

PIGMENT PRINTING

THE BROMOIL PROCESS FROM THE NEGATIVE TO THE TRANSFER

By

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F O R E W O R D

PROBABLY the first essential condition for the appreciation of a book is that there should exist some measure of understanding between author and reader. Without this one may read and not understand, see and not perceive.

In the hopes, therefore, that I may stimulate a sympathetic understanding between my readers and myself, I write this foreword, paradoxically though it may seem, as an afterthought—after writing of my experiences in bromoil and then considering them in retrospect from the point of view of the reader.

The object of this book is to explain in detail, from beginning to end, the bromoil and the bromoil transfer processes. The explanations, the details, formulae, and methods, are approached, described, and pursued from the practical rather than the theoretical point of view. Theorizing is all very well, but except in so far as a theory can be, and is, put to practical purpose, mere theory and theoretical formality is reduced to a minimum.

In brief, I invite the reader into my workroom and together we make bromoils and bromoil transfers. There are no secrets in the process, so nothing is withheld, and, to the best of my knowledge and experience, no relevant detail is omitted.

To make the book complete from the practical viewpoint a number of elementary facts and details which are directly concerned with the practice are explained. The whole process is worked through in normal sequence of operations. In later chapters variations are discussed and explained, and prints are made and the results reproduced, showing the great elasticity of the process. So far as practical bromoil is concerned nothing

is taken for granted and every important step in the production of bromoil transfers is illustrated.

The illustrations themselves are divided into two classes—Plates in photogravure (with two exceptions), all of which reproduce the final print, and Figures, reproduced by the half-tone process, which illustrate stages of progress in the work.

Many of the plates are reproductions from large transfers, 20 in. \times 16 in. and larger. This great reduction, to a size suitable for the page of the book, accounts for considerable loss of quality. Reduction results in a concentration and closing-up of tone masses and, sometimes, a quality of harshness not apparent in the original. When it is realized that size is a factor which governs, to some extent, the depth and tone values of a print and the manner of its treatment in pigment, it will be understood that the qualities apparent in a reproduction measuring only 5 in. \times 4 in. from a 20 in. \times 16 in. original are not always exactly those qualities which would have been produced had one been working for an original of such small dimensions.

In the reproductions texture and surface-quality of both paper and pigment are in some absent, in others compressed, whereas in the originals such qualities as these may be, in fact often are, features which play an important part in the rendering of the finished picture. These finer points of a transfer print may be appreciated, only subconsciously perhaps, but they take their part, nevertheless, in producing whatever effect or reaction the print is capable of making upon the observer.

The subject-matter and its treatment are, of course, the most important considerations, for it is, after all, the picture that matters. The method of its production, the technique incidental to the process, and the qualities arising from the adoption of

that process are matters with which we are concerned in this book more particularly than with pictorialism, hence this reference to the losses and differences which are due to the great reduction in size of the illustrations as compared with the originals. The dimensions of the original and notes as to its paper base are stated in connexion with each Plate, and the reader will find it helpful to bear these data in mind when considering each picture.

My acknowledgement and thanks are due to my friend, Walter Benington, for the loan of some of his portrait negatives, and permission to use a free hand in their interpretation in the pigment medium (Plates IX, XVI, XVIII, XXV, XXXI, XXXIII).

G. L. HAWKINS.

INTRODUCTION

THE success and lasting popularity of a photographic printing process depends upon four factors. Putting them in order of importance they are: resultant quality, reliability, simplicity, and low cost. Bromoil has something to be said for it on all four counts.

Bromoil has definitely passed the experimental stage. In the hands of any intelligent amateur or professional photographer consistently good results can be obtained. No control process can be simple in all its phases, but it is now possible to set out a definite schedule of operations, with no uncontrollable variables, for the straightforward production of oil prints, bromoil or transfer; and with a reasonable certainty that any one following such instructions will produce prints of unvarying good quality.

The process is not expensive. The materials used in the production of bromoils are no more costly than the materials required for any other printing process. From the point of view of the amateur, the greatest consideration is, often, the initial outlay on apparatus. For transfer a good press is necessary. Other than that there are no heavier items than brushes.

From the professional's point of view time is a most important consideration. Hitherto, when much experimenting was necessary and when, even then, results were never to be relied upon, the question of time was one which may have caused the process to be dropped, or perhaps never taken up. Now the spadework has been done, with the result that, by following a set programme, bromoils or transfers can be turned out nearly as quickly as bromides, and certainly as quickly as carbons or Carbros.

Quality, although of primary importance, comes last for consideration, as it is the result of the process rather than something to be reckoned with under the heading of production. The qualities and the characteristics of a good bromoil or transfer are not easily described. Further, the process affords the worker so much scope for individuality, even when the rendering is to be most faithfully

photographic, that great differences of print quality are possible. The texture of a good bromoil is a thing of beauty itself and the print is permanent. If the pigment is transferred to a new paper base these qualities are still more in evidence.

The keen amateur seeks a process which leads to results that are different. The buyer of photographs to-day, more than ever, seeks something 'out of the ordinary'. Thus in bromoil both the amateur and the professional have a printing process which will satisfy their needs.

For some years I practised bromoil transfer as an amateur; my reason and my chief consideration was a desire to produce pictures coming in that category which is, loosely phrased, pictorial photography. Latterly, as a professional photographer, although I have in no way lost my amateur outlook, I have realized the need so to standardize the bromoil process as to make it suitable for commercial use. This volume is really the result of this endeavour. The fact that I have, as I submit, so standardized the process as to make it a suitable medium for the professional is but incidental. It is for the pictorialist that this book has been compiled, be he engaged in photography as a hobby or as a profession; and I have endeavoured in the chapters which follow to do two things: firstly, to describe the process in the form I have adopted as standardized procedure; methods which will enable the beginner or the more advanced worker to produce prints of unvarying good quality; and secondly, to tell by word and picture some of the variations which may be used when it is desired to take advantage of the power of control offered by the process.

The experienced worker, or student of the process, will find that many alternative formulae have been omitted. The foregoing considerations will explain my reason. Similarly, I have omitted reference to the chemical reactions of the baths used and other technical details which in no way affect the practical side. Textbooks are obtainable which give all such information. This volume is confined to that which is of real importance to the worker in the process—the practical side from beginning to end.

CHAPTER I

BROMOIL IN BRIEF

Transfer the Objective

BEFORE we consider how to make a bromoil print it is as well to have a clear idea of what a bromoil is. Therefore, before going into the details of how to make one, a brief outline of the process will afford the reader sufficient knowledge to understand the more lengthy explanations that follow.

A Bromoil is a photo-mechanical production in so far as a photograph is first produced by chemical means from the action of light upon sensitized materials; then, after treating the photograph with further chemical solutions, the picture is transformed by mechanical means into an image composed of oil pigment instead of silver bromide.

I have never, in the years I have worked the bromoil process, regarded the bromoil print as the finished picture. It seems to me that the natural and reasonable thing to do, having mastered the technique of producing a bromide print suitable for inking and then having inked it satisfactorily, is to transfer the pigment image on to a new paper base. Without this one has only gone half-way in the process. Before transfer the pigment picture is still upon the comparatively vulnerable gelatine base which originally contained the silver-salt image. If the technique of preparation and inking has been mastered the further technique of transfer is not difficult and is certainly worth the extra trouble. The result is so much better. The final transferred print is composed of oil pigment alone upon a paper base, which can be almost any paper the worker chooses, to suit the subject. It is therefore as permanent as any oil print, etching, or painting.

Practically everything that follows in this discourse on bromoil has transfer in view. Should the reader have no intention to transfer I would point out to him that knowledge of the more exact and careful technique required for successful transfer is of considerable value.

Bromoil in Brief

Some bromoil workers do not get good, clean transfers, but any one who understands how to produce a print in oil pigment suitable for transfer can be sure that his bromoils will be of the best.

The process, in as few words as possible, is as follows. A good bromide print is made. This is bleached in a solution of which the reagents do two things: (*a*) bleach away the image, (*b*) tan or harden the gelatine in proportion to the original silver-salt deposit. Thus, where originally there was a dark area, the gelatine receives maximum hardening, and where originally there was a highlight, the gelatine receives minimum hardening. This happens in proportion all through the scale of tones, provided that the bromide print was a good one for the purpose. The print, which now shows a faint greenish-brown image only, is washed and fixed.

After certain other preliminaries which will be discussed in full later, the print, thus prepared, is inked up in the wet state (though without surface moisture) with special brushes made for the purpose. Because the greatly hardened or tanned portions hold less water than the parts which have not been hardened at all, and because, fundamentally, an oily substance such as oil pigment (or paint) has a great aversion to water, the ink put on the brush is accepted on the print in similar proportions to those of the original silver content. Where once the print was dark with silver bromide, now it will become dark with pigment and vary proportionately throughout the scale of tones.

This part of the operation completed, the inked print is laid face downward on a piece of plain paper, inserted between two pieces of stout blotting-paper and passed through the rollers of a transfer press, which causes the pigment to leave the gelatine upon which it was impressed with the brush and to adhere to the selected paper. This, save for minor finishing details, is our bromoil transfer.

CHAPTER II

THE NEGATIVE

The perfect negative. How to correct imperfections

I START in this chapter a detailed account of the methods and procedure, with some minor variations, which I have adopted as being reliable and the best to recommend. The results and conclusions arrived at after some ten years of bromoiling are likely to be of more importance to the reader than the work, experiments by trial and error, and the many failures that led up to these results.

It is necessary to start from the very beginning, from the production of the negative, and then by various stages every manipulation and process will be fully described.

I have implied that this book is not a text-book. It is to be presumed that the reader sufficiently understands the basic principles of photography to make it unnecessary to go deeply into details other than those having some bearing on bromoil work.

In the first place, it is very widely believed that the apparatus used for 'taking the picture' is of great importance.

This is not so. The type of camera used has so little to do with the production of pictures that no one who intends seriously to undertake exhibition work need be deterred by the fact that his camera is a cheap one.

Nor does size of negative matter. Whereas $3\frac{1}{4}$ in. \times $2\frac{1}{4}$ in. and quarter-plate are most popular and convenient sizes, I have made successful 20 in. \times 16 in. bromoil transfers from Leica 35 mm. negatives and one of these, 'The Top of the Cliff', was exhibited at the London Salon (Plate I).

Far more important is the tone range or degree of contrast of the negative produced. This should be short, considerably shorter than that of the type of negative that gives a good rich print on chlorobromide paper. It should be possible to read newsprint through the densest parts when the negative is placed on a sheet of newspaper. At the same time there should be no clear film; the darkest shadows should

have some deposit, and all large areas of what was dark tone in the original should be full of detail or tone values. To produce such negatives great care must be used to avoid over-development. A developer, such as Azol, which is known to be capable of giving soft negatives is preferable. I need hardly mention that exposure of the plate must be ample.

This, then, is the perfect negative for the purpose of the ultimate production of a bromoil transfer, but it must not be imagined that such are the only negatives from which it is possible to work the process. There are several means by which unsuitable or imperfect negatives may be made to give satisfactory prints for bromoil. Intensification and reduction, general or local, need only be mentioned. The development factor to be used in making the bromide print may be varied to compensate, within limits, for the harshness or flatness, as the case may be, of the negative. This point is dealt with in detail in the chapter on making the bromide print.

There is a further means of varying the printing contrasts or tone values of a negative, one which is extremely useful and more often employed for definite control of printing than for counterbalancing defects. I refer to the use of the red dye Coccine Nouvelle. This dye is most easily used on films, being applied to the back. A very dilute solution, nearly colourless, should first be applied with a camel-hair or sable brush to that part of the negative which requires to be held back in printing. Care should be taken that the brush holds only sufficient to cover evenly the area to be treated. The brush should be used with a deliberate sweeping action, the side, not the tip only, making contact with the film. After this first application the gelatine backing of the film will readily take more dye and succeeding applications, all applied by similar means, may be of slightly deeper colour (more concentrated solution), but great care must be taken not to overdo it. Until the correct depth of red-dye stain that will give a predetermined degree of reduction in the printing value is known by practice, trial prints should be made and more dye added if necessary, thus building up the stain gradually until the negative prints, in the treated part, to just the required depth. If too much dye

has been applied the immersion of the negative for a few minutes in running water will remove it all.

A method of gauging the density value of an application of red dye is to view the negative by the aid of a strong, dark-green light in a darkened room.

Viewed in this way the colour is hardly noticeable, but the density imparted by the dye at once becomes apparent.

This visual test must be regarded as only approximate, since the enlarger light is composed of rays of other colours than green, but for practical purposes the test is useful.

Mercury-vapour light is much more intense than half-watt light, but this intensity is due to the blue and violet rays of which the mercury-vapour light is largely composed. The red dye absorbs a greater proportion of these than it does of the yellow rays of a half-watt lamp.

This fact may be put to good use by fitting up the enlarger with both a mercury-vapour tube and a battery of half-watt lamps, each being wired to independent switches. By means of such an arrangement one has very great control over the printing values of a negative by the red-dye method.

This method of control is a great power in the hands of the photographer who takes the trouble to master it. It enables him to reduce the depth to which any tone in the negative will print. From my remarks on the subject it will be understood that I advocate the making of any desired alterations at the time of making the bromide print rather than using the later pigmenting process as a means for control. Not that the latter cannot be done—it is done, and quite effectively—but my own procedure and my advice to others is to bring about desired alterations step by step rather than by leaving it all to be done when pigmenting.

The application of red dye, if for no other purpose, will be found most useful for removing entirely any unwanted objects such as telegraph poles. It should be remembered when using this control method that it is easier when pigmenting to put on pigment than it is to remove it, that is, if satisfactory transfer is the ultimate object.

Thus, if too much red dye is applied or if a part of the negative is dyed where no dye is required, it is not difficult to correct this when pigmenting, as such parts will be too light rather than too dark.

By comparing the two prints (Figs. 1 and 2) the ability to correct harshness in a negative may be seen. Fig. 1 is from the print before any dye was added. Fig. 2 shows a print, produced under otherwise identical conditions, after the negative had been treated with dye. The whole of the foreground, boats and masts, were dyed to a decided, but not deep, red. All the windows and other dark tones in the background were dyed to a slightly deeper red.

The result was a negative which would print the highlights without rendering the thin parts too dark for satisfactory bromoil. This negative was, admittedly, under-exposed and over-developed, but only by reproducing the results of such work is it possible to illustrate methods of correcting faults. The final bromoil transfer 'Bare Poles' (Plate II) turned out to be a successful exhibition picture.

By careful study of a trial print it is possible to decide upon and then to carry out almost any tonal alterations to the negative. Shading should, of course, be employed when printing to bring about the desired depth locally when the area to be controlled is large enough. A gadget (if it can be so described) that I make use of constantly is the old-fashioned hat-pin. Long ones are the most useful, and I have one with a spherical head about $\frac{1}{4}$ -in. diameter which is most useful for shading small areas. To the pointed end a piece of card of any desired shape and size may be attached and by suitable manipulation any part of the projected image may be covered effectively. Perhaps these details should come more properly in the chapter on making the bromide print, but as they can be, and are, definitely matters connected with control of the light-transmitting qualities of the negative I mention them here.

It will be realized that the application of red dye to the negative is useful only for decreasing the amount of actinic light which will pass through any given part of the negative. It is of no use if it is desired simply to make a small part of the negative print darker. This in practice is not nearly so often required, and occurs only when one

is dealing with a negative where the contrasts are too strong, one in which the highlights refuse to print with any tone. Several methods may be employed to correct this. Local reduction with Baskett's reducer is one. Methylated spirits rubbed on with a piece of cotton-wool will also reduce by friction in a similar manner though not so drastically. The red-dye method may be employed through the medium of a positive transparency from which a further negative is made after the application of the dye. This is a method I have employed effectively. In printing, too, an over-dense part of the negative may be made to print by means of shading the whole of the remainder of the projected image, using for the purpose a sheet of card in which a hole has been cut to correspond roughly to the area which is to receive extra printing.

I do not pretend that the foregoing methods are the only ones of negative printing control. They are the methods I use constantly, and throughout this book I am putting forward the methods I have adopted after many years of practical experience during which time I have experimented in all manner of ways. Later I shall mention some of the experiments that failed, because I believe that there is as much, if not more, to be gained from knowing what not to do as there is from knowing the right way.

CHAPTER III

THE BROMIDE PRINT

Its essential qualities and limitations of production

RULES and recommendations concerning the production of suitable bromide prints for bromoil might be simple if negatives could be standardized, but as even the most careful photographer produces negatives of considerably varying densities and contrast ranges for reasons often beyond his control, it is only possible to state what procedure is best when dealing with the perfect negative, and then to indicate ways and means for dealing with other negatives.

If possible the print should be fully developed, and by this I mean that, having been correctly exposed, it should be developed until the image ceases to darken perceptibly. The factorial method may be employed and in the case of a normal Amidol formula a factor of 8 to 10 will be found to produce full development. With Azol the image appears sooner but develops up more slowly after it has gone about half-way, and I find that a factor of as much as 12 can safely be used.

An idea of the negative quality which I find perfect for bromoil is conveyed most easily by reference to its response to the practical process of making a print from it on bromoil paper.

Exposure is to be sufficient to give, after full development, all the highlight detail visible in the negative. The darkest part of the print so made will be, compared with black, a decided grey.

The novice will find it helpful to print the rebate of the negative so that a strip on the margin of the picture will develop black. By comparing the tones of the print with this black edge it is a simple matter to judge the depth to which the darkest part of the picture has been printed.

There are, unfortunately, other negatives to contend with. The negative that is too soft for bromoil is rare, but when it does occur resort should be made to intensification, possibly local dye treatment, and then it should be printed and developed in the same way as

the originally perfect negative, care being taken to secure the very brightest print possible.

Negatives which show no tones or details in the highlights when printed as above, or, if they do, render the deeper tones too dark, must be printed and developed to a lower factor, even so low as 4 for the negative of extreme contrasts. Below this the middle and lower tones become degraded to such an extent that differential tanning in the subsequent preparation of the print becomes so negligible as to make pigmenting difficult and loss of tones probable. Experience alone will guide the worker in making a decision as to the most suitable factor for each negative, and I do not propose to go further into this aspect of the process in this volume, except to recommend careful study of those textbooks which have for their purpose the elucidation of all the elementary, as well as the deeper, problems of bromide printing.

Most of my prints are developed with Azol used at half the recommended strength, i.e. $\frac{1}{4}$ ounce to 12 ounces of water. Immediately development time is complete, the print is rinsed and placed in a bath of plain hypo, 2 ounces to the pint. After ten to fifteen minutes, during which time it is kept moving, it is placed in running water to wash for two hours. It is then dried most carefully by blotting till no surface moisture remains, and then laying it flat on a muslin net or on dry blotting-paper.

The temperature of the developer, the hypo, and the washing water is of importance. Developers work best at about 65° F., but a more important point is that the temperature of the developer, the, hypo, and the washing water should be approximately the same. As it is not practicable to warm the washing water the best method is to use everything at tap temperature, and to avoid making prints when it is so cold that the developer does not work properly or when it is so hot that the gelatine gets soft and sticky. This may sound rather like exaggeration, but I am passing on experience as I have found it, and I have had no difficulties in making prints, which subsequently inked well, with the temperature as low as 50° F. and as high as 75° F. When the temperature of the tap-water is between 50° and

55° I warm the developer and the hypo to five degrees above it. This difference in temperature causes no harm and is an advantage as the solutions work better.

When the print is quite dry the edges can be marked with a pencil line, or the corners pierced with a pin, making quite sure that it is marked off with the corners square. This will facilitate trimming after bleaching, for which process it is now ready.

The print, however, may be bleached immediately after washing, omitting the drying process.

An alternative method to that first described, known as the 'short' process, which will be enlarged upon in the chapter on preparing the print, is to omit the fixing after development, bleaching immediately after a preliminary wash.

Fig. 3 is a reproduction from a bromide print on normal glossy bromide paper, developed with Azol half strength to a factor of 15. The negative is one of the type I consider perfect for bromoil, and this illustration is intended to form a guide and basis for comparison with prints made on Kodak bromoil paper. The high factor ensured that development was carried to completion, and it will be noted that the deepest tone is far from being as dark as the black edge at the base, which represents the clear film and is purposely left for comparison. This absence of blacks is due entirely to the quality of the negative and not to incomplete development of the print.

Fig. 4 represents the print, of that part of the negative selected, on Kodak bromoil paper developed to a factor of 10. It has similar quality and is ideal for bromoil.

Fig. 5 is from a print which received 50 per cent. more exposure and was developed to factor 5. Viewed as a print without considering the details of its production it appears to possess qualities desirable for bromoil. In practice, however, it would be found that although it was easy to ink, the greatest care would be required as the darker tones would quickly lose quality and the middle tones would not show their subtle differences so well as would the print reproduced in Fig. 4.

The print in Fig. 6 received the same exposure as that in Fig. 5.

but was developed to factor 10. The tone values are more accurately rendered, but owing to the greater exposure, compared with the print in Fig. 4, the tone scale is inclined to be too long and it is definitely too strong a print to form a basis for pigment printing. Though the highlights may not, perhaps, be too dark for the subsequent requirements of bromoil, the deeper tones are too dark for the production, by ordinary methods, of a perfect bromoil transfer, perfect in ease of working and result.

Referring again to Fig. 4, this print, by virtue of its tonal quality and the method of its production, will, after bleaching, accept ink readily. There is, however, considerable latitude in the depth to which the bromide print may be printed and still give satisfactory bromoils or transfers. Extremes are given in the foregoing examples. A lighter print than Fig. 4, one produced by development to a factor of, say, 7, would prove quite simple to ink, and in the hands of some workers might be preferred. Similarly, it is possible to produce good pigment prints from bromide prints as deep, even darker, than Fig. 6, by means of ink modifications. Variations of this nature, and several other modifications of the process, will be described later.

Summarizing the above illustrations it may be said that, when dealing with a negative which itself possesses the correct tone-range for bromoil, exposure for the print should be sufficient to print the highlight tones when a factor is used for development which may reasonably be supposed to develop fully. Longer exposure is necessary only when a factor lower than that which gives full development is required on account of negative contrast.

CHAPTER IV

PREPARING THE PRINT

Bleaching—tanning. Alternative procedure

THE dried print, or alternatively the still wet print, now has to be passed through the bleaching and tanning process. If dry, it must first be soaked for five minutes, then drained. If wet, merely drained until it is free from excess water.

Copper sulphate is the reagent most commonly used for bleaching, and it is to be found in most recommended formulae, although I favour a formula containing cupric chloride.

A chromium compound is always used as the tanning agent, usually potassium bichromate, but sometimes chromic acid. The bleaching can be done first and the print drained and passed to the tanning solution. This method, called the double bath method, is recommended by some workers, but after numerous experiments combined with tests of most of the published formulae I have satisfied myself that prints respond best to subsequent inking if treated in a single tanning-bleaching bath.

The following is the formula I commonly use:

A	Cupric chloride	160 grains
	Sodium chloride	2½ ounces
	Hydrochloric acid	3 minims
	Distilled water	10 ounces
B	Potassium bichromate	55 grains
	Distilled water	10 ounces

For use take one part of A and one part of B and add two parts of water.

The following formula, used by several well-known workers, may be relied upon:

10 per cent. solution copper sulphate	5 ounces
10 per cent. solution potassium bromide	5 ounces
1 per cent. solution potassium bichromate	2½ ounces
Acetic acid (glacial)	8 minims

For use dilute one part with two parts of water.

For a ready mixed bleacher I recommend Sinclair's Bromoil Bleacher. It is handy to use and never varies.

It is essential that the solution shall flow over the surface of the print in one sweep, otherwise unevenness will appear later. Here again I favour keeping all baths at an approximately uniform temperature. The image commences to disappear at once, and after about one minute is only faintly visible. The deepest tones should be bleached in about two minutes, and the print is removed after $2\frac{1}{2}$ to 3 minutes' immersion, drained for about ten seconds, and placed in running water face up. Fresh solution is used for each print. The most satisfactory method of washing is running water in a sink, continually draining it away as it fills. Six complete changes in this way wash the print sufficiently for it to be passed to the fixing bath. During the washing process it is helpful to swab the surface of the print lightly with a large piece of wet cotton-wool. This accelerates the removal of the bichromate. If the print is to be washed in running water, but without completely changing the water every few minutes as advocated above, it should be washed for at least twenty minutes. The changing method takes but ten minutes.

The bleached print is now placed in a bath of plain hypo, again 2 ounces to the pint, and kept submerged, and moving therein for fifteen minutes. When several prints are prepared at one time fresh hypo should be used for each print, otherwise the changes which take place in the fixing solution, owing to the slight but continued addition of traces of bichromate, will cause a general tanning of the gelatine, which will make the subsequent inking difficult.

An alternative to using fresh hypo for each print, which I find quite satisfactory, is to use a very large quantity and to fix several prints at once. For example, I sometimes make several 20 in. \times 16 in. prints at one time and for these I use 25 in. \times 20 in. dishes, about $2\frac{1}{2}$ in. deep, and one gallon of hypo ensures satisfactory fixing without the risk of the trouble which might occur if several such large prints were fixed at the same time in a smaller quantity of hypo.

After fixing, the prints are placed in running water, and fifteen to twenty minutes' wash is sufficient.

If they are now to be dried, great care must be taken to remove all surface moisture before they are placed on muslin nets or dry blotting-paper. Large prints should not be pinned up as they stretch unevenly and do not dry square. If a single print has been prepared it can be inked up without drying, but in this case all the operations must be carried out to a careful time-table, otherwise overswelling may occur and inking will be almost impossible.

Transfers of the finest quality are made sometimes from prints which have not been dried after bleaching. Where the subjects have large areas of shadow or similar dark passages it may be better to ink without drying, but a perfect bromide print, properly prepared, will ink up just as well and produce just as good a transfer if dried and re-soaked immediately before pigmenting. Moreover, this method will be found more convenient by those who cannot spend whole days at bromoil work.

The print that has been prepared by the 'short' method mentioned in a previous chapter may also be inked without previous drying. For the rapid production of a bromoil or bromoil transfer the details of this method are worth attention.

By the method I am about to describe I have, under pressure, produced a finished 20 in. \times 16 in. transfer in two hours, from the negative to the exhibition print, but I would remark that such rushed methods should never be adopted as the normal working procedure of the bromoilist.

The chosen negative is enlarged on to a piece of 20 in. \times 16 in. bromoil paper. It is developed, fixed, rinsed and examined by daylight, and the times of exposure and development noted. Now proceed to make a duplicate. If the first one was not right, amend the times of exposure and of development to produce a satisfactory point. Instead of fixing, after development, wash the print for ten minutes in fast running water, completely changing the water every minute. The print will now be sufficiently free from developer to be bleached. I have not found a stop bath necessary or advantageous.

Now bleach the print (still with the orange safe-light as the illuminant) in the ordinary way. Follow by washing it (six changes, running water), then fix for fifteen minutes, ten to fifteen minutes' wash, and the print is ready for pigmenting.

These operations take approximately one hour, and the subsequent inking and transfer should be completed in a second hour.

A method of local control may be mentioned under the heading of this chapter.

Sometimes it is necessary completely to remove a tone from the print, to show a bare white patch when the print is inked which can be filled in by freehand methods on the bromoil or on the transfer. For this a very weak solution of potassium cyanide and iodine is used. As potassium cyanide is a deadly poison great care must be taken in its use and storage. The wet bromide print should be blotted until free of surface moisture. The cyanide and iodine is then applied to the object which it is desired to bleach away, using a brush, or piece of cotton-wool, when it quickly disappears. The print should be washed for ten minutes in running water before passing it to the bleaching-tanning bath.

This treatment is suitable for the removal of such objects as telegraph poles. It is much easier to add the pigment necessary to cover such erasures than to remove ink from the transfer once it has been applied.

Throughout this volume theory takes second place to practice, sometimes to the extent, even, of omitting the consideration of chemical facts or reactions which are, after all, but incidental to the practice, and therefore of less importance to the worker in the process than to those who, by patient research, evolved the formulae. And it is to the practical worker who is content to accept the findings of the research worker that this volume is addressed.

Nevertheless, before leaving this chapter on print preparation, and having stated the bare principles and mode of procedure, there are one or two points concerning bleaching-tanning formulae which should be understood by the practical worker.

Firstly, let us consider the functions of the formulae employed. The print is bleached with a view to the conversion of the silver image into a form suitable for its reaction with the tanning solution. The tanning, which takes place in the same bath, is proportionate to the silver deposit. The hypo bath which follows is for the purpose of fixing out the silver image which, having served its purpose, is no longer required.

Secondly, we should consider the conditions which are essential for these functions to be performed. There are many different formulae published for bleaching and tanning, but results from their use are similar, and for all practical purposes their minor differences may be neglected. The solutions should be made with distilled water, and if they are to be kept for an indefinite period, those formulae which are made up from stock solutions containing one reagent only, such as the second one in this chapter, may be preferable. Solutions A and B of the first formula appear to keep well for several weeks.

The small quantity of acid in each of the two alternative formulae given is present to prevent the formation of any precipitate which might be formed, due to impurities in the chemicals used, or impurities in the water used for dilution. Water in many districts is 'hard'. This 'hardness' is due to calcium and magnesium compounds in the water. Let us consider the changes which will take place when using the formulae given first in this chapter. Calcium bicarbonate is most commonly present in hard water and forms, with copper chloride, copper carbonate (which is insoluble in water but is dissolved by acid) and calcium chloride. Water containing calcium or magnesium bicarbonate is classed as 'temporary' hard water. Water containing the sulphate of either of these two elements is 'permanently' hard. The salts formed when permanently hard water is added to the bleaching solution are calcium chloride and copper sulphate, both of which are soluble, and therefore the change is not visible.

Two facts emerge from a consideration of these chemical changes which take place when impure or 'hard' water is used to dilute the bleaching-tanning solution:

- (1) Changes take place which may or may not be visible according to whether the product is soluble or is precipitated.
- (2) The changes may be harmful or not according to (a) the properties of the newly-formed salts, (b) the extent of their formation, (c) the extent to which their formation has weakened the original and essential components of the solution. (b) and (c) are, obviously, dependent upon the quantity of impurities contained in the added water, and this, for our purpose, can be reckoned in degrees of 'hardness'.

It is not necessary to go more deeply into these chemical matters. They are not of great importance to the average bromoil worker, who is never likely to come up against difficulties which, for their correction, call for such knowledge.

I mention this matter to record only the fact that chemical changes do take place, to an extent dependent upon the 'hardness' of the water. There may be, amongst my readers, some who choose to enlarge (or may have enlarged already) their knowledge of these matters. For those who have time available such research is interesting. I, personally, am one of those bromoil workers who believe that results are more dependent upon a careful observance of simple rules of procedure, such as are given in the first part of this chapter, and that these results would not have suffered had I been completely ignorant of the chemical reactions which occur.

Undoubtedly, the quantity of acid in the solution to be used for bleaching and tanning should be computed in relation to the alkalinity of the water. So far as the bromoil worker is concerned it may be reckoned that acid neutralizes the lime and other salts which (chiefly) cause temporary hardness and thus enables the tanning agent to do its work properly. The acid does not prevent the formation of unwanted salts, but it appears, in practice, that the acid neutralizes the effect of their presence. The quantities of acid given should be sufficient for water that is 10° to 20° hard. In districts where the water is so chemically pure as to be regarded as 'soft' (probably 1° to 4° of 'hardness') the acid may be omitted. Theoretically, perfect differential tanning, in exact proportion to the

silver image, may be ensured by careful attention to the efficacy of the tanning solution. A failing in this respect might become first noticeable in the delicate highlight tones, and any worker who feels that his bromoils or transfers lack something in highlight detail might do worse than investigate this aspect of his preparatory work.

CHAPTER V

PIGMENTING

Preliminary Soaking. Appliances. Brushwork and Control

IN the previous chapter three methods (or modifications of the normal method) of preparing the bromide print for the final stage of the operations which go to make a bromoil transfer were discussed. First, the normal or long method—develop, fix, wash, dry, bleach, fix and dry; second, similar, but omitting the first drying, and possibly the last drying; and third, the ‘short’ method, in which the first fixing is omitted and inking is done as soon as the print has been washed after its one and only fixing. The print prepared by the last method can, of course, be dried if it is desired to keep it for pigmenting at a later date.

Which method to adopt depends on circumstances, but the normal method, though longest, should be used whenever possible, as it is the most consistently reliable and unvarying. It also has the advantage that any number of prints may be prepared at one series of operations and stored for subsequent inking.

The next process, applying the pigment, is the same in its fundamental principles for all prints, by whatever method they have been prepared, so that no further reference need be made to print preparation except that dry prints must be immersed in water before inking.

I have already pointed out that the result of the tanning process has been to harden the gelatine in proportion to the original silver deposit which formed the visible image. Now when this prepared print, or matrix as it may be referred to in future, is soaked in water, the gelatine will absorb water in inverse ratio to the original silver content, because the more the gelatine is hardened or tanned the less will it absorb water, and the less it has been so affected the more water will it take up.

When the print is not dried before pigmenting, the degree of water absorption or swelling is dependent upon the time that has been

taken over its preparation, and the temperature of the solutions and that of the washing water. Prints so prepared, and immediately inked, will not always be in the same condition for inking unless these two factors, time and temperature, are standardized. The method has the disadvantage, too, that only one print may be prepared at one time.

In the case of the dried print we start, as it were, from the beginning, for the gelatine as yet contains no water.

Bromide papers vary, even paper made and sold specifically for the bromoil process varies; some makes taking twice as long as others to swell sufficiently. The best advice I can offer is to stick to one make. During years of working the process I have relied upon Kodak bromoil paper and have never found it to vary either in speed, quality, or response to after-manipulation.

Ilford is a make of bromoil paper having some very good features. It has a marked natural affinity for pigment, accepting hard ink more readily than any other paper I have tried. It parts with the ink equally readily, so is suited to the requirements of transfer. Care must be taken not to over-ink on paper of this make, and thin ink must be used with restraint. Because it takes ink easily it is a paper upon which control of tones and alterations are easily carried out. Fifteen minutes' soak at 65° F. brings Ilford paper into perfect condition. The amount of visible swelling is considerably less than that of Kodak paper similarly treated.

At 60° to 65° F. twenty-five minutes' soaking will bring Kodak paper into condition. When the water is colder, as in the winter, it may be an advantage to warm it to 65°. When, during a heat-wave, the tap-water is 70° or over, I carry on just the same, relying on ink variations which are controllable to correct any differences in working.

When I speak of a print being 'in condition', I should make it clear that I mean a condition that suits my own methods of inking. My methods, and my handling of the brushes are, I think, fairly normal, but it should be understood that the personal element comes into play strongly once the actual application of pigment commences, so that

bromoil workers have to work out details for themselves to suit their own methods. This accounts for the noticeable differences between the productions of one bromoil worker and another, and gives the distinction, at least, of individuality.

Later, the more advanced bromoilist can so command the process that he can, at will, produce pigment prints of greatly varying characteristics, and this is a great power in the hands of the worker, since he is able to treat any subject in the style most suited to it.

Nevertheless, the inking process is so dependent on the manual operations of the individual that the work of most well-known workers in the process can be distinguished anywhere, apart from the subject, by any observer who understands the finer technical points, and by many who do not, if they follow the exhibitions and salons.

It must not be supposed that Kodak paper (or any other make of bromoil paper for which longer soaking time is advised) cannot be pigmented after a soak of short duration, say ten minutes. It depends entirely upon the subject and the rendering desired. A short soak is permissible, even an advantage, for a subject that demands bold treatment, a subject that requires breadth and massing of tones, and does not depend upon photographic tone rendering of detail. The low swelling condition obtained by short soaking is often suitable for the production of effects of this nature, which are heightened by the coarse grain inseparable from the use of hard ink.

It is my endeavour in these early chapters to give the reader a working basis from which he may understand the principles involved in the bromoil process. In a later chapter this basis, which I term my standard practice, will afford a starting-point for the comprehension and comparison of variations of method, and of result.

Let us now consider the various appliances and tools which will be used in the final stages of the process. Of brushes it will be sufficient here to say that only those made and sold as bromoil brushes are of any use for the process. They are known as 'stag-foot' from their shape, made of fitch, imitation fitch, or hog's hair. The largest brushes have a working surface of about 2 in., and they are made in

all sizes down to $\frac{1}{8}$ in. Several brushes of various sizes are necessary, and if large prints are to be attempted at least one brush of the largest size should be available. The hog's-hair brushes are the cheapest, but although I have several of these I nearly always use the fitch brushes—they are not so hard on the soft gelatine and are altogether more 'kind' in use.

Pigment specially made for bromoil is obtainable from several makers. Hard ink is usually supplied in pots and soft ink in tubes. Colour will be discussed later. White glazed tiles, 6 in. square, obtainable from any builder's merchant, make useful palettes.

A large sheet of plate glass forms the working support for the print, and I, personally, use this tilted at an angle of 10° supported on a drawing-board. Over this at a height of about 15 in. I have a reading lamp with a daylight blue bulb and a diffusion screen arranged so that it throws an even light over the print with no direct reflection reaching my eye as I stand at the work. This enables work to be continued after dark without any appreciable difference in visible tone values or colour, which is a difficulty that arises when working by ordinary house lighting that has not been compensated for daylight nor arranged as described above.

On another bench I have a second sheet of plate glass, the use of which will be mentioned later.

Plenty of bench or table space is essential for the successful working of large prints.

Other odds and ends, all of which have their uses are: medium for thinning the pigment; a fine camel-hair brush for removing large hairs which may become displaced from the brush; plastic rubber for removing smaller hairs and other foreign bodies from the print, also for removing the pigment from any small area such as where there was a pinhole or scratch in the negative; a tea-spoon (use will be seen later); some paper stumps of various sizes; transparent paper as used by architects; one or two palette knives; a large wash-leather, and a screw-lid tin (such as a $\frac{1}{2}$ lb. Three Nuns tobacco tin) in which to store the leather to keep it moist; a steel straight-edge; a mount trimmer's knife; a two-foot rule; a supply of heavy-weight

blotting-paper, 20 in. \times 16 in. or larger; a celluloid set square; a celluloid 'Ensign' Composing Rule; a dish large enough to take the print to be soaked; water, if not laid on in the room; cotton-wool; a clock; turpentine; some means of spraying the turpentine (I use an aerograph, but a scent spray can be made to serve); transfer paper—the selection of papers upon which it is proposed to make bromoil transfers; and last but not least, the transfer press. Mine is the well-known Autotype Press and it does its work well.

These, with a few other items I shall mention later when I come to their special uses, are the things always to be found in my work-room.

Let us now imagine we are going to ink-up a print, something quite straightforward. If it is a large one, or in fact if it is anything larger than 9 in. \times 7 in., it will stretch sufficiently in the subsequent treatment of transfer to give us trouble unless we take steps to counteract this. So we take one of our sheets of blotting-paper, lay upon it a sheet of clean paper, such as a cheap machine-made cartridge paper, obtainable from any printer, and prepare this by spraying it with turpentine. About a drachm sprayed over a 20 in. \times 16 in. sheet suffices to give it a waterproof covering which prevents the soft moist gelatine sticking to it.

We now take the print from the water where it has soaked for twenty-five minutes, blot it between two sheets of clean blotting-paper, then lay it face downwards upon the prepared cartridge paper; lay a sheet of blotting-paper on the top and pass it through the press. The correct pressure to take out all the stretch can only be ascertained by trial, no definite rule can be laid down, but once it is found, the position of the adjusting handle can be noted and the same pressure repeated thereafter with the certainty that it will have the required effect. It is, as a matter of fact, about the same pressure as will be required for transfer, though transfers can be made with considerably less pressure when required, as I will describe later.

It should now be possible to remove the print from the cartridge paper without any tendency for it to stick, yet the pressure must of necessity have been great enough to leave a distinct impression on the

paper. Should it adhere to the cartridge paper, either the pressure has been unnecessarily heavy, or the paper was not sufficiently treated with turpentine. One object in using a paper such as machine-made cartridge is that, as it is a soft-surfaced paper, should the gelatine stick to it and need to be pulled away, it will damage the surface of the cartridge paper rather than the gelatine, and any of the substance of the paper which remains adhering to the gelatine can be wiped off with a wad of wet cotton-wool. If we had used a hard-surface or hand-made paper the reverse would have happened, the gelatine adhering to it would have been pulled away from the paper base of the bleached print we had fondly hoped to ink up.

The stretched print or matrix is now immersed again in the water-bath for a minute or so, then placed flat upon the glass plate upon which it will be pigmented. It is essential that no air be trapped beneath the print; that it makes contact with the glass over its whole area. We have now to remove every particle of surface moisture. This is best done with a damp wash-leather folded in such a way that it presents an even surface to the print. Twice over with this, using some pressure, will remove all surface moisture, but, in the case of a large print, though it is drained before it is placed on the glass, it will be found that any water under the print will work its way towards the edges and care must be taken to mop this up, otherwise (as the print has been trimmed before soaking and requires therefore to be inked right up to its outside limits) particles of water will be taken up by the brush and deposited on the surface of the print, and will form white spots. It may even be found that the slight squeegee action of inking will gradually force water out from underneath towards the bottom of the print, and this must be mopped up before inking that part.

Nothing is to be gained by placing the print on a sheet of damp blotting-paper instead of on the bare glass. This practice is still more conducive to the same trouble and does not, as some imagine, help to keep the surface of the print in condition. The water held by the gelatine evaporates much faster than it can possibly be taken up from damp blotting paper below the paper upon which the gelatine rests.

However, with the room temperature at 65° F. it should be possible to ink for twenty minutes at least before there is any need to resoak because the print has lost condition.

When all surface moisture has been removed we can prepare the pigment. There are several makes of bromoil pigment on the market and in many colours. In blacks and browns there is great variety to choose from. I have found them all satisfactory though some are distinctly too soft for my normal methods. Some makers supply hard ink in pots and a soft ink of the same colour in tubes. Others supply their hardest ink in tubes, and this is never so hard as that supplied in pots. Where ink is supplied in tubes, of one consistency only, bromoil medium is required for thinning the pigment. Where it is supplied in hard and soft grades, the latter are used to thin the former. I strongly advise beginners to commence by using hard ink in pots and the ink of the same make and colour in tubes for thinning.

When, however, thinning of the pigment is to be done with a medium, two aspects of its quality should receive attention. Firstly, it is advisable that the medium should be of the same make as the ink, and secondly, if transfer is intended, it should be a moderately slow-drying medium. Suitable media are supplied by the pigment manufacturers.

A medium I use, almost exclusively, is Canada Balsam. This has very little thinning effect upon the ink, in fact I do not regard it as a medium for reducing the viscosity of the ink. I find that a very small quantity added to the ink improves its working quality in such a way that pigmenting is done with greater ease. Pigment that is easily applied is easily transferred so that, when transfer is intended, anything that is conducive to the former will help the latter.

It cannot be too strongly emphasized that to ink successfully when one has not had a great amount of experience, it is necessary to stick to one method. We will proceed, therefore, to ink up the print in hand in, what is I think most bromoilists will agree, the most straightforward way. Take a small portion, about the size of a pea, of the hard ink and spread it on the palette. If it is one of the varieties

supplied in pots it is almost sure to need a very little of the soft ink of the same colour before it can be expected to work. When mixing ink, use the palette knife; mix well by repeatedly spreading, re-collecting on the knife and spreading again. When it has been mixed spread it out flat. This should be done in one corner of the palette. During the time occupied by this operation the last remaining particles of water on the surface of the gelatine will have evaporated and the print will have had a chance to come to the same temperature as the atmosphere in the work-room.

Now take the largest brush, pass it over the palm of the hand several times to flick off any particles of dust or loose hairs, and place it gently down on the ink so that the front or longest hairs take up most ink and the back part practically none. Now dab it several times on a clean part of the palette.

Next place the brush upon the print in a similar way, quite lightly; lift it off. Repeat this twice or thrice. If all is well, the part of the picture under the brush should appear, though perhaps only broadly. This is repeated all over the print, which should work up easily without thumping or effort of any kind. A method I have adopted which facilitates covering a large print quickly is to apply the pigment with a large, soft, imitation fitch brush, covering evenly and working only just sufficiently to deposit pigment as the tones of the picture. Then I take a soft but slightly more springy brush (a real fitch) and work over the print, adding but little ink to that which is already there, putting all but the lighter tones into their proper places. It should, I think, be pointed out that, if the preparation has been in every way correct and all conditions are now perfect, the pigment will take at once in its proper place and only very light dabbing, and that of very short duration, will be required. Fig. 7 illustrates the appearance of the print at this stage.

It is seldom, however, that this first application of hard ink will finish the print, probably the highlight detail has not come up at all and the deeper passages are not dark enough. Thinner ink must be employed, and if the print is not a large one this further inking may proceed at once. If the print is large it will be advisable to resoak it

for a minute or two and then repeat the surface-drying process. By thinner ink I mean ink similar to that we have just used, with the smallest addition of thin ink well mixed in. If we are using an ink supplied in one consistency only, a minute quantity of medium should be added to thin the pigment. Now we proceed, much as before, quickly covering the print again, and this time there will be a marked difference. The tones towards the top of the scale will show and the lower tones will become considerably darkened and more subtle tones within these tones will become noticeable.

Fig. 8 illustrates the completion of this stage of the inking process, and in the case of some subjects this once-thinned ink may so correctly render all the tones that no further inking is necessary. Often, as in our example, it is necessary to go over the print again, once more thinning the ink slightly, or it may be necessary to go over only parts to bring out highlight tones, or in other cases to deepen shadows. In our example the lower tones have attained sufficient depth from the first-thinned pigment and in the application of more ink care must be taken not to over-ink these parts. Dark passages will readily accept soft ink, in fact they will go on doing so until all detail becomes lost, the tones just above the darkest rapidly catching up with them. It is possible by continual thumping with the brush to bring out lost detail in dark parts, but quality is lost, and the ink is so embedded in the gelatine (which here contains but little water) that transfer of the ink (or most of it) becomes impossible and no semblance of the tone values is apparent in the transfer.

Also it must be remembered that in transfer all the ink deposited on the highlights will be transferred, whereas a residue will be left in the shadows so that the bromoil for transfer will appear a little more contrasty before transfer than will the transferred print. By this it must not be imagined that it is necessary to get the dark parts deeper in tone than they are required to appear, on the contrary it is the highlights that we must look out for, keeping them absolutely clean; and by clean I mean carrying only just that amount of ink which will, in the transfer, reproduce the proper values and detail. A surplus of ink on the highlights may be unnoticed on the bromoil, but it

will degrade the transfer. A surplus to a limited extent upon deeper tones will not matter. Fig. 9 illustrates the result of the final inking before transfer.

Correct brush action is not easy to describe, in fact I feel that it can only be learned from practice. If the brush is gently placed on the print with just enough pressure slightly to bend or spread the hairs, then as lightly removed, ink will be deposited. This action repeated slowly several times will put on all the ink of any given consistency that the print is capable of taking. In time this action can be done quite rapidly, but should be done slowly until the worker is fully accomplished.

A slightly more jumpy, dabbing action will increase contrast by removing ink from the lighter tones and depositing it in the deeper tones. A more drastic action known as hopping removes ink except from the deepest parts. Hopping is no use to the transfer worker, and in any case, if used habitually, is an admission that the originals are unsuited to the bromoil process, or have not been correctly prepared.

If a print, or part of a print, has been over-inked (due, probably, to the ink being too soft), hopping may be made to remove some of the excess pigment; and may bring back some of the lost detail, but the result, when transferred, will be disappointing, especially if the hopping has been at all extensive or prolonged. Where the hopping took place, the pigment becomes embedded in the gelatine and less pigment will be transferred from these parts than from the parts where the inking has been of a more spontaneous nature. The texture of the pigment, too, is altered by hopping, and there is an absence of true tonal quality.

The inking process may have resulted in a few hairs and dust particles remaining on the print. The large ones should be removed with the fine camel-hair brush, slightly damped, and all other spots removed with the plastic rubber worked into a fine point. Do not worry if this process results in a number of small white spots, they are easily retouched in the transfer.

The inked print can now be transferred, but before we pass on to

the chapter on transfer there are a few more points about the actual inking part of the process worthy of further consideration.

The foregoing has been a straightforward piece of inking with a view to single transfer. Nature may be beautiful, but it is seldom that the picture cannot be improved by some slight alteration or the removal of some unwanted object. Very drastic alterations can be made but are best avoided unless one has had artistic training. Nevertheless, methods of control in pigmenting come within the province of this chapter as the methods of control did in the chapters on the negative and the print.

The fact that the softer the ink the more readily will it be accepted on the swollen gelatine gives to the bromoil worker a great (and often abused) power. An unwanted highlight may be toned down by the local application of soft ink; how soft the ink should be depends upon two things, the natural tone and how much deeper it is intended to reproduce it. If it is an extreme highlight and it is required almost to blacken it, the ink will have to be very considerably softened. If it is a middle tone, and is required only a shade darker than it naturally prints, then only slightly softer ink will bring about the desired result.

Whether by chance or not I do not know, but I possess a number of large brushes each one of which has some peculiar characteristics if used in some particular way, of which, with constant practice, I have learned the value. One fitch brush, for instance, is much harder than all the others and when used in the right way is a most excellent brush for enriching the darker passages of a print without clogging up shadows, and is best so used with the hardest ink only. It is of no use at all for producing highlight detail or tone; it just takes all the softer ink off however it is used.

Another fitch brush is delightfully soft and spongy and is ideal for getting, with great ease, the finer detail of the highlights. Another, originally a $\frac{3}{4}$ -in. brush has spread to about $1\frac{1}{2}$ in. and is an ideal brush for the application of a fine deposit of the thinnest ink for such purposes as giving breadth to a subject or overcoming jumpiness.

Another, a very old fitch brush, has become very flattened and has

lost all its springiness, but it makes an admirable sweep. By running it over a print once it will, if desired, remove surplus ink from highlights and middle tones in a way that no other brush will do.

I mention this point about the behaviour of brushes believing that mine cannot be an isolated case, and it is a power that is worth full realization.

If any tone in the original requires to be lighter in the finished picture it should have been restrained by one of the methods advocated in the chapters on the negative and the print. The most that can be done satisfactorily in the pigmenting stage is to restrain the inking over that part, but to do this and still get the correct tonal values and detail within the area so restrained is not easy, particularly if single transfer is to be adopted.

A good plan, particularly if alterations are to be made in the pigmenting, is to have a guide print pinned up whilst inking up the bromoil. This guide print should be made from the negative exactly as it was when the print was made for bromoiling, and any alterations to be carried out in inking may be indicated on it roughly in pencil.

If the bromoil, during inking, has, as sometimes happens, become covered in places with an excessive number of small bits of hair or other foreign matter it is best to remove the print to the second sheet of glass and to swab it lightly with cotton-wool. This will, if done properly, remove all foreign matter without disturbing the pigment. It is then replaced on the inking-glass, remopped with the wash-leather, and any final work carried out. The same procedure may be adopted to remove all the ink from the print except the darker tones. The ink is simply washed off with cotton-wool and plenty of water. This may come in useful if a print has been inadvertently inked up with ink too soft, but this method of cleaning helps only the higher-middle tones and highlights. Ink cannot be so removed from lower tones.

The wash-leather used for mopping should be wrung out periodically, but it must always be used damp; if it is at all dry it removes ink, when damp it will not touch the ink. A wash-leather is far more effective for removing surface moisture than any blotting-paper, and

the latter is sure to remove ink from shadows if enough pressure is used for it to be effective as a moisture remover.

Another method of local ink removal, should it be needed in spite of all the advice to avoid the necessity, is local transfer. Take a piece of transparent paper, such as architects use, and lay it on the part of the print to be reduced. Then gently press the flat of the handle of a teaspoon on the area, which can easily be seen through the paper. This takes off some ink, and if repeated with clean paper more will come off. Usually, too, this method pulls the gelatine film away from its paper base, thus forming blisters which may or may not cause trouble later.

Referring again to the illustrations of the three inking stages, Figs. 7, 8, and 9 (which, by the way, are reproduced the normal way round, not reversed for transfer, so that comparison with the transfer reproduction—frontispiece—may be simplified), the print (Fig. 7) was first lightly inked with the large soft brush mentioned above. The pigment was accepted in the proper place from the first. The initial application of ink completed, the print was gone over with a fresh brush lightly charged with the same ink. Some workers prefer a large hog's-hair brush for the first inking. The second brush used was kept lightly charged from the deposit of ink on the palette made by the first brush—just sufficiently charged to ensure that its action tended to apply ink rather than to remove it. The print was then photographed for the purpose of the illustration, and Figs. 8 and 9 illustrate the two subsequent inking stages.

I have referred to the method of inking just described as a straightforward way of inking a print. Other, slightly different, ways may be equally straightforward, but I regard the method outlined as one which allows for considerable latitude in print condition, and one that is least likely to result in errors in the early stages of one's bromoil experience, and therefore suitable as a first exercise for the beginner.

The brush action described for the application of pigment, in fact the whole procedure, is calculated to bring about the desired result slowly, step by step, and without necessity for haste.

Inking can be done very much more rapidly when the worker has

had sufficient experience to know, before commencing, that the condition of the print, and the consistency of the ink, will form the perfect combination necessary for rapid pigmenting. When this perfect combination of conditions exists, the first application of ink may be made with more deliberation; with considerable freedom, using a brush fully charged with hard ink, without fear of over-inking. The condition of the matrix is such that the ink is 'offered' to it rather than 'applied'. From a fully charged brush a correctly swollen matrix accepts the pigment spontaneously in the lower tones, almost without brushwork. The lighter tones are worked in with slightly softer ink and a brush only lightly charged.

This method of inking (mentioned here as an example only, variations being discussed fully in subsequent chapters) may well be considered by any worker who has mastered the technique of print preparation, to be a perfectly straightforward method of inking. Nothing could be simpler when it works well. I feel, however, that the beginner should master the method I have described, and illustrated in Figs. 7, 8, and 9, before attempting any variations.

CHAPTER VI

PIGMENTING (*continued*)

Variations of method to produce controlled variation of result

BEFORE passing to the subject of transfer, there are several details concerning pigmenting which call for consideration.

The normal and proper sequence of operations according to my standard methods must be broken to allow for the elucidation of technical points, and descriptions of variations from the normal. Similarly, it is impossible to deal with every detail of pigmenting practice without occasional reference to transfer, the details of which have not yet been described, but which come in a later chapter.

The relationship between swelling time, temperature, and ink consistency is a matter of some importance. Broadly speaking, the greater the degree of swelling of the gelatine the thinner will the ink have to be. The trial and error method is the only way by which the beginner can ascertain, beyond doubt, the best combination of the three factors.

Theoretically, there are two basic methods of working: (1) to suit the degree of swelling of the gelatine to the ink; (2) to suit the ink to the condition of the print. I think all experienced bromoil workers are agreed that the former is the best basis to work upon, but in actual practice I, and most workers I believe, use what amounts to a combination of the two, but in accordance with a predetermined schedule of variations.

The bleached print is soaked for a predetermined time at a predetermined temperature. Some vary this temperature according to the air temperature. Certainly in very hot weather it may be advisable to raise the temperature of the water above that used in normal or cold weather. This procedure is adopted to counteract the ink variation which is bound to occur, as the pigment is harder in cold weather than in hot. I have found it better to control the temperature in my work-room and always keep it between 65° and 70° F., which is not difficult during nine-tenths of the year.

Thus my first water bath is normally 65° F. and soaking time twenty to twenty-five minutes. Now the only possible variable is the ink, and only practice can make this point clear. It must suffice here to say that it is hard, hard enough to require some pressure to spread it on the palette. After the first application of pigment comes the procedure which I have described as predetermined variation to suit the ink to the print. If the first inking has not completed the picture to the worker's satisfaction, one of several operations will take place according to the indications of the particular print. It may be that a further application of the same ink is all that is required and, in this case, a further brief soak in water at 65° F. is all that is needed. It may be obvious that a thinner ink will be needed to bring out the highlight tones. If so, a five minutes' soak in water 5°, or sometimes 10°, higher may be necessary to prevent a general degradation of tones when the thinner ink is applied. In this way the print has been suited to the ink, for, fundamentally, thinner ink means more swelling.

And, although it may be said that the ink has been suited to the condition of the print, it has not been a haphazard, hit-and-miss procedure. On the contrary, the ink is thinned because it was found necessary to increase the swelling of the print, which is a very different thing from swelling a print and trusting to ink variations to get it working satisfactorily.

The reader may think this is all very vague. I agree it is. But in dealing with such details of such a variable process it would not be really helpful to attempt more than an outline of the basic principles. One may say that an experienced worker adapts his procedure to the needs of each print he makes. To make bromoil a cut-and-dried process, set to rule-of-thumb methods, would certainly be possible, but, and this point I wish to emphasize, by so doing much of the attraction and advantage of the process would be gone. I think it better to indicate the lines upon which those seeking advancement in the process should work, so that, in working out details for themselves and trying to make the best of each picture, they will be developing their own style.

Thus I speak broadly and say that if detail which was visible in the bromide print does not come with the ink you are using, a thinner ink should be tried. If this degrades the whole picture you have thinned the ink too much for the degree of swelling. If, in the commencement, ink will not adhere to the print or if it does so a little and is quickly picked up again by the brush then the ink is probably too hard, unless the print has been grossly overswollen, in which case the fault lies in the water temperature. I have known a print so grossly overswollen that ink, of any consistency, when applied in the ordinary way, worked up as a negative image, and only by prolonged and hard brushwork was the ink made to 'take' properly.

Bromoilists vary in their opinions as to what constitutes a perfect working matrix, and descriptions of that condition also vary. This is natural because a condition which is 'just right' to one would not work satisfactorily under the brushwork of another. Those differences are small matters and a condition which suits the individual is soon found by trial.

I must confess that I do sometimes find my print does not work perfectly, but there is no cause for discouragement in that. I have produced numbers of exhibition pictures under such conditions; and I have often found that the print that gives a little trouble in inking, which does not work with mechanical ease and precision, produces, in the end, a satisfactory result.

I would describe the 'feel' of perfect ink condition (in combination with perfect print condition) as a noticeable stickiness of the ink. It adheres to the print according to the tones of the picture with great ease, almost spontaneously. Where it is thickest on the print it feels rather of a 'gluey' nature. There is a decided feeling of drag as the hairs of the brush are lifted off the print.

To sum up the matter of ink technique. If the gelatine is insufficiently swollen the hard ink will not 'take' with any degree of ease; if it is forced on it may be accepted, but not in true accord with the tones of the picture, and it will show excessive grain. Thinning the ink will only make matters worse. The remedy is either to soak the print longer at the same temperature, or to soak it at a higher

temperature. The probability is that it has not absorbed all the water possible at the starting temperature, but if further soaking at this temperature is not effective the temperature must be raised.

If the gelatine is overswollen, that is to say, overswollen for the hardness of ink it is intended to use, that ink will 'take' only in the darker parts. The remedy is to thin the ink, very gradually, until it is found that most of the tones are reproduced.

Presuming now that the worker has determined the correct temperature and time for soaking, and, on commencing to apply pigment, finds that the image comes up with considerable ease but with no depth, and appears flat and of a muddy colour instead of rich black or brown black, then the ink is too soft.

Quite the safest way for the individual, once he has standardized his time and temperature by trial, is to commence inking with pigment which is distinctly hard, perhaps too hard, then to gradually thin it if and as necessary.

To illustrate some of the foregoing points four partially inked prints are here reproduced. Fig. 10 is from a print which, instead of soaking at 65° F. for twenty-five minutes (my standard), was soaked for only ten minutes, and inking was then commenced with the pigment I know by trial to be correct for my standard procedure. Fig. 11 is from a print which was soaked at 75° F. for thirty minutes (i.e. deliberately overswollen) and again the same ink was used. For Fig. 12 the print was soaked for twenty-five minutes at 65° F. and inked with pigment which was too thin.

In every case inking was not carried beyond the first stage, as my object was to show just how the pigment appeared after two or three minutes' brushwork under the varying conditions described. For comparison the fourth print was soaked at 65° F. for twenty-five minutes and pigmenting commenced with the same ink as for Figs. 10 and 11, ink which I knew to be correct for this degree of swelling. This, likewise, was worked only for two or three minutes (Fig. 13). In this there is a noticeable but pleasing pigment grain; all tones show signs of formation; the darker passages have not become blocked-up with ink and have not lost detail. In other words, the pig-

ment image is of similar tones to the original silver image, though, when inking has been completed and full depth gained, the tone-scale will be longer than that of the original bromide print.

In the case of Fig. 10, which received only ten minutes' soak, the result is rather more granular: the lighter parts would be represented by a grainy deposit rather than the true detail of the image if an attempt were made to complete the pigmenting in this undersoaked condition. All this is due to insufficient differential swelling. Fig. 11, the overswollen print, is distinctly coarse-grained. Great depth is readily obtained in the shadows and detail therein quickly lost. The middle tones are deficient and the highlight tones absent. By softening the ink until it suited the high swelling, a good bromoil could have been made. The possibilities of high swelling in combination with soft ink will be considered later.

The third example of this series (Fig. 12: the use of too soft ink for the degree of swelling) illustrates the degradation of tones which at once takes place under such conditions. The pigment is readily accepted, the darker parts quickly clog up and lose detail. All the highlight tones are quickly formed, but much too much ink is deposited. The resultant transfer is far worse in these respects than the bromoil appears before transfer. In it there would be no tone variations in the shadows, and the highlights would appear many tones too dark. By continued brushwork it is sometimes possible to produce a passable bromoil with ink which is inclined to be too soft, but not a transfer.

The finished 'exhibition' transfer, 'The Harbour Steps' (Plate XI), is an example of straightforward, practically uncontrolled, inking. The transfer was made by two impressions, because when inking a large print I find it better to work in stages, than to attempt a transfer of full depth from one application of pigment.

Before leaving the subject of correct soaking times and ink consistency it should be pointed out that it is very useful to be able to produce, at will, the effects here illustrated as faults. For instance, we may have a subject which it is desired to treat very broadly, producing a quite sketchy effect in a coarser grain. Either overswelling

or underswelling, accompanied with the use of hard ink, will produce such an effect, in varying degrees. No subject dependent upon highlight detail should be treated in this way.

The use of ink that is too soft for the degree of swelling is not of much value except as a final inking after a good, strong image has been produced with ink of the correct consistency. Then a restrained application of soft ink quickly applied without attempting to work it in will often add breadth and quality to an otherwise jumpy or spotty composition. Skies can sometimes be worked in with the help of an ink softer than is required for the rest of the picture, but it must always be remembered that too drastic thinning of the pigment results not only in degradation of tones but also in a change to a warmer colour. ‘The Fishing-boats Return’ (Plate XII) is an example of coarse grain deliberately produced. Here the bleached bromide print was considerably overswollen (as compared with my normal practice), and the pigment used was the hardest that would take readily without any forcing. It was applied with a fully charged brush, and the transfer reproduced is from a single pull on thin Japanese paper. The suggestion of cloud was worked in whilst pigmenting.

‘In Harbour’ (Plate XIII) is an example of coarse grain produced by inking with hard ink after the print had been soaked for ten minutes only at 65° F. A low swelling condition is one under which very hard ink, applied with a large hog’s-hair brush, is readily accepted, and the actual pigmenting of this, a 10 in. × 8 in. print, occupied about ten minutes. It will be observed that the highlight tones are broadly suggested rather than actually reproduced. The subject is one for which such treatment is suitable, as it depends more upon the broad effect of its composition than upon pure photographic detail.

The bromoil worker has complete mastery over texture. This may be seen, not only from these two examples, but from a careful comparison of the plates illustrating this volume. Compared one with another many differences of texture and general appearance will be seen. These differences are dependent upon the preparation and manner of pigmenting, as I have shown. They are dependent also

upon the surface quality of the paper upon which the transfer is made. The right combination of pigmenting method and transfer paper will result in perfection, or at least, in the desired effect. Papers suitable for transfer are, however, so numerous that in this volume I can only attempt to indicate the general principles that govern the appearance of the finished picture. Every picture attempted should be regarded on its own merits, and an effort should be made to decide what treatment will suit it best before commencing work.

Reproduction in this volume on a considerably reduced scale, and the absence of the actual surface of the transfer, causes certain loss and makes the illustration of purely technical differences less evident in the reproductions than it would be from a comparison of the originals. I think, however, that differences of texture and pigment quality are evident enough to be seen and realized.

To some extent swelling temperature and ink variations are dependent upon the depth of the bromide print, and the tones to be reproduced. For example, the bromide may have been a light grey one, full of subtle tone variations and detail in large areas of highlight (a whitewashed cottage for instance) such as would be produced from a soft, thin negative. With this print I should commence with a soaking at 65° F. and an application of hard ink. Subsequently it would be necessary to increase the swelling temperature to 70° F. or even 75° F., and then to use a considerably softer ink to bring out the highlight tones.

Such a print, if it is one not having highlights containing delicate tone values, may often be inked completely with hard ink at the lower temperature. Normally the harder the ink the more grainy the print, and for some subjects this typical bromoil grain is excellent. Nevertheless, repeated impressions with hard ink, applied in 'small doses' by means of multiple transfer, will result in a most pleasingly soft effect with a close grain, typical of the process, but quite unlike the more photographic renderings which come from the use of softer inks, and quite different from the more granular one-impression, hard-ink transfer.

A method adopted by some well-known exhibitors of bromoils

of exquisite quality is that known as the soft-ink method. It is extremely difficult to get good transfers by this method, but an adaptation of it is possible, and, as it can result in bromoils of such fine quality, it deserves full consideration.

The basis of the method is to produce such a high degree of swelling that soft pigment (much softer than I have advocated so far) is necessary for the correct reproduction of the photographic image.

The bromoil paper is soaked at a high temperature, until the relief is many times greater than for hard-ink work. In the case of Kodak paper soaking for forty minutes and over at 95° F. will bring about this relief. Pigmenting is then carried out with a soft ink such as Encre Taille Douce or a similar easy-flowing pigment. The picture builds up rapidly and with great ease. If brushwork is carried too far and too much ink is applied the darker parts quickly clog up. 'Cornish Fishermen' (Plate XV) is a bromoil produced in this manner. Such a bromoil, though apparently satisfactory so far as depth, contrast, and brilliance are concerned, produces a weak, flat transfer. This is probably due to the soft ink not having sufficient 'body' to give richness when impressed on to another sheet of paper. It is not due to any difficulty in making it all transfer. Under ordinary pressure only the normal residue of ink remains on the matrix, just a faint impression, and that only in the darkest parts.

To obtain sufficient depth and still to retain the advantages of soft ink (extreme ease and speed of working) a modification is necessary. Some hard ink must form the basis of, at least, the deepest tones. This may be done in several ways. The print may first be inked with hard ink after a soak at normal temperature, reproducing only the darkest tones, and subsequently proceeding with the soft-ink method described above. Alternatively, and better, I think, the hardest ink that is accepted by the darkest tones is used after an initial soak at the high temperature required for soft-ink methods. A hard ink will 'take' but not, of course, so hard as the hard ink used when lower soaking temperatures are employed. As soon as a foundation has been laid in this way the soft ink is applied. 'Cottage Roofs' (Plate XIV) is from a transfer produced by this method.

Another method to bring about the same result is to transfer the hard-ink 'foundation' before applying the soft ink, transferring the latter afterwards. This method may be applied whether hard ink is applied after a normal soak or after a high temperature soak.

Some may ask why the soft-ink method is not more often used. The reason is that it depends too much on the skill of the worker. The pigment is readily accepted, apparent good depth is quickly obtained, it is excellent as a bromoil—but when transferred apparently rich bromoils are flat and lifeless. Even with the modifications suggested results are not dependable. Moreover, over-inking, when using soft ink on a highly swollen matrix, occurs far too readily and it is not easy to remove it, particularly from the darker parts, and if removed, the fine texture of that part is altered.

The gelatine of such a highly swollen matrix is easily damaged, and is far too fragile for the multiple-transfer method; and the highlight parts, which have but little ink, almost invariably stick to the transfer paper even after treatment of the paper with turpentine and, on stripping the matrix, either the surface of the transfer paper or the gelatine is liable to be damaged, if not entirely pulled away.

The best advice I can offer to those who wish to adopt the high-swelling soft-ink method is to keep their bromide prints distinctly on the light side; the tone scale can be raised, the darkest parts being lighter than for the hard-ink low-swelling method, and the whitest highlight not a shade darker than is necessary to reproduce its detail. Should it be a pure white it can be rendered so in the bromide print.

Undoubtedly very fine results are obtained (usually as bromoils) by the soft-ink method and the purest photographic quality is obtained, but the disadvantages of a highly swollen gelatine matrix are very considerable and I strongly advise the transfer worker to stick to the normal hard-ink method, modifying the procedure by means of gradual temperature increases accompanied by slight ink softening, according to the requirements of the subject. As I have never made bromoils except for transfer (with the one exception of Plate XV produced to illustrate this volume), I have not made a practice of the soft-ink method or any modification of it requiring what I consider

excessive swelling of the gelatine. I believe, however, that there is much to recommend it to the worker who does not contemplate transfer.

The transfer referred to above (Plate XIV) will serve a better purpose, perhaps, as an example of control or modification of tone values, so for comparison the straight bromide print is reproduced (Fig. 14). The transfer being a single pull, the strengthening of the foreground houses, to give a feeling of space and to overcome the flat, all-in-one-plane appearance of the original, was carried out during the one inking operation. This print was pigmented in whole-plate size. Had it been a large print the multiple-transfer method would have been employed as being more suitable for obtaining the desired alterations. This subject is dealt with fully later. If an author may criticize his own work, I would point out that emphasis of the zigzag line made by the foreground houses, and repeated in the distant cottages, is the feature of this picture, and was the obvious treatment required.

To any critic who considers that in this print the foreground roofs and chimneys are too heavy, and that too much detail has been lost, I would reply that to some extent this may be so, but the fault (if it be one) is the result of the use of the soft ink which is necessary to increase depth locally when making single impression transfers. In a succeeding chapter I shall have more to say on this matter, and my critics will then see that this aspect of the print 'Cottage Roofs' gives emphasis to the contention I put forward in that chapter, that such alterations are better carried out by means of multiple transfer, which does not necessitate the use of softened pigment.

One more, and the last, variation in pigmenting procedure is worth mentioning; a method I have employed with satisfactory results up to a point, but with no marked advantages over normal methods. I refer to what might be termed the 'mixed-ink method'. The basis of the idea is to use the matrix as a sort of palette, using both soft and hard ink at the same time and intermixing them during the inking process. A highly swollen gelatine is advisable. On one palette is spread hard ink and on another soft ink. On the few occasions when I have pigmented in this way I have first applied soft ink over the

whole area of the print. A flat but photographically exact image is quickly produced. The next step is to build up the picture according to the worker's preconceived idea, using hard ink where depth and contrast is wanted and soft ink where the reverse is required, not necessarily the hard ink alone, or the soft, but mixtures of them by means of a dab from the hard and a dab from the soft. A thorough mixing of hard and soft pigment takes place on the matrix, but the worker has considerable mastery over local tone values; and for great control in bromoil this method has something to commend it, but I have not found it reliable for transfer.

CHAPTER VII

T R A N S F E R

Single impressions. The press. Transfer papers

FOR the purpose of explaining some of the essential details of transfer, let us presume that we are about to complete operations with the print inked up to the final stage (Chapter V, Fig. 9).

Inking and the final cleaning of the print has just been completed and the print is still resting on the glass support. The sheet of paper chosen for the transfer, smooth hand-made of medium weight, we will presume, is placed upon a sheet of blotting-paper. On such a paper it is possible to obtain perfect transfer without preparing the surface in any way, but even when preparation with turpentine spray is not required for the purpose of waterproofing the paper, its use is a great advantage; it gives the paper a natural affinity for oil with the result that the transfer of the oil pigment from the matrix is made with considerably greater ease than were the paper not so prepared. And the less the pressure that is required when rolling the delicate matrix through the transfer press the less is there likelihood of trouble. Some of the troubles that might occur in this part of the manipulation will be described later.

So we spray the transfer paper with turpentine. The amount depends upon the nature of the paper but, in the present case, the paper being of the hard surface hand-made variety, one cupful of the aerograph hand-piece will suffice.

The inked print is now picked up by two of its corners and laid face down on the prepared paper.

It is essential that this be done in one deliberate movement so as to avoid any tendency to smudge the ink.

If the print is marked previously on the back at the top edge to show the half-way line, and the Ensign Composing Rule is laid along the top of the transfer paper with its zero mark in the centre of the paper or a pencil mark is made to show this point, it is quite an easy matter to lay down the inked print squarely and in the centre.

Now lightly blot off any excess moisture. A second sheet of the heavy-weight blotting-paper is placed on top but it should not coincide with the bottom sheet. The 'sandwich' is now composed of two sheets of blotting-paper, the transfer paper, and the inked print, all arranged in such a way that the edges form steps (rather than coinciding), to facilitate its passage between the rollers of the press. The press, if it is an Autotype, is furnished with a pair of zinc sheets riveted at one end. The 'sandwich' is placed inside these without removing the zinc sheets from between the rollers but by sliding them along until the riveted end is under the rollers with the rivets one side and the rest of the sheet the other. See that the sheets lie square with the rollers, and insert the 'sandwich' or pack similarly squarely.

The correct pressure to obtain complete transfer (except for the normal residue in the dark tones) can, in the early stages of one's transfer experience, be found only by experiment. Once it is known it can be noted and constantly repeated. The pressure varies, however, with different papers, different degrees of preparation, and according to whether the transfer paper is used dry or moist.

For the present we are employing the dry method, and, although only experience or a practical demonstration can convey an exact and sufficient idea of press adjustment, I will explain, as far as words will serve, the degree of pressure and method of its application.

For the purpose merely of this explanation set the rollers so that they make contact with the zinc sheets. In the case of the Autotype Press this is done by turning a small wheel at one end. Turn this to close the rollers but without exerting force.

When working in small sizes, up to say 10 in. \times 8 in. and using the pack already described, the adjusting wheel can be given one turn back or 'off' maximum pressure, which term I apply as describing the position of contact with the zinc sheets above described. This position, by the way, must be adjusted without the 'sandwich' coming beneath the rollers; it is better, perhaps, to make it before the 'sandwich' is placed between the zinc sheets.

If the rollers are now turned with the adjustment at one turn 'off' maximum the pack will pass through the rollers under sufficient

pressure to ensure complete transfer. It is not advocated, however, that the pack should be thus passed through and out. It is better to stop turning the handle as soon as the tension or effort of turning tells us that the print has passed through the rollers, then to reverse the movement and pass the pack back again. The turning movement must be even and at the rate of about one turn to three seconds.

The 'sandwich' is now removed from the pack, placed on the table, the top blotting removed, and, if we are absolutely confident that the impression we have not yet seen is satisfactory, the matrix gently stripped off the transfer paper. But I have for many years practised multiple transfer and even when making single-impression prints always mark the back of the matrix at the edges in four places in such a way that the pencil mark overlaps on to the transfer paper, thus making it possible to re-register the matrix should it be decided, after examination of the first impression, that it would be improved by a further application of ink, all over or locally.

I said that this method of passing the pack through the press once, in and out, at full pressure, can be employed with safety when the prints are small. If we could be definitely sure that all the stretch had been taken out of the paper this method would be safe for big prints. But it is better to presume that a large print may stretch still more even though it received the preliminary stretching process described in Chapter V, and if we pass it through at full pressure first time, although it may turn out all right, it is possible that it may show signs of 'creep' or blurring of the image in whole or part. If the matrix stretches whilst going through the press it has to move over the surface of the transfer paper. The movement is progressive, increasing as the passage through the press proceeds. A 20 in. \times 16 in. print which has not been treated previously for stretch will increase in size as much as $\frac{1}{4}$ in. under pressure. The result is a sort of vibrato effect caused by the pigment sliding and piling up, and being deposited in what I can only describe as uniform unevenness.

If the print, however, is passed through the press with only light pressure at first, gradually increasing this until the estimated maximum pressure is reached, any stretch which occurs will have taken

place so gradually (and without the tendency for movement to be in one direction only) that no effects will mar the transfer. My practice is to set the adjusting wheel two turns 'off' maximum, then increase the pressure $\frac{1}{4}$ turn every time the print has passed once under the rollers, removing it when I judge, from previous experience with the paper on to which I am transferring, that transfer is complete.

The preliminary stretching process described in Chapter V may be regarded as a means of ensuring freedom from the possibility of stretch causing defects in the transfer. For single-impression transfer it is not essential, as, by careful press adjustment and gradual increase of pressure, all the pigment can be transferred without the stretch, which takes place, showing in any way in the transfer. Unless it is known, however, before inking has commenced, that a single impression is going to complete the picture (and this cannot always be predetermined), it is better to take out the stretch before commencing to ink. If this is not done it will be found, on attempting to register the matrix after inking a second time, that the increase in size due to its having stretched whilst transferring the first inking will make it impossible to register it correctly, with the result that a double image will be formed.

My advice, therefore, is to take the precaution of stretching the matrix before commencing to ink prints of a size above 9 in. \times 7 in.

Many different sorts of paper may be used for the final transferred picture. I use any of the following, choosing one which I think suits the effect I am aiming at: a heavy-weight, very rough, cream hand-made paper of unknown make but somewhat similar to Whatman Creswick rough, but heavier than their heaviest; various surfaces and shades of machine-made papers such as are stocked by any high-class printer; from the thinnest to the thickest of Japanese tissues, and other Japanese papers such as Mulberry silk, obtainable in considerable variety direct from Japan only (these papers are particularly beautiful); 'vellum' papers; hand-made papers by Whatman, van Gelder, and others.

These various sorts of paper require individual treatment according

to their surface hardness, tendency to absorb water, their weight, and their roughness of surface.

All of them should be used dry with the exception of the heavy-weight, rough papers, which may be used wet.

All the Japanese papers, being made of silk-like fibres, require to be waterproofed with turpentine by the spraying method sufficiently to prevent any of the water, which will be squeezed out of the swollen gelatine when under pressure, from being absorbed by the surface of the paper. If it is so absorbed the surface-fibres will cling to the gelatine, particularly on the highlight portions, and will be torn away with the matrix when it is stripped from the transfer. This ruins otherwise perfect work. On some of the most difficult Japanese papers in this respect I find it necessary to spray no less than half an ounce of turpentine for a 20 in. \times 16 in. print. These papers must, of course, be used dry, as they disintegrate in water.

The wet method has advantages only in the case of heavy-weight, rough papers. Some of these are so hard that the pressure necessary to obtain transfer in the darks, when the paper is used dry, is nearly twice as much as that already described. Such great pressure will almost certainly damage the gelatine.

By soaking this type of paper it may be brought into such condition that normal pressure will effect satisfactory transfer, even in the darkest tones. My method is to place the sheet, upon which the transfer is to be made, in water before commencing to ink. The surface of some of these papers is of an oily nature, and has to be rubbed over with wet cotton-wool before it begins to absorb water evenly. When the print has been inked and is ready for transfer, this soaked sheet is placed between several thicknesses of clean blotting-paper and passed through the press several times, turning the blotting-paper occasionally to ensure that all the water that can be squeezed out under pressure is soaked up by the blotting. Greater pressure will be required than is ever used in the actual transfer process. The paper is sprayed with turpentine, if only to make it receptive to pigment.

Some consideration of the reasons for wet transfer, in certain circumstances, may be helpful.

The matrix is itself saturated with water and therefore presents a soft, pliable surface to the paper on to which the ink is to be transferred. When pressed into contact with the transfer paper by passing through the press the surface of the matrix makes uniform contact in the case of a smooth-surfaced transfer paper.

If, however, the paper is rough, theoretically, slightly greater pressure will be needed to make the gelatine surface conform to the surface of the paper. If the rough paper is thin it will meet the surface of the matrix half-way (so to speak), because it is able under pressure to flatten its own surface to some extent.

In practice it will be found that there is no difficulty in obtaining complete transfer with such paper, under normal pressure, even from the darkest parts, the transfer paper being used dry. When, however, the transfer paper is not only rough but is also thick and hard, it has little or no 'give', and it is then that the process of transfer may be aided by temporarily softening the whole body of the paper. This is done by soaking it as just described, and this has the effect of so reducing its mechanical hardness that when the matrix is pressed against it in its passage through the press the inequalities of its surface become so much less formidable that the soft surface of the matrix has no difficulty in conforming to that surface. In this way the ink is transferred from the very darkest parts under normal pressure.

In advising a damp condition for rough, heavy-weight paper I should make it clear that it is in this state that transfer of the ink is easiest, being made with the minimum pressure and consequently with the least liability to damage the matrix.

It is quite possible to make transfers on to heavy-weight, rough paper without damping it. The pressure necessary to deposit the ink into the depths of the uneven surface is then nearly doubled. There is a liability to 'creep' unless all the stretch has been taken out of the matrix. But given careful preparation, and that free or spontaneous inking which means a natural disposition to part with the pigment, then transfer on to the hardest, roughest, paper is possible in the dry state, provided several transfers from the one matrix are not expected.

It is interesting to note the effect of too much turpentine on the

transfer paper. A slight overdose results in a noticeable flattening or muddy appearance of the print. Actually the excess turpentine acts as a medium causing the ink to run, very slightly, into the body of the paper. Some not unpleasing effects have been produced accidentally in this way. On some hard-surface papers the pigment actually runs and blurs the image.

A great excess of turpentine on a Japanese tissue will cause the pigment to run right through the paper till it is visible on the back, sometimes leaving an impression of the picture on the blotting-paper which formed the base of the 'sandwich'.

The treatment of the transfer paper with turpentine should be carried out for wet or dry transfer. By giving it an affinity for pigment it makes transfer possible with a minimum of pressure, and the less pressure required the better. The gelatine surface is very delicate, and many troubles will never be encountered if transfer under light pressure, as described in this chapter, is practised. Multiple transfer (dealt with fully in the next chapter) by the wet method is not quite so easy as when the transfer paper is used dry, because there are then two damp papers to contend with, both liable to stretch.

CHAPTER VIII

MULTIPLE TRANSFER

*Registration. Advantages. The Stages illustrated. Some variations.
Properties of bromoil inks*

SINGLE transfer, as described in the preceding chapter, can be made to produce excellent results, and for straightforward work requiring no great amount of control in the rendering of the tonal values it is entirely adequate. Multiple transfer, however, puts such a power into the hands of the artistic worker that it will appeal to all who desire to make full use of the wonderful scope of the bromoil-transfer process.

The procedure is, briefly, to build up the picture in easy stages instead of attempting a finished result in one inking. In my experience it is more satisfactory to build up a picture thus. Even in the case of a straightforward print I prefer to ink up for the darker and middle tones and to transfer them before inking for the highlight tones.

The difficulties inherent in the method are two. The worker has to judge the effect of each subsequent ink impression remembering that, whereas he sees on the matrix only one inking at a time, he will get a cumulative effect on the transfer. And, secondly, he must transfer each successive inking in perfect register with the preceding ones.

Some workers have difficulty in this respect. It is probably a knack, but it is one that is soon acquired.

As already mentioned, to facilitate correct registration four pencil marks should be made, one on each side, running over the edge of the print on to the transfer paper.

It is only when dealing with large prints, however, that the advantages I claim for multiple transfer become evident. As size decreases so can the number of impressions be reduced, until, in whole-plate size the advantage of multiple transfer becomes apparent only when it is to be utilized for control purposes.

It is largely a matter of the time occupied by inking. Large prints

take longer, and I find it more satisfactory to obtain depth by multiple impressions than to continue the brushwork on the matrix until the required depth is obtained for a single-pull transfer.

I will try to give some examples to illustrate the advantage of multiple transfer.

A picture may require balancing by means of darkening some feature on one side or the other; it may be desirable to accentuate the drawing of this feature as well as increasing its depth. If more and softer ink is applied to it before the first inking has been removed by transfer, it may be difficult or impossible to carry out the desired local work without darkening surrounding tones or perhaps lighter tones which appear within the main area to be deepened.

If, however, the first inking is transferred the local strengthening is a much simpler matter. Instead of using a softer ink which would have been necessary had multiple transfer not been resorted to, the required part can be inked up again with the same ink, i.e. with no extra softening to gain depth. This ensures that it will not lose texture, detail, or general tone values within itself, although it will be darkened in the transfer by virtue of a second application of ink. Nor will it lose colour, for it must be remembered that drastic thinning of ink results in a warmer colour being produced where such thinned ink is applied.

Further, suppose this second inking of a local area has worked over to a part where no further depth is required, no harm will come by drastically removing this excess, even to the extent of hopping it off with a brush or wiping it clean away with wet cotton-wool.

In the correct rendering of shadow detail I believe that results are best if the hard ink is transferred before the application of thin ink, certainly ink thinned to any considerable degree.

A print after two, or perhaps three, impressions may need more strength in the shadows, perhaps more strength only in the very deepest tones. This can be carried out by inking with the very hardest ink, using a slightly sweeping action. The fact that the print may have already had an application of softer ink all over is a help. The very hard ink will 'take' spontaneously in the deepest tones but not elsewhere.

A transfer, after several impressions, may be satisfactory except that it needs pulling together; it may appear rather harsh, or jumpy. A very light inking with very thin ink only lightly worked in will, in many cases, bring about the desired improvement.

By multiple transfer it is possible to see the extent to which such an application of pigment 'takes' on the matrix, because the inking is done upon a clear print as opposed to one already fully charged with ink.

Multiple transfer is best carried out on papers suitable for the dry method. As before mentioned, if the transfer paper is used wet there are then two damp papers, and steps must be taken to prevent the damp transfer paper from stretching or shrinking between each transference. This means keeping it at a constant degree of dampness.

To ensure that it neither loses nor gains moisture the following precautions should be observed and carried out exactly.

On a table or bench place a drawing-board or a sheet of glass larger than the transfer paper. After each transfer has been made and particulars noted for the next inking, raise this and place beneath it (all larger than the transfer) (1) a sheet of dry blotting-paper, (2) a sheet of wet blotting (soaked and blotted free of surface moisture), (3) the transfer, (4) a second sheet of damp but surface-dry blotting, (5) a sheet of dry blotting-paper. Over this place the board or sheet of glass.

I have made as many as four impressions from a 20 in. \times 16 in. print on to thick, rough paper, all with perfect register, by carefully protecting the transfer in this way during the whole process except whilst actually transferring.

I have adopted the multiple-transfer method as being best suited to my aims and my own particular views, most of which are based upon experience. I would like to say, nevertheless, that some of the finest work exhibited is the result of single transfer, and at the risk of appearing contradictory I would mention that I have myself produced single-transfer prints in which I could find nothing to suggest that multiple transfer would have yielded a better result.

Such is bromoil; its very elasticity of ways and means gives joy to the worker.

For a more complete understanding of multiple-transfer methods some work is reproduced here illustrating the stages of progress in the production of such prints. The series of illustrations, Figs. 15, 16, 17, and 18, will serve to show the building up of a transfer from three separate inkings. The negative chosen for this demonstration is inclined to be harsh, the subject being one of strong contrasts. The bromide print (Fig. 15) was on this account developed to a factor of 7. Fig. 16 shows the effect after the first application of ink has been transferred. Standard time, temperature, and ink was used (i.e. twenty-five minutes at 65° F. and hard ink). This illustration will serve also to show the extent to which the first inking builds up the tones and will thus indicate, by comparison with the reader's own experience, the hardness of the pigment. As multiple transfer is the method to be employed in this case great care is taken not to over-ink any part. It must be understood that by continuing the brush-work, adding ink all the time, it would have been possible to carry the depth all over considerably farther, and in fact this would have been done if the print had not been a large one. This first inking occupied about twelve minutes. If instead of 21 in. × 17 in. the print had been, say, whole-plate, in the same time the pigmenting might have been carried sufficiently deep to have finished the work, except, possibly, for tonal alterations.

This first application of pigment was transferred and the register marks pencilled before the removal of the matrix. Then a soak of about five minutes, still at 65° F., ensured that its condition would be suitable for a second inking. This could have been done with the same ink, but in the case of this print it will be noticed that practically no tone has yet appeared in the highlights. So the ink was softened very slightly and lightly worked over the whole area and transferred. Fig. 17 shows the effect of this further impression. It will be noticed that most of the darker parts have gained sufficient depth, as also have some of the middle tones.

Next, the water temperature was increased to 70° F. and the matrix soaked for ten minutes, after which thinner ink was used, this time considerably thinner. It was applied speedily, and only worked

sufficiently to bring out the highlight tones. This will happen after two or three dabs with the brush on any one place. Prolonged brush action would tend to deposit too much soft ink in the darker parts, resulting in more depth and contrast in the transfer, just the thing which it is now desirable to avoid. As the house on the right, the shed on the left, and the white boat are too light in the transfer so far, these parts received more soft ink than the rest. Fig. 18 is the transfer after this (the third) inking had been registered and transferred.

For a portfolio print or for any small print to be viewed in the hand it might be considered satisfactory. For exhibition prints it is usually desirable to get greater depth, and usually an altogether stronger rendering, and, if the print is a large one, it is often desirable to effect a broader version of the scene by judicious accentuation. In the case of this picture it was felt that something of this nature was necessary. A fourth inking was made with a view to accentuating the pyramidal composition. One part is accentuated by subduing another, so in this case, the house on the right was still further darkened, also the light wall on the left. The white boat, although it forms part of the base of the pyramid, was felt to be too white; it is an interesting but distracting feature (see Fig. 18). In the final pigmenting it was lowered in tone. The exhibition picture 'Sunshine Corner' is reproduced (Plate XX). In the much reduced size necessary in this book the force of these assertions concerning the qualities required in large prints as opposed to small ones is rather lost. The reader's imagination must be relied upon to carry my point.

The next example is intended to show how bromoil, particularly transfer by the multiple method, can be made to give strong pictures from extremely weak originals. This transfer (Fig. 20) is from a part of a quarter-plate film, measuring 1 in. \times 1 $\frac{1}{4}$ in. The negative is of the 'ghost' variety. It was exposed on a dull misty day, using a 12-in. lens. The strongest bromide print on Kodak bromoil paper of which the negative is capable is reproduced for comparison (Fig. 19). It is practically an aerial view, and owing to atmospheric conditions no detail appears in the negative in any of the lower tones. If, however, the composition is good and there is some form or pattern as a motif

for the picture, a good result can be obtained by having resort to strength and breadth in the rendering. This one is similar to my 'Sunshine Corner' (Plate XX) but viewed from a height, and from a greater distance, on a wet day.

Obviously when pigmenting such a weak original the greatest consideration must be to retain everything that is in the negative, whilst adding that strength which is necessary to make a print worth looking at. Just the correct swelling and the ideal consistency of ink are the essentials. Hard ink, of course, must be used, and applied with care, in order not to lose anything needed in the picture whilst gaining the necessary richness. This one was made with two impressions, using a mixture of Engraving Black and Blue Black as hard as it would take after the usual twenty-five minutes soak at 65° F. Before the second application of ink was made the temperature was raised to 75° F. but the pigment was not thinned.

This transfer, and any print so made, may be satisfactory in a moderate size. But if it is proposed to make a large transfer it is necessary to have resort to other means when dealing with so small a part of so weak a negative. Broadly speaking, the tones will need helping. Some attempt should be made to obtain, in the large bromide print, a scale of tones sufficient to ensure no loss whatever when the final transfer is made.

The method adopted is that of making, firstly, an enlarged glass positive, and secondly a negative, by contact or enlargement, from the transparency. The original was too small for retouching, but in the enlarged transparency stage, and again in the new negative stage, work may be done with pencil or dye (or other means favoured by the worker) with a view to producing, in the bromide enlargement, a print which will reproduce the tones of the picture in a manner that will ensure, as far as it is possible, a transfer of the desired tone range and quality. This procedure was carried out in the case of the negative from which, in the first place, the small transfer (Fig. 20) was made.

The large transfer, the result of this method, is reproduced, 'A Corner of Polperro' (Plate XXI).

By means of a transparency and a new negative a very much greater degree of enlargement is possible than by direct projection of the original. Besides the retouching which is possible, the limitations of the enlarging apparatus itself are greatly extended. Plate XXI is a transfer measuring 18 in. \times 14 in., a very considerable enlargement from a negative of poor quality measuring only 1½ in. \times 1 in.

To illustrate elementary pigment control Fig. 21 and Fig. 22 are reproduced. These should be regarded purely as an exercise in inking with a definite object in view. As in nearly all such examples in this book I have purposely chosen a negative which is far from perfect. To choose, work on, and reproduce results only from first-class negatives would defeat one of the objects of this volume.

The negative of this fisherman-subject is a very thin one, and even for bromoil transfer the best print was extremely flat. Only with minimum exposure of the bromide paper and complete development was it possible to produce a passable print. The print did, in fact, show signs of yellow, development stain, but this stain does not seem to have affected the subsequent work.

These three fishermen carrying their baskets of fish along the quay-side form an attractive subject. The sun streams down an alley-way from which they have just emerged, giving a backlighting effect. But as will be seen from Fig. 21 (which is a 'straight' transfer, two impressions, both of hard ink after soaking at 65° F.) they are rather mixed up in the tones of the cottage behind them, particularly the two outer figures. It would be an improvement if they could be made to appear to stand away from the wall. This can only be done by restraining the application of hard ink which forms the darkest part of the brickwork, steps, &c. It will not be satisfactory if only that part of the cottage which comes behind and around the figures is so altered. They would then appear in a sort of halo. It is necessary to adopt a variation in the inking of the whole subject. The greatest depth in the tones of the cottage must not be so dark as the figures, and care must be taken to reduce the 'bitterness' of those parts adjacent to the figures.

In Fig. 22 these ideas have been carried out. The procedure was as follows:

The first application of hard ink was a general inking, practically uncontrolled except for the reduction of little bits of dark tone around the figures. It was only a light inking, and was transferred immediately.

The temperature of the soaking water was increased to 75° F. and after ten minutes therein the matrix was inked all over with a very considerably thinned ink, taking care to keep the tone range of the cottage within such limits that the figures could subsequently appear a tone darker without being too heavy. This inking was transferred, and after an immersion of two minutes in water the matrix was again placed on the inking support.

This time only the figures were to be inked, and with the hardest ink which would 'take'. This was accomplished by inking them to the required depth, then carefully removing any ink that had adhered around them by means of plastic rubber. This third inking was transferred, and the print which Fig. 22 reproduces was the result.

The peculiarities of the inks used by the bromoilist may be studied with advantage by the more serious worker. The hardness and colour are fundamentally important, but there is another quality which, for those who have the time to experiment, may be put to practical use. I refer to what is termed the covering power of the pigment, and by this I mean its capacity for recording depth relative to the photographic tone reproduced. The ink with the greatest covering power is true black, and obviously it must be hard, because thinning it at once gives it warmth. To go to the other extreme, the ink with the least covering power is white, which, used on white paper, gives no depth.

A little thought will show that some use may be made of the fact that inks differ in their ability to record depth. Here is a simple example. The original bromide print has passages which are too dark, or perhaps, all its darker tones are too deep. Pigmenting with black will make them even darker, but if brown ink is used these

over-dark parts will be reproduced in a lighter tone, because no amount of brown ink can give such depth as black.

Black, warm blacks or browns need not be used alone. If a grey pigment, produced by mixing black and white inks, is used, the worker may reproduce the darkest part many tones lighter than true black, because, by so mixing inks, the covering power is reduced.

This, then, is another method of control for the bromoilst, not local control in the true sense, but a control over the tone range of the bromoil or transfer as compared with that of the bromide print.

When dealing with a subject of great contrast, or with an over-contrasty negative, this power over quality of pigment may be brought into action. Some workers have difficulty in reproducing highlight tones, particularly over large areas such as cloud formations. These, on a soft bromide print such as one normally uses for bromoil, are delicate, and differential tanning is slight. A subject of this nature may be printed much darker than it should appear. This will result in greater differential tanning at the top end of the tone scale. The print so prepared is inked with a pigment mixture designed to reproduce the tones in a higher key. Shades of grey, such as I suggest for this modification of the bromoil process, may be obtained by mixing black with white, or by mixing two substantially complementary colours. The covering power of black and white is readily controlled by the proportions of the mixture. A mixture of two colours has poor covering power, but it can be increased by the addition of black.

The use of a pigment mixture which will give a print in a higher key than that of the bromide print before bleaching, by a controlled reduction in its covering power, has one feature which surely commends it. It allows for a full charge of ink. If the same print were inked with black or warm black, the result would be either a print much too dark, or one in which considerable restraint had been used in the inking. The best bromoils, and most certainly the best transfers, are those which result from free, unrestrained inking. By adopting an ink which will not give too much depth the inking is unrestrained and the result is more satisfactory.

'A May Morning' (Plate XXII) will illustrate some of the points of

this means of ink control. The bromide print Fig. 23 was made much darker than it would have been for normal inking methods. A mixture of cobalt blue and burnt umber was used, and this produced a print in a cool blue-grey of the correct depth.

Plate XXIII shows another transfer for which an ink mixture of low covering power was used. In this case, however, the method was adopted for different reasons. In the first example the negative was strong, an over-deep print was made, and in pigmenting the tone values were corrected by using an ink of low covering power. In the second case, 'Sunlit Cottage, Dunster' (Plate XXIII), the negative was extremely weak, so weak that the strongest possible print, from an exposure adequate for the highlights, was so uniformly grey and so light in tone as to render any hope of a reasonably strong pigment print out of the question. It will be realized that a print can be so weak that differential tanning hardly takes place.

We know that hard ink should be used to gain strength, but there would be great difficulty in pigmenting with hard ink on so weak an original. If, however, the strongest possible print is made (see Fig. 24), one that is considerably darker than is usual for bromoil, though tone differences may be no greater, there will be sufficient depth, and consequently sufficient tanning of the gelatine, to permit the use of a hard ink. If this print is inked up with black, or brown-black, the result will be far too much strength and general darkening, and even if the greatest care is exercised it is more than probable that all the detail in the dark part will be lost.

The object should be to produce without restrained inking a print lighter in tone than the original print. This is done by using a hard ink of low covering power. Plate XXIII was first pigmented with a mixture of cobalt blue, burnt umber, and burnt sienna. A second inking, for the same transfer, was made after slightly increasing the covering power of the mixture by adding a small quantity of black pigment. Hard tube inks, with no thinning, were used.

I feel, in describing ink-covering power, its control and application, that the reader should be warned that conditions requiring such treatment may be rare. But to have full command of the bromoil

process every variation must be understood, and to this end all alternatives that I have ever found useful are explained and illustrated from my own experience and results.

The production of the transfer 'Twin Elms' (Plate XXIV) was aided by an adaptation of the same method.

The subject is one of extreme contrast, the contrast of dark tree-trunks against the brilliant white of a cumulus cloud.

In the negative this tone range is not lessened, the thinnest parts are clear glass and the densest part is quite twice as dense as it should be in a negative suitable for normal bromoil printing. Nevertheless, the negative itself *does* reproduce the tones of the subject as they existed. A bromide print, exposed for the usual grey tone in the dark parts, reproduces nothing in the sky. A print exposed enough to reproduce the cloud tones adequately is, if developed for grey tone, quite hopelessly under-developed.

The obvious and only remedy is to use a strong print, one, in fact, which reproduces all the tones as they should be rendered according to the subject, not according to the normal requirements of bromoil.

Such a bromide print was produced. Its tone range was not suitable for ordinary inking methods, mainly because, with a normal ink, the blue sky would have been rendered many tones too deep, and in applying sufficient pigment to the tree-trunks the tones just above the darkest would have accepted too much pigment, with the result that the lower tone differences would have been lost.

The transfer reproduced (Plate XXIV) is the result of a careful control of the covering power of the ink, varying this according to the requirements of the print. It was first inked with a mixture of low-covering power; a mixture of white, blue-black, cobalt blue, and burnt umber, most of the first-named and least of the last-named. The sky was carefully worked over with this mixture until all the tones of the cloud had been brought out. No effort was made to gain any depth of pigment in the trees or foreground with this ink mixture.

This inking was transferred and register marks made. The result of the first impression showed that the sky tones and the lighter tones

of the remainder of the picture were satisfactory and required no more pigment.

During a brief resoaking of the matrix a new ink mixture was made by adding to the ink already in use an equal quantity of blue-black pigment, the object being to produce a mixture for the second and final inking which would have sufficient covering power to give the depth to the tree-trunks and other dark parts necessary to reproduce the desired contrast between them and the cloud which forms their background; to reproduce, in fact, tones which would re-create the impression registered in the mind at the time the scene was viewed and the exposure made.

This final application of pigment was made with a hogs'-hair brush, and applied with vigour and with a sweeping action which deposited the ink only in the darkest parts.

Considered in retrospect it will be seen that a combination of two methods of inking were employed. One for the sky, and another for the trees. It is only by carefully planning the method to be adopted that satisfactory bromoil transfers are made from negatives, or from bromide prints, which are not, for some determinable reason, of the type usually regarded as suitable for the process.

Some rather pleasing, and certainly unusual, effects may be obtained by using a negative matrix in conjunction with an ink composed largely or wholly of white pigment. Plate XXV is an example.

The print on bromoil paper was made from a glass positive.

To ink this print with white pigment on white paper, to produce a positive in the final result, would be extremely difficult. The result of the pigment application would be difficult to detect.

The work is rendered as simple as inking with black ink if the bromide print is dyed black. An ordinary 'packet' dye from the chemist is quite suitable.

The pigment image is transferred to a piece of black or dark-brown paper and the result is a picture in positive by virtue of its being, basically at least, of white pigment upon a black base.

The transfer illustrated was made with white (zinc white) and red chalk, sufficient of the former to give the required reversal from

negative to positive, and sufficient of the latter to create the impression intended, that of illumination by firelight.

A mixture of pigment composed largely of white has extremely poor covering power and, consequently, a heavy application is required in those parts of the picture which are to represent highlights. Moreover, the ink lies 'on' the surface rather than 'in' the paper. Consequently, where the deposit of ink is considerable there is a noticeable and unpleasant gloss, in fact the ink stands up in relief completely covering the texture of the paper. To overcome this the transfer should be 'defatted' (see Chapter XIII). This leaves an even, matt surface, and an effect not unlike a woodcut.

CHAPTER IX

STANDARDIZATION AND SIMPLIFICATION

Bromoils or transfers in quantities

IN the preceding chapters the pigmenting of a bromoil has been dealt with fully, with particular reference to large transfers and the many details and variations which concern the advanced worker and exhibitor. Consequently much has been said that does not necessarily apply to the more simple operation of pigmenting small prints (10 in. \times 8 in. or smaller), either as bromoils or for transfer.

For the benefit of those who contemplate small sizes only I will set out in this chapter a form of bromoil so simple and reliable that it can be relied upon in the hands of the least experienced. It is the form I have standardized for professional requirements and can be employed both for bromoils and transfers.

Firstly, I must refer the reader back to the chapter on preparing the bromide print. If speed of production is necessary the print or prints should be prepared by the 'short' method. If speed at this stage is not essential it will be preferable to fix the bromide prints before bleaching operations are commenced. Details are laid out in the chapter referred to, but if a dozen or more prints are to be prepared at once, such as twelve portraits, it is advisable to increase the washing, between bleaching and the final fixing, to thirty minutes in running water.

Whole-plate prints, unlike the large prints dealt with in preceding chapters, are easily completed in one inking with no intermediary soaking, and this applies equally to transfer. About ten minutes' brushwork completes each print. The essential element is to use just the right ink, but even the beginner will find this after one or two trials. Thereafter it is purely a matter of routine.

I will presume we have to produce twelve 'straight' bromoils. The dried, bleached prints need not be trimmed, but it is necessary to mark them 1 to 12 on the backs. The first is immersed in water, and presuming the paper is Kodak bromoil, the temperature will be

65° F. and time of soaking twenty-five minutes. Whilst this is soaking, the ink is spread on the palette, the glass inking support cleaned, and one or two of the largest brushes placed ready for use.

After ten minutes' soaking the second print is immersed. When the first has had its twenty-five minutes it is placed on the glass, mopped with the wash-leather, and pigmented. This is done in ten minutes or so, and by this time the second one is ready for pigmenting. As this one comes from the water the next goes in, and so on till the twelve are done. This time-table can be varied to suit the skill and practice of the printer, or the requirements of the print. If some control is needed in pigmenting, the time taken will be correspondingly longer, but if the second print is immersed after the lapse of what is considered the time that the inking will take, a steady rotation is assured. As each print is pigmented it is hung up to dry. The ink will take several days to harden, though with care it may be handled in a few hours. Bromoils may be defatted the day after they are made, and this has the effect of drying out all the oil, leaving a hard, evenly matt, surface. This process, entailing immersion in benzine or other grease solvent, is described in Chapter XIII, and is more reliable for bromoils than for transfers.

Another method of 'mass production' I have employed successfully is to print two or more (up to four) whole plate prints on one piece of paper, preparing it and inking it as one print right through. For smaller sizes, correspondingly larger numbers may be pigmented at once. When transfers are required the method of producing several differs from the foregoing because more than one transfer may be made from a single bleached bromide. In this case the worker must decide whether to make a maximum number of prints from one matrix or to make two or three only from each, using several matrices. I have made as many as twelve transfers from one matrix, but I advise a maximum of four as being more practicable. After many immersions the gelatine becomes soft, sometimes overswollen and often liable to blister. It is better to make a sufficient number of bromide prints to allow not more than four transfers from each. With these the worker proceeds in a fashion similar to that adopted

for bromoils except that time must be allowed for transferring, although this is largely compensated for by the relatively short resoak needed after each transfer is made. Whilst inking for the third or fourth transfer is being done the next print goes into the soaking water. In sizes as small as whole plate the stretch of the matrix in the press may be neglected. In small sizes ample depth is obtained at the first inking for good transfers so that there is no advantage in employing the multiple method. Transfers have the advantage over bromoils in that they require no time allowance for drying.

Two or more prints may be made on each sheet of bromide paper, inked up and transferred as one, but of course, in the case of transfer, they must be separated by white margins to allow for dividing them when finished.

CHAPTER X

COMPOSITE PRINTS

Building pictures from more than one negative

THE fact that handwork may be employed in so many forms in bromoil, at various stages of the process, as well as on the final transfer, makes it a very suitable medium for the production of a picture from more than one negative. Printing-in skies and similar combination work can be most successfully accomplished and more difficult combinations made with more chance of success than is possible when the finished picture is a silver bromide print.

The making of a print from more than one negative for pictorial ends, though decried by the purist, is extremely interesting work; it *can* result in pictures which ring true, and it is a fitting subject for this volume, dealing, as it does, with a process which in itself is not always considered straight photography.

There are probably few who embark upon the adventure of bromoil for the first time who are not thrilled at the prospect of so much personal control. Hence it can be presumed that the average bromoilist is going to take advantage of the powers he commands. Those few advocates of pure photography who *do* make bromoils, realizing that they can be as truthfully accurate as a straight silver print, are not bound to read this chapter!

Except for the addition of extra figures I have never found it necessary or advisable to combine more than two negatives. Several distinctly different methods may be employed, each having features which commend it for some particular type of combination.

The simplest method (and by simple, I mean simple to manipulate and suitable for simple ends) is the projection of two negatives successively on to the same piece of bromide paper, shading that part of each which is not to be printed and carefully registering the position of each negative so that it projects the wanted part in the desired place. Even this method may be worked in more than one way according to the composition of the subject and the tone values

adjacent to the division where the part from one negative begins and the other ends.

Two concrete examples will serve to illustrate this method of combination. The first is perhaps an extreme one, but will illustrate, nevertheless, the simplest combination that can be made. The main negative (the negative which will form the greater part of the final print) is of a dull, misty, mountain scene. It is a fully exposed negative and a straight print renders it just as it was seen, misty mountains in the distance and a flat, black foreground. It will serve no purpose to reproduce it alone, as except for the addition of trees it is in no way to be altered. The negative containing a row of trees, from which three are to be isolated and printed into the mountain scene, is a negative similar in so far that it was made late in the evening under similar weather conditions so that it is quite conceivable that these trees, or some of them, might have grown in the foreground or middle distance of the mountain picture. Their introduction is simple. It is necessary to block out everything from the tree negative (except the selected trees) that would print if it were not blocked out. Printing should commence with a trial from each negative to ascertain firstly, the correct exposure for each, and secondly, the correct relative degree of enlargement, because it is seldom that enlargement upon the same scale from each negative will be just what is wanted. It will be noted that in this example no attempt is made to 'block out' in the main negative to allow for printing in the trees. As it is a picture in which the foreground and trees are in silhouette, no such work is necessary. It is simply a matter of printing the trees on top of the other print, 'planting' them where we want them to grow, in fact.

When calculating the correct exposures it must be remembered that for bromoil transfer the smallest tone differences in the light parts (sky and mountains of the main negative) must show distinctly, be fully developed, and yet, by the same development, the dark foreground and trees should not be more than a deep grey. It is of no importance which negative is printed first, the only important point still to be considered is registration: the 'planting' of the trees in the right place. The method adopted to ensure this depends to

some extent upon the enlarging apparatus employed. With the simplest enlarger it is not difficult. One or two small pencil marks on the bromide paper, made under the light projected through the orange glass, will suffice to show the position into which the trees have to go. The orange glass must be optically true, otherwise the image shown through it will not be the true image as projected by the lens, and distortion due to the use of a bad glass would result in the object added being printed in the wrong place, by an error of as much as $\frac{1}{8}$ in. in some cases.

Having exposed for the first negative it is removed and the second one inserted in the holder. Whilst this is being done it is as well to cover the bromide paper with a card. Now the second negative, projected through the orange glass, is registered into the correct position by moving the bromide paper till the new image falls in the right place. Care must be taken that no stray beams of light penetrate through the edges between the plate and the holder. This may happen with some types of holder, and where a part of a negative, which is near to one side or one corner, is to be printed nearer to the middle of the composite print, such stray beams would fall upon the bromide paper.

Having made the second exposure, according to the test, it remains only to develop and fix and proceed in the ordinary way as for a straight print.

Except for composite prints in which a thin part of one negative is to be printed on to a dense part of another, this method is not useful. Fig. 25 is a 'straight' print from the tree negative of the foregoing example; and Fig. 26 a print after 'blocking out'. 'Evening in the Highlands' (Plate XXIX) is the finished composite bromoil transfer.

The printing-in of skies to a landscape to add to the interest or improve the pictorial composition is probably the object most often in view when combination printing is attempted. To the same category (so far as method is concerned) may be added the combination of two negatives, one of which is to give the foreground and perhaps middle distance, and the other the more distant planes and sky.

Two methods may be adopted for screening unwanted light, that is, the light projected through the foreground of the negative from which it is intended to print only the distance and sky (or perhaps sky only) and the light projected through the distant parts and the sky of the negative from which only the foreground is to be printed. These parts may be shaded with card, shaped roughly to conform to the line of division, keeping it slightly on the move during the operation, or the negatives themselves may be treated with red dyc. I favour the latter method and in practice have found it much more reliable and, although a little more trouble, well worth adopting. I do not advocate the use of opaque medium except perhaps in conjunction with red dye, as I will explain. My second example will afford more explicit details.

The two negatives chosen are (No. 1) a highland scene with gently sloping foreground, a very pleasant grouping of sheep, but with a hopeless background, so hopeless that there is no purpose in reproducing it. It was composed of two straight lines (the top of a hill and the shore of a loch), both dead parallel with the top of the picture, and leaving a triangle on the right of the picture representing the loch but utterly devoid of tones.

A straight print is reproduced of the second negative (which I will refer to as No. 2), part of which is to take the place of this unwanted loch and hill-side (Fig. 28).

Now the method of procedure. Negative No. 1 is placed in the retouching desk. Water only just noticeably red with Coccine Nouvelle is quickly brushed over the whole of the negative except the foreground part which is to be left. With this first application no attempt is made to conform accurately to the line of division. Now the strength of dye is increased, by how much it is difficult to describe, perhaps about three times as red but still not strong. This is brushed over with some attempt to conform to the top of the trees. The next application, a little stronger, is applied with a definite intention of masking down to, but not quite touching, the top of the dividing line. It is probably necessary now to dry the negative before it will absorb any more colour.

Then the process goes on again and is repeated until the part not to be printed is a rich red. The object the whole time is so to modulate the applications that there is no well-defined dividing line such as is unavoidable if an opaque substance such as Photopake is used. Should the negative, or that part of it to be printed, be dense, thus requiring a lengthy exposure, the red dye alone may not be sufficient to prevent the action of the enlarger illuminant entirely. In this case a last application may be of Photopake, care being taken not to bring this low enough to nullify the graded mask effect at the line of division.

Fig. 27 reproduces a straight print from this negative after the above treatment. The difference between masking by this method and masking with a completely opaque medium is perhaps subtle, but any reader who is doubtful should take any similar type of landscape and block out any plane or planes with an opaque medium only, and see what a hard line is produced in comparison.

The negative so treated is dried, fairly speedily if possible. If there is any trace of hypo in the film and drying is prolonged, the dye may turn yellow in patches and its effectiveness then becomes uneven.

No. 2 negative, from which the distance and sky is to be printed, is now to be similarly treated, using No. 1 negative as a guide. Place the already dyed negative in the retouching desk. Upon it lay the second negative; the way round depends upon whether both originals are being combined the true way round or not (according to composition and lighting which I will deal with later). The complete picture is now before us except that it is difficult to see much detail because of the red dye on the underneath negative. But the unwanted part of the negative on top (the negative from which the distant planes are to remain) shows up clearly because there is no red dye over this area on either negative. All that remains to be done is to apply repeated dressings of red dye just as was done to the first negative, but this time to the part which clearly shows as undyed. The negatives must be carefully registered together and fixed according to the desired combination. By working the red dye so that, when finished it appears approximately uniform over the whole area of the

combination it will be found, on separating them, that the dividing line has been so blended that when viewed together the whole area of the combined negative is almost uniformly red, although when viewing each negative separately there is no well-defined line of red density. If printed together in this position practically nothing would print. When separated, however, and placed in the enlarger, each can be made to project just that part required for the combined print and it remains only to register each negative carefully in a manner similar to that described previously, in this case the pencil marks being made on the edges of the bromide paper. Because the masking was itself 'meshed' together, no line will be seen, no harsh over-dark bits and no unduly light parts, such as usually occur, when shading with cards is employed during projection. 'Highland Sheep' (Plate XXX) is the combined picture, a 'straight' bromoil transfer produced by intermediary means anything but straight!

Before I go more deeply into this question of composite pictures and describe more advanced methods, it would be well to consider the limitations of the process. Because I see nothing against *making* pictures even to the extent of manufacturing them I practise what I am preaching in this chapter. But it must be always remembered that a picture fails at once if it is either (a) an obvious combination or (b) does not ring true, conjuring up doubts in the mind of the observer, even though the actual work of combining has been most skilfully done.

I am trying to describe in this chapter how to make these combinations in such a way that the fact of combination will not show itself. But it is equally important that the fact of combination should not show itself because of some falsity. The observer must not 'feel' that the picture is not true. It is not sufficient that he cannot say what is wrong. There must be nothing open to question.

Obviously the lighting of each scene to be combined is the first thing to be considered. Even if the sun was not shining there is nearly always some degree of directional lighting, but there is then much more latitude in the combinations that may be made.

When direct sunshine shows itself by highlight and shadow it is not

sufficient that in each negative the sun was on the left or on the right. For the picture to be correct the sun must have been at about the same height in the sky as well as at the same angle. This applies, of course, much more strongly when the picture contemplated contains well-defined objects such as figures, and when the most distant plane is relatively close. If the only part to be used of one negative is a far distant mountain, for example, atmosphere may have so softened the tones that no directional lighting is discernible.

Perspective, too, must be taken into account. Broadly speaking the viewpoint should be the same relative position to the picture in the case of any two prints to be combined. As a matter of fact a higher or lower viewpoint in one, than in the other, is more noticeable than a lateral difference. There must be a similar 'quality' about both negatives, a quality not easily described. For the combination processes already outlined the negatives themselves must be such that a common development factor will give a good bromoiling print of each. It is no good, with bromoil in view, to try to combine a harsh negative which can only reproduce all its tones with a development factor of 6 with another negative which gives perfect depth and tones with a factor of 12.

This conveniently brings us to the next method of combination printing, that of joining prints and rephotographing them, for it is a process to which this advice as to similarity of negatives does not apply. The 'paste-up' method is useful when the line of division between the two pictures which are to be combined is too complicated for the shading or the dye method to be employed. Conversely, it is more *easily* accomplished when the division is well defined and not too irregular. Briefly, the method involves the production of a perfect black and white print from each negative, on smooth single-weight bromide paper. I use glossy, but a smooth matt will do equally well.

With bromoil in view these bromide prints for the 'paste-up' should be of a quality somewhat similar to that required in the final print on bromoil paper. The darkest shadow, though it can be a little deeper than we would have it for the print on bromoil paper, must not be black. No detail whatever must be lost and this applies equally to the

highlights. The object is to produce prints which, when copied, will reproduce all the tones, even the most delicate. They should be large, not less than 10 in. \times 8 in., larger is better. One of the prints will probably form the base upon which the other is to be imposed after the unwanted parts of the latter have been cut away. For the cutting out I use a pair of fine, curved scissors with long finger-pieces. The curved blades enable the fingers to be held above the print whilst still applying the correct cutting edge to the paper. Needless to say, the greatest care must be exercised in cutting out the print. Small or thin objects, such as a length of rope which is to stand alone, are better cut right away, relying on brush, knife, or pencil to put them in afterwards.

If the print thus cut out is pasted down without further preparation, the join is almost certain to show in places however the 'paste-up' is illuminated for copying. If, however, fine sand-paper is used to taper the cut edges until they terminate in a 'knife-edge', this difficulty will be overcome. The cut-out print should be placed face down on a flat board, and the edge to be sand-papered drawn up to the edge of the board. Apply the sand-paper, held at a slight angle to the surface of the print, drawing each part to be worked on to the edge of the board, turning and twisting the print to bring it in line with the edge of the board. In this way the boundary of the print to be superimposed on the other print is reduced to a fine edge which presents no thickness.

The first print may be dry-mounted on a stout card, one which has a smooth surface. The 'cut-out' must be mounted with paste. Mountant should be well worked in, not merely laid on with a brush; it is best spread with the fingers and worked till it presents an even surface; sticky but without excess paste. Its position should have been marked at the edges so that it may now be placed without hesitation into the correct position on the print already mounted. If the greatest precision is necessary on account of some feature of the combination, allowance should be made for the fact that the print, being now wet with mountant, will be perceptibly larger than it was when dry. Having applied it in the required place it remains only to press it down with particular care for the fine edge. It can now be left to dry,

and if the card tends to curl badly this may be counteracted by pasting a waste print on the back.

When dry the combination ‘paste-up’ may be finished with brush, pencil, and knife, according to the requirements of the composition. I work up my pasted prints with oil pigment slightly thinned with medium. This works excellently upon ordinary glossy paper and has the advantage that it can be wiped off with dry cotton-wool. In finishing a print it must be remembered that, in copying, there is a tendency to lose some of the finer tone differences, especially in the shadows. Work upon the print with this in view, bringing out slight tone differences by strengthening where necessary, but do not overdo it. Remember that the negative yet to be made from this print must have no clear glass. In making the copy negative the composite print should be illuminated evenly, and this can only be accomplished by arranging a series of lights on at least two sides. The production of this negative is entirely under control, so that there is no excuse if it is not perfect for bromoil. Half-plate is a size convenient for retouching or other handwork.

Two examples of this work are illustrated, ‘Reflection’ (Plate XXVIII) and ‘Drying Sail’ (Plate XXXII). The former is obviously a suitable subject for almost any method of combination, the line of division between the two originals being the straight line of the sail and the line of the quayside. It would have been equally simple to work by the glass positive method, a process I shall describe later. The latter (Plate XXXII), by reason of the more intricate dividing line, would be an almost impossible combination to make except by the paste-up method or the glass positive method. Both are ‘straight’ transfers, that is to say, nothing has been done to obliterate signs of combination, in fact had I reproduced the ‘paste-up’ instead no difference would be noted except the absence of the quality inseparable from a bromoil transfer, and minor alteration of tone values which have no bearing on the dual nature of the composition. In the case of Plate XXXII straight prints are reproduced of the two originals from which the combination was made (Figs. 29 and 30). The ropes and cord ties of the sail were added with a brush; it would have been almost

impossible to have kept them in the 'cut-out'. A tip on adding a pencil line to a glossy print may be useful. Make the line in the required place with the point of the retouching knife, or a pin. Now run down it with the pencil, which will 'take' along the line where the gelatine has been scratched away.

The next combination process, and the last to be described, is, in practice, much easier than it sounds in print. Two plates, each containing a part of the final picture, are bound together to form one plate. And in each plate that part which is not part of the picture is clear glass. There is more than one way of doing this. The worker should choose a variation of the process which will suit the particular case in hand. Two negatives may be bound together, or two positives. I prefer the latter because then my final negative can be retouched if necessary, whereas, if two negatives are bound together, no work on them is possible except as separate units before binding, and this is not so convenient nor so satisfactory as working on one unified whole. My normal procedure is as follows, and for the purpose of clarity, I will work through the procedure which results in Fig. 34.

The original negative which contained the foreground and the two figures is a $3\frac{1}{4}$ in. \times $2\frac{1}{4}$ in. film. A very hurried snapshot it was, to get these figures. The foreground and the figures are in focus but are extremely thin, the negative being under-exposed and over-developed (unintentionally, but such things do sometimes happen). The lighter parts of the background are practically unprintable unless the darker parts are rendered much too black, and even then the cottages are so out-of-focus as to be unpleasant in a print of dimensions suitable for exhibition. The foreground part of the negative is too small for control work thereon. A straight print is reproduced in Fig. 31.

The first item is the production of a quarter-plate glass positive, working for good rendering of the foreground regardless of the rest. This is made by projection, printing only the part required in the finished picture. I use fine grain ordinary plates for this work.

From the positive a negative is made by contact, again working for good rendering of the foreground tones. What was weak and thin is now quite strong. Overstrengthening, which is easily gained, must be

avoided. Now the background—everything except the quayside, the boats, and the two figures—is blocked out with strong red dye. This is not difficult as this part of the negative is now so dense as to be almost unprintable anyway and only the thinner parts, windows, &c., need to receive attention.

Now a glass positive is made by contact with this negative. In making this positive, in which only the figures and foreground print, the rest being clear glass, care must be exercised to obtain reasonably soft gradation consistent with retaining sufficient contrast to ensure that the final negative is of the right character for bromoil. This is the final glass positive for the foreground and is here reproduced (Fig. 32) by means of a bromide print from the negative from which it was made.

It might here be useful to mention a tip in connexion with blocking out. If, after all due care, some parts of the blocked-out part *do* print through, these unwanted parts are quickly and easily bleached away with potassium cyanide and iodine. It may be applied with a brush to the dry plate. As soon as the image is bleached out wash for a few minutes under the tap. If this procedure leaves an uneven appearance with a 'chalky' deposit, treat with a weak (about $\frac{1}{2}$ per cent.) hydrochloric-acid clearing-bath. Should this have been omitted, and when the plate is dry this slight deposit is noticeable, it may be removed by rubbing lightly with cotton-wool dipped in methylated spirit.

The next requirement for the composite picture in hand is a positive transparency of the new background with clear glass in place of the foreground objects. And, of course, the blank part of this transparency must coincide exactly with the foreground objects which are to be placed there.

For the background that is to be introduced a negative is chosen which will give a suitable composition. This choice probably entails much searching, and several trials must be made with rough prints roughly cut out and pasted together with prints of the foreground, to see the effect.

The selected negative for the background is placed in the enlarger and projected on to a sheet of glass (an old negative) to which is stuck

a sheet of white paper for focusing. Some form of holder, or pins, should be employed to enable the sensitized plate to be placed in the same position as this focusing plate; an orange glass is not safe for plates, there is no red light in mercury-vapour illumination (which I use), and half-watt light through red glass is not sufficiently brilliant for visibility, so it is better to rely on a holder or pins on the enlarging board. Place the finished foreground transparency over the dummy plate so that they coincide. This transparency, having clear glass in place of the background, allows for the projected background to be seen upon the dummy plate. Focus the image at the correct magnification and move the plates, still held together, till the projected image appears in the desired place. Fix the holder or pins and turn off the light. Now remove the dummy plate and insert in its place the plate to be exposed. The exposure is made through the foreground positive transparency, using it as a mask.

In the case of my example I took no account of the fact that the foreground of the positive (the mask) would print through. I could have blocked it out and washed it clean afterwards. Instead I made my exposure, developed, fixed, and washed, and when dry, bleached away the faint image that had printed through the temporary mask. Had my new background negative been dense, needing an exposure so long that both the projected image and the image of the positive foreground would have printed to a considerable depth, it would have been advisable to have made the transparency temporarily opaque over the foreground area.

The resultant transparency, by whichever way produced, appears as Fig. 33. For the purpose of this illustration only, the further operation of making a negative by contact from this transparency and a print therefrom, was necessary.

There are now two glass positives, one with clear glass background and the other with clear glass foreground, and, owing to the method employed in their production, it is a mathematical certainty that the two images will coincide. Before registering them and binding them together it is as well to look over them in the retouching desk. There may be some minor blemishes which can be corrected with the pencil

at this stage which would, if attempted in the next (negative) stage, mean the knife.

When you are satisfied that they cannot be improved, lay one, glass side down, on a clean support, put at each corner a spot of glue (I use Durofix, it dries quickly and allows separation afterwards without risk of breaking the plates), then place the second transparency, emulsion side down, upon the first. Hold them together firmly. In a few minutes the glue will be sufficiently tacky to hold them together but not so firm that they will not move one over the other for the purpose of registration. I should perhaps point out that it is essential that both coated surfaces are quite free from particles of dust, otherwise scratches are sure to result. I would mention too, that, though both these transparencies are of quarter-plate dimensions, both are printed in the centre of a half-plate to make handling at this stage easier.

Hold them up to the light and it will be found that there is one position, and one position only, in which they appear as one. This is the position of correct register. When found, place them carefully upon a level surface and leave them for several hours to dry. If you try to clip them together, or bind them, or in any way exert pressure, the chances are that when you come to use them you will find register is not perfect.

The last stage in this course of operations is the production of a final negative from which the prints upon paper will be made. Obviously this negative must be made by projection, so any size plate may be chosen. In the case of my example the final negative covers the greater part of a half-plate. As in the 'paste-up' method of composite work, the production of this negative is entirely under control so that it may be made ideal for the printing process aimed at, in this case bromoil transfer.

The final print, Fig. 34, differs in no way from a straight bromide print so far as we are concerned in this chapter on combination printing. No purpose would be served in reproducing a bromide print, no defects caused by its being a combination had to be corrected. In bromoiling, ordinary control was employed to broaden slightly the general effect of the composition, and to emphasize the dramatic possibilities of the subject.

CHAPTER XI

COLOUR WORK

The arbitrary introduction of colours

IT will be gathered by those who have had the patience to read so far that I have experimented in many directions in the bromoil field. I have said but little so far about efforts that have failed, or of methods which, for reasons of my being unable to master them, I have given up.

Trials of inking with rollers instead of brushes, and using the specially hardened paper necessary, have not proved successful in my hands except in small sizes. It is interesting to note, however, that the hardened gelatine of the paper supplied for Oleobrom will swell sufficiently for pigmenting with a brush if soaked at a temperature of 110° F.

Nor have I been successful with the use of two bleached bromide prints for the production of a bromoil transfer. It is possible to make combinations from two negatives in this way. Instead of combining the desired parts in one bromide print, as described in the chapter on composite prints, two prints are made each containing a part of the final composition, the part of each that is not to be printed being represented by white paper. The two prints are made so that when pigmented and transferred the two images will coincide. The prints are produced in much the same way as the positives for the combined negative; the process described last in the chapter above referred to.

First, one print is inked and transferred. Then the second is inked, carefully registered upon the first impression, and transferred.

I have made one or two successful prints by this method, but there is little to commend it. Similar ends may be achieved more easily by making the combination in the bromide print. The greatest difficulty, when attempting to work with two bleached prints, is to secure correct register. In spite of the greatest care, one print usually stretches more than the other.

A method with so large an element of doubt or risk is not to be recommended, except to the experimenter.

For the same reason I consider three-colour work (natural colour photography), which calls for the use of three bromide prints, to be impracticable for transfer. It can be done, but it is doubtful if any one, however skilled, could be sure of getting one in ten perfect.

Having made up my mind to this effect I set about trying to produce pictures in colours which, though making no pretence to be colour photography yet could make some claim to correct colour presentation on a massed scale. Whether or not these efforts are satisfactory I leave to those who see them to judge, but I go so far as to say that, from the purely pictorial point of view, and as works representing some phase of nature, colouring by arbitrary means is often superior to those productions which are the direct result of colour photography on paper.

The principles involved in colour work dependent on the manual skill of the artist, are, in the bromoil process, in several respects quite contrary to the principles observed, and the methods employed, for bromoil in monochrome. It must be presumed that the worker has at least an elementary knowledge of colouring, and if he has had some training in oil painting so much the better.

The principle that the pigment is accepted most in those parts of the bleached print which have received most tanning, and least in the lesser tanned parts, still holds good and is used in so far as the production of the oil print is concerned, but with one notable reservation.

If the swollen gelatine matrix were to be inked up in whole or in part in a colour, say green, in the normal way as described in previous chapters, the result would be far from satisfactory. In nature the colour is greatest, i.e. most luminous and therefore noticeable, in the highlights. A grass field, for example, with a dense wood on one side, and illuminated from the woodland side will, to the eye of the observer, be greenest where the sun falls on the grass; and where the grass is in shadow the green is not only darker—it is less rich in the green colour, appearing in some lights and atmospheric conditions to be tinged with blue.

In the pigmented print, however, the green colour will predominate in the shadow and be less intense in the highlight, the reverse, in fact,

to nature. The reason for this is obvious. The maximum colour goes on in the darks by virtue of the fundamental principle of the process, and in the sunlit part comparatively little pigment 'takes' with the result that (the picture being ultimately on a white base) the eye sees the paper base plus a thin layer of colour quite insufficient to convey the correct richness of colour even though the depth of tone may be correct, and the print would have been satisfactory had it been in black and white.

Therefore some other method must be adopted to counteract this if colour is to be used satisfactorily. Yet, whatever is done it must be remembered that the depth, drawing, main tone values, everything except colour, must be dependent upon the differentially tanned gelatine.

After several trials I have adopted a procedure which is the reverse method to inking in monochrome. I commence inking with very much thinned ink on a highlight part of the picture, using the appropriate colour. This ink is accepted on that highlight area and the tones are reproduced. Care must be taken that the ink is not too soft to reproduce the proper highlight tones. It is worked only sufficiently to produce correct modelling, and with a view to the avoidance, as far as possible, of a deposit of this ink in the deeper tones of any part which is not of the colour in use.

This procedure is carried out in the various colours desired, in their appropriate places, using an ink in each case which will not only bring out the tone values but which will leave a noticeable deposit of colour on the highest highlight. Each colour is transferred separately to the chosen and prepared transfer paper. I usually work in two main colours only, and by transferring each colour separately it is possible to wipe away any excess which has passed over to an area where that colour is not required.

The above procedure serves only to give colour to the highlights and higher middle tones.

Thereafter, each print I undertake is worked up according to my ideas of the moment, these being based, of course, on the knowledge of what the subject is, what it looks like in monochrome values only,

what it looked like in nature, and what I am endeavouring to make of it, always bearing in mind the limitations of the process.

I think a rough outline of the essentials as I have found them, and the means whereby I get such results as I have been able to show, will suffice to give the reader enough of the method to enable him, if he so desires, to develop the process to suit his own subjects.

The colours chiefly used are blue-black, black, cobalt blue, veridian green, burnt sienna, crimson lake, light yellow, vermilion, and zinc white. The last-named is, perhaps, one of the secrets, if it can be said there are any secrets in such work. I use a lot of it, in fact I seldom use raw colours. Nearly all pigment mixtures that I make for colour work contain either zinc white or black, often both, the former predominating when I am working on highlights and the latter when working on dark tones, the raw colour being used only to maintain the desired hue. In this way I am doing two things at once: building up the picture in depth and tone values, and also colour. It is best to confine oneself to two, or at most three, colours in one picture, working for broad massing of colour just as one does in regard to tones.

It should be remembered when producing prints in colours by multiple transfer, that, to some extent, changes of colour will take place when one colour is transferred on to another colour. The effect is not the same as mixing the colours on the palette, but, after a little experience, the knowledge of what colour will be produced can be applied usefully. Until that experience has been gained results may be a little disconcerting, and it is perhaps better, when it is desirable to reduce all elements of doubt to the minimum, to confine each colour to one part of the picture.

Should the colours of a transfer appear too bright, their brilliance can be reduced by a final inking with black or a mixture of black and white (to produce grey). Blue-black is usually the best to use to make a grey pigment, and the application should be made over the whole of the print, and with ink sufficiently soft to produce a deposit in all the tones. This remedy will be satisfactory only if the transfer can stand greater depth generally, but it will sometimes 'pull together' an otherwise unsatisfactory colour transfer.

Given a proper balancing of raw colour with white, and of raw colour with black, the transfer will be satisfactory without having resort to any such toning-down process.

Pigmenting for transfers in colours by the method I have evolved is done from soft ink to hard ink, the reverse of monochrome work. By mixing plenty of white pigment with the colour for the highlights, the ink can be applied liberally, with a view to getting the colour there without risk of losing luminosity. By varying the proportions of white to raw colour one has complete command over the intensity of the colour. By adding black (usually blue-black) and strengthening the consistency of the ink, the deeper tones are built up in their correct tone values, still maintaining the appropriate colour. The colour becomes less evident as the depth of pigment increases; just as it should do in the darker passages of the picture.

My large transfers in colours are the product of several impressions, sometimes ten or more, and often with one colour transferred over another. During so many passages through the press in contact with the wet matrix the transfer absorbs moisture, usually enough to make it expand unevenly. To counteract this it should be hung up to dry whilst inking is in progress, otherwise registration will be difficult.

The variations possible to the bromoilist who has some artistic skill are infinite, and those who take pride and find pleasure in producing works which are far removed from the purely photographic or merely mechanical, works which can show individuality of outlook and treatment, will not hesitate because a process, such as that just described, is long. The joy of creation is infinitely greater than such considerations, and no process affords more satisfaction to the worker, and more scope for his creative powers, than bromoil transfer.

CHAPTER XII

BROMOIL AND TRANSFER PORTRAITS

A PORTRAIT is not the easiest subject to render in oil pigment. Nevertheless, given the right class of negative yielding a bromide print of soft gradation, bromoil is a medium which will produce very fine results, especially if care is exercised in selecting the right sort of portrait for the process. Where character and broad effect are to be dominant features bromoil or transfer is ideal. For soft 'sketchy' portraits, and high key renderings too, it is most effective.

The chapter on 'Standardization and Simplification' should be studied in connexion with the subject of bromoil and transfer portraits.

Further than this there is but little to say, from the technical point of view, which has not been dealt with already in connexion with bromoil for other subjects. The fine gradations, the delicate skin texture, and the subtle tones and modelling of a sitter's face, can be rendered satisfactorily in pigment if the worker has sufficient experience. For perfect pigment portraits to be turned out with regularity there must be exacting attention to detail and precision in the preparation of the print. This is, after all, only a matter of conforming to set rules. This applies almost equally to the pigmenting itself, though, here, the skill of the worker will tell a little more, but there are no considerable difficulties to be overcome.

The production of good bromoil portraits calls for great care in inking. In landscape work there is greater latitude for error in the rendering of tone values and there may be slight inequalities in the ink deposit which will go unnoticed. In a portrait the pigmenting must be of the cleanest. A surplus of ink (i.e. more ink than the particular tone truly accepts) must be avoided. Care must be taken not to over-ink shadows on a face. In a landscape a shadow may be rendered several tones deeper than it prints in a straight bromide, but in a portrait this might give an unnatural appearance. In pigmenting, particularly when it comes to the eyes, it is possible to lose

'likeness', a factor with which the landscape worker does not have to contend.

In pointing out the possible troubles of the worker in bromoil portraits too much stress should not be laid upon them. It is necessary to mention them in order that the worker may guard against them. A conscientious worker who attends to details himself and understands the simple but essential requirements of the process will have no difficulties.

It is best to keep to the blacks and brown-blacks, though some subjects, particularly high key renderings, can be very beautiful in red chalk. Colours may be introduced in much the same way as for landscapes but with more restraint in their use. The permanency of an oil print, particularly the transfer, is a feature to commend the process for some classes of portraiture.

My favourite treatment for a bromoil portrait is a rich granular rendering. The subject must be a strong one, not relying upon delicate tone gradations. Such treatment may be in low or high key, and results are best if the bleached print has a preliminary soak of about half the time required for a normal fine-grain result. Pigmenting is commenced with a large hog's-hair brush, and ink should be accepted almost spontaneously so that about three dabs completes the image under the brush. Success depends upon applying the ink evenly so that no extra dabbing is needed to even up the picture, for as the brushwork is prolonged so the pigment grain, particularly in the darker parts, becomes of finer texture.

The work may be completed with the hogs'-hair brush, but if a little cleaning up is considered necessary or if a less coarse grain is required, a quick run over with a large, lightly charged fitch brush will be found to be all that is necessary.

The actual pigmenting of a print in this manner is essentially quick work. A 12 in. x 10 in. print should occupy no more than fifteen minutes, often considerably less.

Several examples of transfer portraits are reproduced, and to the professional photographer I would suggest careful consideration of the possibilities of such productions. Bromoils and transfers should be

treated as things of special artistic value and merit. They should not be offered by the dozen or half-dozen, but as single portraits, in the same way as large framed portraits and coloured pictures are usually offered.

Bromoils can be produced in numbers, as I have explained in a previous chapter, and the knowledge and practice of such work is of great value, but as in most things connected with art or craftsmanship, much of their value is in their rarity, and pigment prints have quite enough of the qualities that proclaim a work of art to make them valued as such.

CHAPTER XIII

FINISHING TOUCHES

A few hints, and a word of advice

ABROMOIL transfer, just as any other type of print, can usually be improved by attention to a few minor finishing details. At the very least there are sure to be a number of white spots which need to be darkened. The smallest ones should be spotted out with a finely pointed pencil—I use Wolff's No. 3 Academy Chalk, a hard black non-shiny pencil. Large spots should be toned down with pigment applied with the end of a fine stump.

The corners, where the tips of the fingers removed some ink, will need similar attention.

Larger areas may need slightly darkening, and this may be done with a small bromoil brush and pigment of the same colour. If anything more than the slightest toning down is attempted at this stage, the difference in texture, which is unavoidable, will be noticeable.

Whilst the pigment is still soft, but not after twenty-four hours, it may be removed to a limited extent by merely pressing on to it a suitably shaped piece of plastic rubber.

Dabbing with this material also tends to remove ink as does a slight brushing action, the former being suitable for removing ink from deep tones and the latter for cleaning up highlights. The result of such methods as these depends largely upon the nature of the paper upon which the transfer was made. On no account should any removal of ink be attempted till the paper is quite dry otherwise it will be damaged.

Should it be decided that the picture will be improved by the addition of a narrow black border this may be done easily with a black chalk pencil or with a brush and pigment diluted with turpentine, the latter being best on some soft papers and Jap tissue as it 'takes' more readily than pencil.

The care of bromoil brushes. These are expensive so should be properly looked after. The best cleaning material is carbon tetra-

chloride. A little of this on a piece of thick flannel, pinned to the table, makes an admirable brush cleaner. Twist the brush in all directions over the cleaner finally drying off on clean paper till no trace of pigment remains. Keep the brush in a card or paper cone and hang up to a hook by means of a small screw-eye in the end of the handle.

Carbon tetrachloride may also be used to clean the pigment off the glass inking-plate, and off the hands. It is one of the most powerful grease solvents known and is non-inflammable—quite the reverse, being in fact the liquid used in many fire extinguishers. It is most cheaply purchased from any Pyrene agent in the form of a Pyrene refill tin.

It will be noticed, particularly on some papers, that the deeper tones of a transfer, holding, as they do, much more ink than the rest, appear slightly glossy. If this is objected to it can sometimes be removed by immersing the whole print for a few minutes in benzine. This is best done one or two days after the print was made but not so long after that the ink has hardened. If done too soon the pigment may run. The action of the benzine is to dissolve out the oil, which is the agent which causes the gloss, leaving the pigment only, and if successful the transfer will then have a uniform matt surface. I have done this successfully, but it is not certain in action and should be avoided if possible.

A method I have found successful sometimes of enriching a transfer which appears dull and uninteresting is to pass it through a solution of celluloid in amyacetate (celluloid varnish, strength about half saturation). This has the effect of depositing a thin layer of celluloid on the print, not enough to be visible as such but enough slightly to enrich the print.

My readers may have remarked, concerning my method of making colour transfers, that the process is so long that one is liable to go without meals all day. This is not so. The method I adopt to keep the matrix in condition for an hour or more whilst work is dropped is to place it, gelatine surface up, upon a sheet of glass. Place upon it a sheet of blotting-paper, larger than the print, which has been

saturated with water and drained. Squeegee in contact by means of a rubber roller so as to remove all air bubbles. Place a piece of dry blotting-paper on top and roll again. Now another sheet of glass over the whole and the print will remain in the same condition in which it was left.

If the print were merely left in a dish of water it would, in an hour or so, become sodden, and not only is there a danger of overswelling, but the paper itself absorbs so much water after the squashing effect of several passages through the press that it becomes difficult to handle and liable to damage.

If I may offer one last piece of advice to the beginner I would say: standardize your methods and do not attempt variations until you have mastered the process in its simplest form.

As I intended to infer in the introduction to this volume, it is not offered as a textbook. It relates my own methods; my object being to propound one consecutive series of manipulations with only the essential and useful variations, rather than assembling together all the many and often contradictory statements, suggestions, and methods, that could be advocated in a volume dealing with the subject from other than a single point of view.

CONCLUSION

I HAVE said but little in this volume from the aesthetic point of view on the subject of pictorialism. Having described, in detail, the process and variations of the process, the pictorial side must be left to the artistic perception of the worker. I have explained the ways and means, and I hope the reader has understood. It remains for the reader to make use of this most beautiful of all printing processes for the production of pictorial works displaying, not so much skill in production, as individuality of outlook and treatment.

Viewed as a whole it may be said that bromoil is not only the leading control process, it is the most versatile, the most elastic.

It is not dependent for success upon any one set of conditions as to negative or print. I have shown how satisfactory transfers may be made from good and from bad negatives, negatives so thin and flat as to be almost unprintable in any other medium, and negatives which are equally imperfect in the opposite direction, that of over-strong contrast.

I have attempted to show, too, variations of method and treatment for the production of prints of varying characteristics.

The individual worker will, after mastering the essentials, adapt the process to suit his own aims, adopting a technique which will, eventually and indirectly, characterize his work.

A printing process which offers so much scope for individuality *must* have a wide appeal. If, in this volume, I have made known some of the advantages of the process; and if I have given some indication of the fine quality of the results which come from an understanding of the process—then the object of this volume will have been achieved.

ILLUSTRATIONS AND NOTES ON BRUSHWORK

(ESPECIALLY COMPILED FOR THE BEGINNER)

A practical demonstration, supplementary to Chapters V and VI.

THE beginner at bromoil may find that a careful examination of the set of illustrations, numbered 1 to 9, will help him in his first attempts at inking a print. Reference should be made to the details of procedure appended, and the reproductions compared one with another.

With the object of separately inking eight identical prints all prepared, up to the point of inking, under identical conditions, the prints were made on one sheet of bromide paper which was treated throughout as if it were one picture only. The reproductions are the same size as the originals. In this small size it was possible to cover evenly the area of each picture with four strokes of the brush. The largest bromoil brush was used (Sinclair's No. 28).

Except for the light hopping referred to in No. 6 the brush action was normal, as described in Chapter V. In practice this action becomes a rapid succession of dabs, entirely without force, the brush being lifted gently and without the hairs quite leaving the surface of the print before the brush is again lowered.

The light hopping used for No. 6 is a slightly more springy action entailing a complete and deliberate removal of the brush after each stroke. The word 'hopping' is used with reluctance in the absence of an alternative word. True hopping to remove ink, other than the lightest cleaning of highlights, is definitely a bad practice and should always be avoided.

- No. 1. The original, unbleached, silver print.
- „ 2. The first application of ink of suitable consistency to the bleached and correctly swollen gelatine matrix; two or three dabs only with the brush.
- „ 3. After about 15 seconds' brushwork.
- „ 4. After about 25 seconds' brushwork.
- „ 5. After about 60 seconds' brushwork.
- „ 6. After about 3 seconds' light hopping (with the same brush and the

print at stage No. 4. No. 5 has been carried too far, see observations below).

- No. 7. After about 10 seconds' brushwork with slightly thinner ink. The finished print.
- ,, 8. The first application of ink as it appears when the ink is too thin, or the gelatine is much underswollen.
- ,, 9. Continued brushwork with soft ink, which, if the gelatine is sufficiently swollen, will give a print of passably good appearance but which will produce a weak and degraded transfer.

Observations.

The first application of pigment of correct consistency, and its preliminary working, does not blacken the whole picture but the pigment 'takes' roughly in accordance with the tones of the original picture (No. 2).

Less than half a minute's brushwork completes the picture under the brush so far as the hard ink is able (No. 4). In practice, with larger prints one works, of course, over the whole area as quickly as possible without attempting to finish any one part before commencing another.

Further work with the same ink only tends to deposit more ink in the darker parts until detail is lost (No. 5).

A slight hopping action of brief duration will clean up the work so far as it has progressed (No. 6). The extent to which this is necessary, if at all, depends upon the subject.

A very light application of slightly thinned ink will complete the middle and highlight tones without blocking up the darker tones (No. 7). A print so inked is perfect as a bromoil and has all the qualities necessary for making a good transfer.

If the pigment is too thin it 'takes' too readily and not according to the tones of the original print, except after continued brushwork when it becomes unsuited to transfer (Nos. 8 and 9).