printed on such paper will lack much of the detail and brilliance which they would have on art paper.

I turn now to the **preparation of the originals** and my concern is, of course, solely with those aspects which affect reproduction.

Line drawings usually present the most problems, and the principal problem is the large size of archaeological drawings. I hope to learn from you why you prefer to work in such large sizes, and it is my duty to tell you why this practice creates serious difficulties for the camera operator and the printer.

Modern cameras normally have copy boards which will hold originals up to 20" x 30" and will reduce the image size down to 25% linear. There are exceptions, and some blockmaking and platemaking firms still have old cameras which may have larger copy boards and may reduce to 12½%, but such firms are reluctant to use old cameras because they take longer to operate and often have technical problems. You will readily understand the difficulties presented by drawings (and we have had them) up to 12 feet long and reductions which are far greater than modern cameras are designed to cope with. Frequently it is necessary to effect excessive reductions in two or three stages. Very large originals may have to be accommodated in a variety of eccentric ways which increase the cost and may affect the accuracy.

A degree of reduction is desirable in the reproduction of illustrations since it gives a sharper finish to the printed image, but please, whenever possible, *do not require a reduction in excess of 25% linear.*

Another disadvantage of large scale originals lies in the possible loss of detail in reduction and reproduction. If, for example, a plan has to be reduced for publication to one fifth linear of its original size, every line in that plan will be reduced to one fifth of its original width. If the draughtsman has used very fine lines they may disappear altogether or appear in print as broken lines. If he has used close shadings or mechanical stipples these may reproduce as a muddy mess, almost a broken solid. It may thus become impossible to distinguish between the different paterns of shading or stipple.

It is clearly desirable that the archaeological draughtsman should know before he commences work, what size the illustrations are intended to be in published form. He may then be able to ensure that *the following points are observed:*

1. The necessary reduction will not exceed 25% — that is, the drawing should not need to be reduced to less than ¼ (25%) linear of its original size.
2. The drawing, where possible, does not exceed 20" x 30".
3. All details are capable of being reduced to the desired size without being lost or distorted, i.e. no lines are too thin and no shading, stipple, or other detail is so close that it will 'fill up'.

Postage and carriage provide further mundane but cogent reasons why drawings should be kept within reasonable size limites. Many archaeological drawings are so large that there is no way by which they can be sent through the post. However they are packed or rolled, they exceed the permitted size. This creates problems for author, editor, and printer since they are obliged to use special transport or carriers. Consideration of transport brings to mind the question of packing. If their size permits, keep originals flat and interleave them with plain paper to prevent scratching and smudging. Pack them between stout boards with a very strong outer wrapping. Modern GPO machinery seems specially designed to destroy all but the stoutest of wrappings. If the drawings are too large to be packed flat and are on flexible material, interleave with clean paper, roll them, and insert them in a sturdy cardboard cylinder.

The materials used for drawing are important. Though I have no expert knowledge of these, I should like to make a few points. If the drawing is of such a size that it can be transported without being rolled, a good drawing board is probably the best material to use; this is particularly appropriate for the 'finds' when a composite page is made up by pasting many small drawings on to one board. If this is done on a flexible sheet, and then rolled, the small pieces may peel off.

Larger drawings, which will clearly need to be rolled, are best done on dimensionally stable transparent film. Tracing paper or linen is to be avoided since it creases, contracts, and expands according to the humidity and temperature.

Some adhesives which are used for assembling small drawings into composite pages of 'finds' cause discolouration which will be picked up by the camera. The best adhesive for avoiding this is 'Scotch' aerosol manufactured by 3M, but it is very expensive (like most good things!).

Cow gum, if spread thinly, is all right but it causes fibre-tip pen-work to run if the ink is petroleum based. Incidentally, it is wise to avoid the use of fibre-tip pens since, if the ink is water based, it will run when exposed to damp. Waterproof black drawing ink is the best medium.

Most draughtsmen make extensive use of Letraset for their lettering, and rightly so, therefore it may be useful to mention three points in this connection:

1. Avoid typefaces with fine lines and serifs which may not reproduce well if the image is reduced in size. Sans serif faces such as Univers and Helvetica are ideal and they have the further advantage of providing a pleasant contrast to the serif type which is likely to be used for the text. If a serif type is used on the illustrations it will not provide a contrast but it may clash with the text face, for example, the text may be in an old face type and the draughtsman may have used a 'modern' such as Bodoni: this would be typographically undesirable.

2. It is important to rub down the Letraset carefully and firmly. If done harshly with, for example, the top of a ball point pen, cracks are likely to appear in the lettering. The blockmaker or lithographic plate-maker will probably touch these up, but he will charge for it. The draughtsman should ensure that the lettering is good before he parts with the drawing.

3. Rolling and handling a drawing can cause the Letraset to rub or peel off, and this tendency can be avoided by the use of a spray supplied by the Letraset firm. This effectively fixes the work if it is sprayed all over.

If it is necessary to draw guide lines, or write notes on drawings which are not to be reproduced in the finished print, use a very light blue pencil. This is the only colour which will not be picked up by the camera. I emphasise: a very light blue.

Half-tone illustrations in archaeological work are almost invariably reproduced from photographs. Wash drawings are so rare that they hardly merit a mention. The most suitable type of print for repro-duction is a glossy bromide; black and white, not sepia. Matt prints tend to give poorer results and grained finishes are to be avoided. Try also to avoid the need for an enlargement of a photograph and equally avoid excessive reduction. A reduction of two-thirds of original size would be ideal. If greater reduction be necessary, consider whether the photo is sufficiently clear to retain the detail when the size is brought down. Reduction is stated in terms of linear measurements so, if we reduce to a half linear, the area becomes only a quarter of the original. Bear in mind, also, that there is a further loss of detail because the continuous tone of the photograph is changed to the half-tone dot formation of the letter-press block or lithographic plate.

In parenthesis let it be said that only in exeptional circumstances should one be persuaded to repro-duce an illustration from a half-tone print in an-other book. It is almost impossible to get a really good reproduction from it; a tolerable result might be obtained if no original photo can be found.

The **masking** of certain areas of a photograph is often necessary; this may be done to remove unwanted detail, to improve the composition of a picture, or to change the proportions in order to obtain a better fit on the page. Masking is best indicated on a tracing overlay attached to the back at the top of a photograph and folded over the front. On this overlay draw lines to indicate the excluded areas and shade them. Avoid marking or indenting the face of the photo in any way.

Photographs should not be trimmed since the edges are likely to be damaged thereby, and the cutting may not be square.

The scaling of illustrations for reproduction is normally done by the editor of an archaeological work. He may find himself faced with a difficult task if the photographers and draughtsmen were not given proper guidance concerning sizes and propor-tions before they commenced work.

Perhaps enough has already been said about size and the need to avoid excessive reduction, but the proportions are also important. Ideally those whose duty it is to produce the illustrations should be informed of the text page area of the book or journal for which their photos or drawings are intended. They can then endeavour to produce originals which will reduce to the required area.

By 'text page area' is meant the area occupied by the text on a full page, not including the running heading and folio. This is normally expressed in the printers' measurement of 12 point ems, but, if a printer's scale is not available the area may be stated in inches or millimetres. Thus, on a crown quarto book, the text area may be 45 ems deep x 32 ems wide or 190mm x 135mm. Do not forget to make allowance for the caption. This may be 3 or 4 ems of depth (13 or 18mm), so the available size for the illustration itself would be, say 41 x 32 ems, or 172 x 135mm.

If an oblong is drawn to those dimensions and a diagonal is drawn and projected beyond the top corner it becomes easy to establish larger areas which are in direct proportion and thus establish suitable sizes for drawings which have to be made or photographs which have to be taken. Admittedly it will not be possible to make all the originals in direct proportion to the text page area, but the closer one approaches to this ideal the easier the tasks of editor and printer become, and the final appearance of the book will be proportionately enhanced (a justifiable pun, I think!).

In this connection one must bear in mind that more than one illustration may be combined to make a page. This is particularly so when numerous small 'finds' have to be illustrated, and in this section it is most important that the illustrator should paste the small illustrations of 'finds' within an area which is a precise projection of the text page area (less allow-ance for caption), and that the size should be such that a reduction to ½, ⅓, or ¼ will produce the correct size for the block or plate.

There is a great advantage in so preparing illustra-tions that the reduction factor is common to all, or to as many as possible. There are two reasons for this: firstly, it saves the camera operator a good deal of time since he has to set the camera for each scale: secondly, if letterpress blocks are to be made, the smaller subjects can be photographed and etched in groups, and separated later — this reduces the cost.

A further advantage in preparing illustrations for a common reduction lies in the fact that, by so doing, one is likely to achieve a desirable consistency in thickness of line and size of lettering — another way of improving the finished appearance of the book.

Unfortunately it is necessary to cater for the possibility that such consistency cannot be, or has not been, achieved. This is particularly true of plans. These almost invariably carry a drawn scale so it may be thought that they can be reduced to any degree consistent with legibility and with the size of the book. In fact it is sometimes necessary to ensure that several plans shall have exactly the same scale of reduction because they relate directly to each other. It is important to emphasise that such is the case when handing the material to the printer. I remember one large archaeological work where the author failed to this, although the question had been put to him. The result was that thirty large blocks had to be re-made at considerable expense.

There are several ways of **calculating the scaling** down of illustrations:

1. The simple geometrical method based on a diagonal of the illustrated area.

2. The same results can be achieved by simple equations:

   a. If you have fixed a reduced width and wish to find the reduced height, multiply the original height by the reduced width and divide by the original width.

   b. If a reduced height has been determined and you wish to find the reduced width, multiply the original width by the reduced height and divide by the original height.

3. Special calculators are available for working out these reductions: a particularly good one is made by Fearns of Gateshead. But, in view of the almost universal use of small electronic calculators, method 2 is preferred by most people.

Marking instructions on illustrations should be clearly and properly done. Line drawings usually have margins outside the area of the drawing and it is convenient to use one of these margins for writing the instruction for scaling down. Remember that the instructions must be based on linear measurements and do not use ambiguous phrases such as 'third reduction'. Be precise. State that the illustration must be 'reduced to one third linear' or 'reduce width to 5¼".' If the precise size is unimportant apart from the fact that the illustration must look well on the page, and if you are dealing with an intelligent printer, if may be sufficient to indicate that you require the illustration to occupy a whole, a half, or a quarter page.

Obviously it is not possible to write instructions on the face of photographs. Such instructions may be written on the back but must be very lightly written. If the pen or pencil makes any indent this is likely to be visible on the face of the photo and will be picked up by the camera. It is better to type the instructions on a small label and stick it on the back of the photo.

If there is any room for doubt, indicate which is the top of an illustration. The terms 'portrait' (meaning long side vertical) and 'landscape' (long side horizontal) may also be useful sometimes.

Every illustration must bear its reference — Fig. 3 or Plate V — figures being denoted by arabic and plates by roman numerals.

The captions should never be written on the original illustrations: they must be typed as a separate list. Probably a further, and more concise, List of Illustrations will also be required.

Fold-outs to accommodate large plans, etc., are sometimes unavoidable, but they are expensive since they have to be printed separately and involve costly handwork in the bindery. If there are many of them, they also make a book 'spongy', difficult to trim, and weaken the binding. Fold-outs, therefore, should be kept to a minimum, but if they cannot be avoided try to give the printer wide discretion as to their position in the book. The text will probably be printed in sections (or gatherings) of 16 pages. It is easiest, and therefore cheapest, to tip a fold-out on to the front of a section. The second preference is for the back of a section; the third is the middle of a section. Any other position will involve slitting a section with a knife before tipping in — and that is very expensive. Also, if you must have fold-outs, keep them to the minimum possible size. One fold will give you almost double the normal page width and that should be adequate for most requirements. The larger the size and the greater the number of folds, the more the cost escalates.

The position of the half-tone illustrations also deserves consideration. These should at least be grouped in four-page units (i.e. two leaves) because this can be sewn into the book. A single leaf (or two-page) has to be tipped-in by hand.

If it is desired to distribute the half-tones throughout the book it is wise (as for the fold-outs) to allow the printer some discretion, so that he may arrange to wrap them round or insert in the middle of sections to avoid the expense of slitting sections after folding. The most economical method of dealing with the half-tone illustrations is to group them all together in one or more sections, usually, though not always, at the end of the book. This method is becoming increasingly popular.

Finally **the placing of line illustrations.** The author should indicate to the editor the point, in relation to the text, where he would like each illustration to appear. When the galley proofs of the text and the proofs of the figures are in the editor's hands he should mark in the margins of the galley proofs the desired position for each figure. But it must be clearly understood that the printer may not be able to place each figure exactly where marked; he can only place it as near to that position as circumstances permit. If, for example, when the type is being made up into pages it is found that, at a point near the bottom of a page, the editor has called for the insertion of a large block, it is not possible to comply with the requirement and the figure must be placed a little higher or lower in the text. So long as editor and printer understand each other all will be well, and I am a great believer in a close relationship between them.