

CHAPTER VI

TRANSFER

THE process of transfer consists in passing the bromoil in contact with a suitable transfer paper through a press. The ink from the bromoil matrix offsets on to the transfer paper, and a print in ink upon a pure paper base, results, the gelatine support having been completely eliminated. In the opinion of the majority of those interested in the pigment processes, it is in transfer that the summit of their possibilities lies. Certain it is that the majority of bromoilers, after becoming expert in producing bromoils, pass on to transfer, although there are one or two notable exceptions.

It will be seen, in what follows, that there are other methods of effecting transfer than by means of a press, and in these cases the requirements as regards the bromoil itself are somewhat different, but, speaking generally, it may be said that to obtain a satisfactory transfer, a perfect bromoil must first be made. It will be necessary, however, before going further, to define exactly what we mean by a perfect bromoil. In the first place, a good few bromoils are shown in exhibitions even of the highest class, which, judging by inspection of the dry prints, could never be transferred with the hope of getting the ink away from the shadows. The transfer of ink from the shadows is the crux of the whole problem. Thus, it is possible to make a bromoil print of good depth by forcing the ink on to the gelatine merely by applying the brush with a certain amount of power and persistence. Anyone who has prepared prints of this type and compared them critically with others made specially for the process of transfer will easily realise the difference in shadow quality. Actually the type of print which will transfer easily exhibits an altogether more brilliant shadow tone than one which will

not. This is due to the fact that the ink rests on the surface of the gelatine, and is not driven in and slightly sunken in appearance. It should be borne in mind, of course, that the amount of pressure exerted by the press will have a great influence on the amount of ink which can be made to transfer, but it is assumed throughout that a print properly prepared for transferring should be capable of giving up its ink without the application of undue pressure. To get this result it is absolutely essential that the ink should take to any required depth on the bromoil without hammering or forcing with the brush.

From this we arrive at once at the first desideratum in preparing a bromoil which is to be used for transfer: *the soaking of the matrix must be exactly adjusted to the ink in use.* If anything, soaking should be carried to that stage when oversoaking is just setting in. Usually a prolongation of the usual soaking time applicable to bromoils not to be transferred, by about 10 minutes, will produce just the right degree of swelling. This, alone, renders it essential that the worker shall be thoroughly conversant with the technique of producing bromoils, and with the theoretical implications of the variations of that technique, before approaching the subject of transfer. C. J. Symes, perhaps the greatest authority on this section of the subject, says in his book *Perfection in the Pigment Processes*: "Soaking must be most accurately determined in the manner described . . . (i.e., by soaking test stripes), and the time must be so arranged that the pigment will just take sufficiently without dilation. . . . The right condition almost borders on over-soaking."

Consistency of Ink. One of the greatest difficulties in the way of producing prints suitable for transfer with complete assurance and regularity lies in the very general adoption of low soaking temperatures, usually for short times, coupled with the use of the hardest ink that can be got to adhere. The author's experience has led him to believe that this is by no means the best for general use. Once the attempt has been made to produce transfers from bromoils fully swollen at high temperatures there will be no doubt of the increased facility this procedure affords.

Mr. Symes and many other authors stress the fact that the very finest quality can only be obtained with very hard ink, but this can hardly hold in its extreme form, especially as such an experienced and successful worker as Mr. R. C. Grimwood (*New Photographer*, 1926, p. 303, and also *ibid.* 1926, p. 7) recommends the use of partially softened ink.

In the second of the two references here quoted, Mr. Grimwood gives summaries of four methods which may be adopted in inking, and although these four are not the only ways that can be employed, they do give a choice of method for the worker just contemplating a start in transfer. The four methods given are as follows:

- (1) Stiff ink with low soaking temperature and single pull.
- (2) Over-inking, partially drying and transferring.
- (3) Two pulls (a) medium ink and medium soaking temperature; (b) swelling at higher temperature and re-inking with softer ink.
- (4) Gradually increasing soaking temperatures, accompanied by gradual thinning of the ink, as previously described in this book.

The first method is that of Mr. Symes, and this has already been dealt with. The second method has specialised uses, although not to be recommended for general use. It may be adopted by workers not owning a press but having the use of one at a club or elsewhere. The prints are inked up, and may then be transferred at any time up to four or five hours later. Owing to the reluctance of the ink to leave the shadow portions, these must be over-inked to an extent found by experience to allow of the production of full depth in the shadows in the transfer.

The third method is that employed by Mr. Grimwood himself, and the quality of his work is a sufficient testimony as to what can be done in this way. In general, only the deeper tones will be covered in the first inking, and richness and depth are secured by superposition of the softer ink. In the second inking great care should be taken not to block up the differentiation of the shadow tones, and bring

about the production of an empty, uniform dark area in the transfer. This is extraordinarily easy to do in any method of working, and is undoubtedly the main consideration behind the advice given by Symes and others to use the hardest possible ink. As a matter of fact Mr. Symes' most recent writings on the subject of pigmenting methods (*Amateur Photographer*, 1929, p. 538) seem to mark a slight recession from his former opinion in that he now states: "Encre machine, however, transfers rather better when it is mixed with a softer ink, e.g., Encre Taille Douce. . . ." There can be no doubt that this is quite true.

Much early work in bromoil and oil transfer was done with very soft inks indeed, this being mainly because a very high degree of swelling was often employed, but also because the best type of press had not then been determined, and with such make-shifts as wringers and mangles, the softer inks gave a much greater certainty of getting adequate transfer of ink. The reaction which subsequently set in carried the pendulum in the present direction of rather over-estimating the virtues of hard ink. Therefore, before passing from the subject of consistency of ink we may outline what can be done with soft ink alone. Providing there is adequate adjustment of swelling to the ink used, there is no difficulty in securing adequate shadow depth with soft ink such as Sinclair's Encre Taille Douce. For bromoil itself the objection lies rather with the greasy nature of the deeper tones. This, to a great extent, disappears after transfer, and may therefore be disregarded. As mentioned previously, a much lighter original print must be used for this type of work, as otherwise the shadows will assuredly block up. The author has made good transfers by the soft ink technique from bromide prints which were almost of the ghost order.

An interesting method outlined by Dr. Norman Flowers is quoted in J. A. Sinclair's book *Bromoil and Oil Prints*, p. 12. Bleaching is carried out with solutions warmed to as much as 120° F. (the make of paper is not stated but would probably be one with a rather harder gelatine than the ordinary bromoil papers, excepting Drem). A considerable relief is obtained which would cause entire refusal of the ink to take if applied at once. The print is therefore,

plunged into cold water, and is left for 24 to 48 hours. The gelatine appears to harden up, and will then take a moderately soft ink. This method would appear to be worthy of further investigation.

Another method which the author has carried well beyond the experimental stage for transfer purposes is that put forward in the previous chapter, in which the first inking takes place with a very soft ink, and is followed by the application of hard ink, thus securing a very spontaneous acceptance of the ink by the shadow portions. This method was evolved in the endeavour to devise a procedure which would infallibly yield prints capable of transfer with the rather low pressure values obtainable with the small type of wringing machine made for clamping to the edge of a table. Under the circumstances, provided a suitable paper be selected for the transfer, very good results can be obtained. In this, as in all soft ink methods, it is essential to make sure that the ink is well evened up on the paper. Unevenness and granularity of the unpleasant type which pass unnoticed on the bromoil are decidedly disagreeable when transferred. In fact, it is quite surprising how the least defect or lack of finish is magnified in the transfer.

Contrast. Whatever method of inking be adopted, the first essential is to keep the bromoil distinctly on the bright, or contrasty, side of what is desired in the final transfer. In the first place, a slight trace of ink which appears as a faint tone in the bromoil will come out in the transfer as a lighter middle tone. Thus, in order to keep the highlights of the transfer clean, it is essential that those in the bromoil should be brilliant, and the brightest catch-lights should be pure uninked paper. The careful use of plastic rubber will serve to clear small areas, but this must be done with great care, and must be followed with an evening operation with a clean brush, or differences of texture will show in the transfer, which will make the handwork plain to all. The maintenance of pure highlights is particularly to be watched when soft ink is used because it is the easiest thing in the world to get a slight tone over everything which is not noticeable unless the ink be removed with the rubber to show the pure paper tone.

Not only do the highlights need watching, but the shadows must be carefully kept free from any suspicion of clogging. This is all the more difficult as in any method designed to facilitate getting a print in a single pull, over-inking of the shadows is relied upon, in order to compensate for the reluctance of the ink to leave these portions. This is the real justification of Mr. Grimwood's method, in which the shadow tone differentiations are obtained in the first pull, and these may be left severely alone in the second inking. Taking everything into consideration, the high-light problem is much the easier of the two difficulties to solve; in fact, the shadows are the real crux of the process when transfer is in question. Occasionally, very occasionally, a print is pigmented, in which from the first it is evident that the ink is taking with special ease on the shadows, and when touched with the plastic rubber the whole of the ink is removed, even in the shadows. Such a print will transfer completely with very little pressure. Unfortunately the writer has never been able to produce such exceptionally favourable prints regularly, and is still not clear as to the reason for their unusual behaviour. As a means for securing the maximum brilliance in the shadows Symes suggests not drying the print after tanning, but proceeding at once with the pigmenting. The writer cannot say, from personal experience, how far this claim is justified; but it is certainly a procedure worth trying where the method is one which can conveniently be practised.

BROMIDE PAPERS FOR TRANSFER

A little consideration needs to be given to the subject of the suitability of bromoil and bromide papers for transfer. For bromoil pure and simple the only essential is that the gelatine should give adequate differential relief, and should withstand successfully the not very violent strains of the brushwork. The bromoil paper which is to undergo transfer must have the additional degree of robustness to withstand the very considerable stress of the actual passage through the press, and, in addition, must yield up its ink deposit without, at the same time, requiring to be swollen so near to the melting point of the gelatine

that the latter runs any risk of sticking to the transfer paper.

Transfer papers differ very greatly in the way in which they behave when brought into contact with moist and partly swollen gelatine. In general there is never much danger of sticking when the gelatine is well covered with ink. Always a residual film of grease will remain on the gelatine which will prevent its adhering to the transfer paper. It is in the portions where the gelatine has received very little ink deposit that this kind of trouble will be experienced. Taking the ordinary type of paper made specially for bromoil, and using a paper which is at all prone to stick (and some of the best papers for the purpose do stick) it will generally be found that it will be unsafe to exceed a swelling temperature of 70°-75° F. if sticking is to be avoided without adopting other means. This places rather a restriction upon the inking with the softer inks, and really rules out any but the hard ink technique. In practice there are papers which show very little sticking propensities, such as Van Gelder, which give a little more latitude, but even with these there is an occasional risk. The "Drem" high soaking temperature paper is a great convenience in this respect, because it will stand soaking at quite high temperatures without sticking to even rather soft surfaced transfer papers, and parts with its ink with considerable ease.

Many experts who have studied the subject of the suitability of bromide papers for bromoil and for transfer are of the opinion that, contrary to the usual practice, it is advisable to use baryta insulated papers when transfer is in view. Mr. A. C. Banfield, in a private communication to the author, points out that in his experience baryta treated papers rarely fail to yield good transfers. On the contrary, however, baryta papers are of small use for the straightforward bromoil process, because the results always appear so dull and lifeless. This is obviously a point which requires some study, and it is quite feasible that an interested manufacturer might, as the result of experiment, find it possible not only to make a special paper for bromoil but also one for transfer.

The Transfer Press. Having discussed the type of bromoil which is suitable for transfer, and touched upon the room for improvement in existing commercially available papers, we now come down to one of the main essentials for effecting the transfer, viz., the press. The presses in general use cover quite a wide range of types, all of which are not equally suitable for the object in view. If the transfer process is to be taken seriously, and there is no risk of the worker becoming convinced, after a short trial, that the process does not do what he wants, there is a clear case for the purchase of a special bromoil transfer press, or of an etching press. These two specially adapted instruments give a degree of certainty in manipulation that is a very great asset in getting acquainted with the process, and in using it for the attainment of æsthetic ideals. There are a fair number of variables which have to be brought under control in the transfer process, and if by the adoption of a really adequate press only one of these can be eliminated, it is a considerable gain. Transfer presses are made, amongst others, by Sinclair's, Autotype Co., and the Drem Co., and are usually of the type in which the bromoil and transfer paper are passed between two rollers, the pressure between which is maintained by a spring controlled by a screw or screws. In some cases the lower roller runs light, while in other designs the two rollers are inter-g geared. In view of the expense of purchasing an example of each type, it is not easy to obtain a reliable comparison of their respective merits. In all probability there is not a great deal of difference in performance. A certain amount of creeping action of the bromoil over the transfer paper is liable to occur with any type of roller press, but, unless definition of a pin-point order is required in the transfer, this will not be important.

An etching press may be purchased from any artist's materials store, and, in particular, Cornelissen's, Kimber's, Roberson's and Lechertier Barbe's may be mentioned. In the smaller and simpler patterns these come a little cheaper than the transfer presses, and are equally efficient. Usually, the pressure between the rollers is direct, being exerted by a pair of screws, one at either side of the rollers, the thrust being applied to the bearings of the latter, through thick cork blocks.

In most books on the subject of bromoil transfer, the domestic mangle is given as a substitute for a properly designed press; this it is in a certain degree. There is, however, always the difficulty of obtaining sufficient pressure. This is usually feasible with the full size wringers common some years ago, but the smaller table mangles, with wooden or rubber rollers, now favoured in the modern household are, in general, only just capable of giving a transfer under favourable conditions, and the maintenance of sufficient pressure is a constant source of anxiety. The trouble with all mangles is that the pressure is commonly applied through helical, or sometimes leaf springs, which are made more flexible than is desirable for transfer purposes. The smaller wringers can, however, be used with a considerable amount of success if a few conditions be observed:

- (a) Inking should be with moderately soft ink.
- (b) The print must be completely swelled and in the most favourable condition.
- (c) The screws must be screwed up tight.
- (d) There should be a minimum of packings of a yielding, pliable nature in the "sandwich."

A great improvement in the performance of small machines of this type will be effected if the helical springs can be removed and replaced by cork or even wooden blocks. The manual effort required to get the print through is then considerable, but, provided the mangle is well anchored to the bench, it can easily be managed. With the full size mangle, quite satisfactory work can be done, always providing the pressure screws are done up quite tightly.

The Sandwich. Whatever type of press be employed, it is necessary to use some form of packing to enclose the bromoil and transfer paper in their passage through the rollers. This packing is frequently referred to as the "Sandwich." Such sandwiches may vary in complexity from a single folded sheet of blotting paper to multi-layered arrangements of millboard, printer's blanket and what not. The type and condition of the press in use will usually

be the deciding fact. Dr. Meyer, in his book, stresses the fact that many-membered packings reduce the effective pressure of the machine without any compensating advantages. This is quite true, providing a special transfer or etching press is available, in good condition and perfect alignment. If, however, slight inequality in the rollers or lack of parallelism is to be feared, a give and take layer of some sort to even up conditions all over the line of contact of the two rollers is essential. For this purpose printer's blanket is, without rival, the best material. It smooths out slight inequalities of pressure without being so soft and yielding that the available pressure is reduced to a mere percentage of what it otherwise would be. It is a little expensive to purchase, but, once acquired, it lasts for ever, and quite a small piece, after all, is all that is needed unless transfers of considerable size are to be made. There does not appear to be any cheap and efficient substitute.

With the regulation presses a sheet of cardboard on either side of the bromoil and transfer paper is all that is required, with possibly one thickness of printer's blanket. If, however, the wringer or mangle be employed, a more complicated sandwich will be advisable. There are many effective combinations for such a sandwich, among which the following arrangement has proved serviceable. Starting from the bottom we have: a piece of $3/16$ inch strawboard, and on top of this a piece of $1/32$ inch zinc sheet. On top of these are placed the transfer paper and bromoil, and over these a sheet of blotting paper and the printer's blanket (preferably two thicknesses). Another sheet of strawboard completes the pack—all the layers should be stepped back about $\frac{1}{4}$ inch from the one below in order that the entry into the rollers shall proceed gradually and without undue strain on the mechanism.

Making the Pull. Before actually passing the bromoil and transfer paper through the press, it is as well to give it a last soaking, at any rate if it has not been in the water at most five or ten minutes before. The excess moisture is then dabbed off, any stray pieces of hair and other foreign bodies carefully removed with the plastic rubber, the

whole evened up by a few gentle taps of an almost empty brush, and the bromoil is then laid on the transfer paper, which is already in position on the zinc sheet of the sandwich. The rest of the pack is then assembled, and the whole passed through the press under light pressure, just to get things well stuck in place, and to prevent any slipping which might occur if full pressure were used at once. The actual degree of pressure required to effect transfer most efficiently will have to be found by experiment. In the case of the mangle, there will generally be no error in assuming that the greatest which can be obtained will not be excessive. Mr. Herbert Bairstow, however, has given a tip in an article (*Club Photographer*, Vol. V, p. 35, 1924) which is very useful. Replace the transfer paper by a sheet of blotting paper, and place on this a sheet of thin card, about the thickness of the bromoil. Now screw up the press until, on passing the sandwich through, the card produces a distinct but not too deep plate-mark on the blotting paper. This will give the pressure necessary for transfer.

After the full pressure pull has been made, carefully open up the pack and make registration marks on bromoil and transfer paper. This is done by taking a soft pencil and ruling with a ruler short lines cutting the edges of the bromoil at right angles to and in the centre of each edge, and extending beyond on to the transfer paper. This should be done quite faintly and without pressure. The bromoil should then be gently stripped from the transfer paper, starting at one corner, and detaching it very slowly.

The state of affairs after the first pull may not be very inspiring to behold, although, on the other hand, it is possible to produce magnificent prints by the single pull method. Generally, however, the reluctance to transfer in the shadows causes a washy appearance in the first pull, decidedly forbidding to the beginner. Much can, however, be done at this stage by the process of "airing," without resorting to another inking. This "airing" process was first disclosed, the author believes, by Dr. Meyer in his little book *Bromoils and Bromoil Transfers*. It will be found that if the print and transfer are separated and allowed to remain exposed to the air for two or three minutes, and are then re-transferred in registered contact

a great deal of the remaining shadow ink will come off, and after a second airing there should be only a trace of ink left in the deeper portions of the bromoil, while the highlights should have come away in their entirety.

Even after this treatment, it will, in general, be found that the transfer still lacks depth, and to remedy this it will be necessary to resort to a further inking. This inking may be local or general, according as to whether increased depth is desired over the whole transfer or only over selected portions. The bromoil should be put back in the water for a further short soaking, and inking is recommenced with the partly completed transfer as a guide to further requirements. It will depend on the scheme of work being followed, whether the second and subsequent inkings are with ink of the original consistency or with a softer ink. If increased contrast is required this may be secured by re-inking with a harder ink, which will, in all probability, take only on the deeper tones. The passing of the bromoil through the press usually seems to produce a slightly increased relief, so that often a harder ink will not be practicable. One thing, however, should be avoided: the application of soft ink to shadow portions where it is desired to retain gradation. Even though the shadows may still show gradation in the bromoil itself it is probable that it will be quite swamped out in the transfer. Generally speaking, the second and further inkings will be effected with a good deal of ease, although, in the author's opinion, the least possible amount of the total effect should be entrusted to the subsequent inkings because it is difficult to secure spontaneity and a delicate grain after the first inking. For this reason, also, the first transfer usually seems to be the best. This is in direct opposition to the experience of several well-known workers, including Herbert Bairstow, who recommend the rejection of the first pull altogether, as a mere trial. Evidently much depends on the idiosyncrasies of the worker's particular method.

If it is desired to put aside the used bromoil matrix for producing further transfers in the future, this must now be cleaned up and dried. This cleaning operation is not so straightforward as might be imagined. To begin with, carbon tetrachloride, or chloroform, should be used for

removal of the remaining ink. If petrol is employed it is found that even aviation spirit leaves behind a faint greasiness of the print surface which does not help the production of a satisfactory re-inking. The removal of the ink is accomplished by gently rubbing with a wad of cotton-wool saturated with the solvent. The wool must be frequently renewed, as otherwise the ink is merely spread irregularly over the print surface. It will be found much easier to make a good job if the print is kept thoroughly wet until the last traces of ink are removed. The matrix is then hung up to dry and put away for future use.

Papers for the Final Image. The papers which may be used for the reception of the transferred image are of a very wide range of types. Drawing papers of good grade are suitable as a general rule, and there are papers specially manufactured for transfer by the Drem Co., and by the Autotype Co. The vast bulk of workers in the process, however, avail themselves of the very extensive supply of different etching papers, which are almost all suitable for bromoil transfer, at any rate after pre-treatment in the case of those which have a very soft surface.

The principal requirements in a paper for bromoil transfer are that it takes the ink with a fair amount of ease, and has sufficient strength when damp, to be stripped from the bromoil. Even if the transfer paper be used dry, it becomes damp on contact with the bromoil, and tends to lose its original toughness. Mr. Bairstow suggests, as a first choice, Whatman's Imperial Creswick Note 90 lbs. This is a cream drawing paper with a soft surface which does not stick to the gelatine, and which is not granular enough to be unsuitable even for small subjects. It is heavy enough not to need mounting if a wide margin be left. It can be used wet or dry, and is really a delightfully easy paper to handle. For a beginner wishing to have everything as favourable as possible, it cannot be improved upon. Hot pressed drawing papers are not as a rule suitable for transfer, because their hard surface does not easily take the ink, and there is a tendency to adhere to the gelatine; with the result that when the two are stripped, not the drawing paper surface, but the gelatine itself comes away.

Etching papers are made in enormous variety, and most of them are ideal for transfer. A paper commonly used by many experienced workers is Van Gelder. This may be obtained in three tones: white, light cream, and deep cream. All three are very fine. They are best used damp, but will take quite satisfactorily dry.

Another type of paper which can be used with great success for small subjects are the Japanese papers. Only the substantial ones are advisable as they all become rather frail when damp. Also, it is necessary to pre-treat the surface to avoid sticking to the gelatine. They cannot be recommended for all subjects, as they do not give great tone differentiations in the highlights, but for special types of subject they are excellent. A semi-translucent paper of this type, though not a genuine Japanese variety, is known as "pebble." This is a very valuable paper for special effects.

Another very soft paper, which is of an ivory white tone and is found specially suitable for bromoil transfer, is Allonge. This is a delightful paper for high-key work, and is preferably used dry after pre-treatment. The make of note-paper known as "Basildon Bond," especially the maize shade, does well for small pulls. Any worker of individuality will, in short, find something to suit him in the tremendous variety available.

Pre-treatment. Many transfer papers work better when damp, and a good few have very delicate surfaces which necessitate some form of protection before being submitted to the rigours of the press. The damping operation may be effected in a variety of ways, and it is worth while to devote a little study to determining the best degree of wetness of the chosen paper. In general, the paper should be damp, but should show no excess moisture on its surface.

With the Van Gelder papers the method adopted by the writer is as follows: The paper is soaked in warm water till completely saturated, and is then allowed to remain about one hour between blotting boards, without pressure. It is good to keep the paper and boards in a warm, damp place, as warm paper seems to transfer more easily. Other

writers advocate removing surplus water after soaking, and keeping for various periods between sheets of plate glass. Mrs. Marietta Ralli, than whom there can be no more reliable guide, is quoted as merely soaking the paper in water, and passing through the press with blotting paper to remove excess. The final aim in each case is, however, to get to that stage where the paper is quite limp but is almost dry to the touch. The exact procedure will, to a certain extent, depend upon the paper.

The effect of working with wet or dry paper is very different, and everyone should experiment with both methods before deciding which to adopt. Generally, it is stated that the dry paper produces more contrast, while requiring more pressure. The former statement is certainly true, but the extra pressure required with dry paper need not be very great. It is much less easy to get a brilliant highlight with a wet paper, and the shadows seem to transfer in a more delicate way, which makes the retention of gradation rather easier. In very large prints it is almost imperative to damp the paper because of the expansion of the dry paper in contact with the wet bromoil matrix. Other than for this reason, the writer's invariable practice is to use the paper dry. Mr. Bairstow in his "Club Photographer" article already referred to, also suggests this course. Provided that the paper be not too grainy, there is no need to fear that the pressure will be inadequate, and for all moderate-sized work nothing appears to be gained by damping, unless the softer effect appeals for its own sake.

Pre-treatment proper, i.e., to protect the surface of the transfer from abrasion by sticking to the gelatine, can be carried out in two ways. The paper may be sprayed or wiped over with a solution of wax in benzene, or with ordinary turpentine of Artist's quality. Turpentine substitute will not do. In each case a layer of wax or rosin is deposited on the soft paper surface and reduces adhesion to the gelatine. After treatment the paper is put away for an hour or longer, until all solvent has evaporated. It may then be used wet or dry. Even the most delicate Japanese papers work well after this treatment. In these cases it is always advisable thoroughly to saturate the paper

with the protective mixture. There is absolutely no alteration in appearance after treatment.

It should be mentioned in this connection that there is another way of using these delicate papers, which does not involve the use of solvents, and protective coatings. The bromoil is inked up as usual, and when complete is put aside until the paper, but not the ink, is dry. This will usually be in from 2 to 4 hours. The transfer may then be effected with complete certainty on any paper. The obvious drawback to this procedure is that the transfer must be finished in a single pull, and allowance for the shadows must be made by over-inking.

Transfer without a Roller Press. If transfer is to be attempted and no regulation press or mangle is available, there are still ways and means of obtaining results. These expedients we may discuss under three headings:

- (a) Rubbing-down process.
- (b) Solvent transfer.
- (c) The knife-edge press.

Hand Transfer. It is well-known that lino-cuts and wood cuts may be and are printed by rubbing the paper into contact with the inked block by hand. A similar method is quite practicable for bromoil transfer in sizes up to whole-plate, and even 10 in. \times 8 in. A rubbing-down desk of some sort is necessary, and may be home-constructed, or a suitable apparatus is marketed by Sinclair's under the name of the "Revelle" desk. The principle involved in the construction of such a desk is simple. The bromoil and transfer paper are clamped together by one edge on a metal or plate-glass surface. Over the top is clamped a protective card, and the ink is transferred by rubbing over the card with a ball-shaped implement. A special tool is sold by Sinclair's, but an ordinary dessert spoon does very well. Both the bowl and the handle may be used for special effects. The clamping is best effected by means of a pressure bar running across the bed plate and parallel to its shorter edge, the pressure being obtained by bolts and

fly-nuts at the two ends. A sketch of a suitable apparatus will be seen in Fig. 3. A white margin is best left along one edge of the bromoil so that space is left for clamping under the pressure bar, where, of course, rubbing down cannot be effected, although it is possible to deal with the clamped portion by reversing the print and transfer paper. This method is a perfectly practicable one, and can be made to yield transfers of very good quality indeed in the smaller sizes. The labour of rubbing down is not great, and the whole operation is one of considerable fascination, as the exact amount of ink transferred at any point is under control. One inking is usually sufficient, as all the ink can be got off the shadows of a suitably inked print,

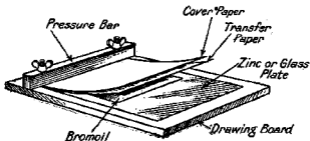


FIG. 3

and all necessary control can be exercised in the rubbing down. As with press transfer, dry or damp paper may be used.

Solvent Transfer. This process rests on the fact that if an ink solvent be used for moistening the transfer paper instead of water, the ink will be removed from the bromoil to the transfer paper if the two are subjected to quite light pressure. The process appears to have been invented by Robert Demachy, and in his account of it he claims considerable success. Other writers on the subject report that complete failure to get presentable results ensues. Although a fair amount of experiment would seem necessary before this method can be advanced beyond the uncertain stage, it is certainly worth trying. A volatile solvent is

the best to use, such as benzene or toluene. Turpentine degrades the colour of the ink too much. The necessary pressure may easily be obtained by means of a light rubber wringer, or even a roller squeegee.

The main difficulty in working successfully is to get an even though sparing quantity of solvent on to the paper. With thin papers the solvent penetrates the pores of the paper, and the ink soaks through and assumes a dull and unattractive appearance. A fairly successful mode of working is to use a 25% solution of benzene in acetone (the latter is a non-solvent for most inks), and to apply this with a wad of cotton wool. If a thick, close paper is used, such as Whatman's Imperial Creswick Note, 90 lbs., or even a heavy, hot-pressed paper, there will not be much saturation of the paper by the solvent, and quite good transfers can be got. As every vestige of ink is transferred from the bromoil by this method, the prints must be inked up quite lightly, and the highlights must be perfectly clean. Advantages of the procedure are that there is no crushing of the grain of the paper owing to the absence of pressure, and that no special apparatus is necessary. In some results obtained by the author, a spreading effect was obtained reminiscent of Sir D. Y. Cameron's etchings; when this effect came out as intended the results were very striking. There was, however, great uncertainty.

The Knife-edge Press. In German photographic circles after the War, great interest was taken in transfer processes, but the price difficulty with regard to presses of standard pattern was exceptionally severe, and quite a number of ideas for substitutes were mooted. Some of these appear a little impracticable, such as one in which the bromoil and transfer paper were to be laid on a wooden support, and another wooden plank was to be rolled over them, with the interposition of one or two thin metal rods which rolled over the print, transmitting the pressure applied along the line of contact. A much more promising suggestion was that of Prett (*Phot. Rundschau*, 1923, I, 5), who adapted the pressure bar type of press used in collotype. The construction of the press which he puts forward is, indeed, quite simple enough to render it possible for anyone

with a mechanical turn of mind to be able to make quite a useful article for himself. Fig. 4 shows the press in sufficient detail to enable the main principle to be grasped. The print and transfer paper are sandwiched between two sheets of good quality plywood, preferably of a hard variety, such as birch. Alternatively the upper one may be replaced by a metal sheet. If the work is well-done and the alignment of the press is true, no equalising layer, such as printer's blanket, will be required.

The sandwich is attached by means of stout cord, stranded wire, or leather strips to a windlass or crank handle, the

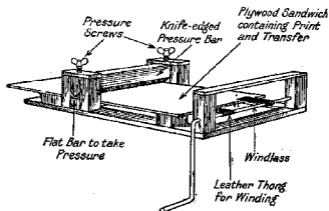


FIG. 4

turning of which serves to wind up the cord, or straps, and draw the sandwich through the pressure bars. These are hard wood bars about $\frac{1}{2}$ inch thick, the upper one planed down to a knife edge along one edge. The two pressure bars are pressed together by the fine thread screws at each end of the bars. The outer surfaces of the sandwich can be lubricated with talc if any difficulty is found in getting the pack through the press. No dimensions are given in this account, because anyone can work them out to suit his particular case, but if the work is to be carried out at home it is important to remember that a quite consider-

able strain falls on the parts taking the pull, and that the construction should be robust, all joints being preferably glued and screwed. Those with the necessary facilities would do well to make the whole apparatus out of metal, but a wooden press can be made to do very good work. After a time the pressure bars may become worn, but it is a simple matter to substitute new ones. This apparatus is not recommended where an ordinary etching or transfer press is in any way obtainable, but when well made it is superior to a mangle or wringer, and it is certainly capable of doing quite excellent work, even to making single pull transfers.

Other means for facilitating transfer include swelling with ammonia after inking, and swelling at very high temperatures, such as 140° F. after hardening in formalin and using the very soft inks employed in copperplate work. The first method, however, fails because it is next to impossible to mop off the superfluous water without removing ink, while with the second method the author has never succeeded in getting an image of sufficient depth to be satisfactory. In any case, with the present-day understanding of the conditions necessary for success, there is no need to adopt such extreme courses. If a standard press is not available the mangle may be used, or a knife-edge press may be constructed, or, failing all else, there is a great deal to be said for doing only small work, and transferring by rubbing down.

LANDMARKS FROM CHAPTER VI

- (1) The first essential for easy transfer is correct swelling of the matrix in relation to the ink used.
- (2) Preferably use a softened ink unless a press capable of the maximum pressure is to be used.
- (3) The most generally useful inking method is to make two pulls: (a) medium ink; (b) higher temperature swelling and softer ink.
- (4) Keep the highlights bright, and guard against blocking the shadows, particularly with soft ink.
- (5) Use a transfer press or etching press if at all possible.

- (6) Use as few layers in the "sandwich" as possible, consistent with securing even pressure.
- (7) Wet and dry transfer papers give different results—the dry paper gives more contrast.
- (8) Treat delicate papers with turpentine or wax solution to avoid sticking.