

BROMOIL PRINTING AND BROMOIL TRANSFER

BY

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*AUTHORIZED TRANSLATION
FROM THE SEVENTH GERMAN EDITION*

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AMERICAN PHOTOGRAPHIC PUBLISHING CO.,
BOSTON 17, MASSACHUSETTS

1923

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*Manufactured in the United States of America
Electrotyped and printed, March, 1923*

THE PLIMPTON PRESS
NORWOOD · MASS · U · S · A

PREFACE

THE bromoil process has always been one in which it has seemed difficult to attain success. Though many books and articles on the subject have been published, every writer seems to give different directions and every experimenter to have difficulty in following them. The consequence is that almost every successful experimenter with this process has developed methods of his own and has frequently been unable to impart them to others. One reason for this has been that each make of bromide paper varies in its characteristics from the others and that methods, which are successful with one, do not always succeed with another. Various bleaching solutions have been described, and, as the bleaching solution has two functions—bleaching and tanning, which progress with different speeds at different temperatures—a lack of attention on this point has doubtless been a frequent cause of unsuccess. Little attention has also been paid to the necessity for observing the temperature of the water used for soaking the print. The author of the present book has investigated these various points very carefully, and for the first time, perhaps, has brought to the attention of the photographic reader the need for an accurate knowledge of the effect of these different variables.

In the following book he describes only a single method of work, without variations until the process is learned, though he does describe various methods of

work which may be used to vary results by the experienced worker. His method of instruction is logical and based on accepted educational principles. He describes one step at a time fully and carefully, explains the reasons for adopting it, and then proceeds to the next step in like manner. We feel sure that every reader, who will be reasonably careful in his methods of work and will follow these instructions literally, will learn how to make a good bromoil print. After attaining success in this way, the variations may be tried, if desired.

While the author gives instructions for testing out papers to see if they are suitable, it may be advisable to record here the results of some American and English workers. H. G. Cleveland in *AMERICAN PHOTOGRAPHY* for February, 1923, recommends, in addition to the papers specially marked by their makers as bromoil grades, the following: Eastman Portrait Bromide; P. M. C., Nos. 7 and 8; and Wellington, Cream Crayon Smooth, Rough, or Extra Rough. He suggests that a rough test may be made of a new brand of paper by placing a small test strip in water at 120° to 140° Fahrenheit for a few minutes and then scraping the emulsion surface with a knife blade. If the coating is entirely soft and jelly-like, it will probably be suitable for the process. If it is tough and leathery, it will be unsuitable, and, if a portion of the coating is soft but the other portion tough, then it will also be unsuitable. His experience is that Wellington Bromoil paper is entirely suitable for the process. Chris J. Symes in *The British Journal of Photography* for December 1, 1922, recommends for bromoil the following English papers: Kodak Royal, white and toned; Vitegas, specially prepared for bromoil; Barnet Cream Crayon

Natural Surface, Rough Ordinary and Tiger Tongue. For transfer, he has found the following suitable: Kodak Royal, white and toned; Kodak Velvet; Barnet Smooth Ordinary; and Barnet Semi-matt Card.

The reader who is interested in bromoil transfer, will find the directions of Mr. Guttman on this process slightly different from those of Dr. Mayer in minor points, but the worker who is far enough advanced to essay this difficult process will be able to recognize these discrepancies and choose the process which seems more useful to himself.

Metal etcher's presses for transfer are sold at comparatively high prices in the United States, but second hand ones may often be found in the larger cities. Small wooden mangles with maple rolls may be had at fairly low prices from dealers in laundry supplies, and have been found to be useful.

Following the style of the German original, italics have been freely used for the purpose of calling attention to the most important stages of the process, rather than for the ordinary purposes of emphasis.

Grateful acknowledgment is made to Mr. E. J. Wall for assistance in the first draft of the translation, and also in revision of the proofs.

FRANK ROY FRAPRIE.

BOSTON, February, 1923.

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BROMOIL PRINTING AND BROMOIL TRANSFER

PRELIMINARY REMARKS

WE all know what great progress photography has made in the last few years. The most obvious sign of this advance is the fact that it has gradually escaped from the practice of literal reproduction of the objects seen by the lens, and slowly attained to the rank of a recognized means of artistic expression, so that it can justly be considered as a new branch which has grown out of the old tree of reproductive art. This pleasing development may primarily be ascribed to the fact that the practice of photography, which was originally confined almost exclusively to professional workers, has gradually spread and has become a means of recreation to the multitude in their leisure hours. It was the amateur who demanded new methods and apparatus and thus gave a new impulse to photographic manufacturing. Improvements of the most fundamental character were made in optical apparatus, in the construction of cameras of the most varied types, and in the fabrication of plates and films. An extraordinary number of novelties has appeared in these lines in the course of time; modern photographic apparatus makes possible the solution of problems which would not have been attempted a few years ago, and improvements are still appearing.

The situation in the matter of printing processes is quite different. We are provided with apparatus and sensitive material for the production of the photographic

negative, in a perfection which leaves nothing to be desired. To produce a print from the negative, however, we had until recently no positive processes which were not well-known to previous generations. This may be confirmed by a glance at any photographic textbook written around 1880. The various printing processes, platinum, bromide, carbon, and gum, which were until recently the alpha and omega of printing technique, had been known for decades. Compared with the methods for the production of negatives, printing methods showed practically no advance; they remained in complete stagnation. We can scarcely consider as an exception certain new methods brought forward in recent years, which proved unsuccessful and quickly disappeared from practice.

These facts can only be explained by remembering that the positive processes, which were available to photographers and with which they had to be satisfied, were rather numerous and offered a considerable variety of effects. Nevertheless, a single characteristic was common to all previously known photographic printing processes — their inflexibility. Each of these processes, in spite of its individual peculiarities, could do nothing more than exactly reproduce the negative which was to be printed. It was possible to produce certain modifications of the negative image as a whole, by printing it darker or lighter, or by using a harder or softer working process. Changes on the negative itself for the purpose of giving a more artistic rendering must, however, always be very carefully thought out in advance and effected by retouching, often difficult and not within the power of every photographer, or by other methods which change the negative itself. If such modifications of the

negative proved unsuccessful, it was irreparably lost; if they succeeded, the plate, as a rule, could no longer be used in any different manner. The possibility of undertaking radical changes which might realize the artistic intentions of the worker on the print itself, in order to save the negative, and especially of planning and carrying out the deviations from the original negative, which expressed the worker's artistic feelings, during the printing, was not afforded by any previously known printing methods. A single exception was found in gum printing, if the production of the image was divided into a series of partial printings. Each of these phases, however, was in itself incapable of modification except for the possibility of doing a certain small amount of retouching; nevertheless, by means of efficient management of the single printings and by properly combining them, beautiful artistic effects could be obtained. This, however, required an extraordinary amount of practice and skill, and a very considerable expenditure of time, and it must also be remembered that the failure of one of the last printings often destroyed all the previous work. Also, in gum printing, to have a reasonable expectation of success, the work must be thought out from the very beginning and carried out in exact accordance with a plan from which it was scarcely possible to deviate during the work, even when it became apparent that the desired result could not be satisfactorily obtained.

The possibility of planning results during the course of the printing and carrying them out directly on the print itself did not previously exist.

The first process to bring us nearer to this ideal and make possible a freer method of working was oil printing. The technique of this process consisted in sensitizing

paper which had been coated with a layer of gelatine, by means of a solution of potassium bichromate, and of printing it under the negative. The yellowish image was then washed out; the bichromate had, however, produced various degrees of tanning of the gelatine, corresponding to the various densities of the silver deposit in the negative. The lighter portions, which had been protected from the action of light by the dense parts of the negative, retained their original power of swelling and could therefore later absorb water. The shadows, however, corresponding to the transparent parts of the negative, were tanned, had lost their absorptive power, and had become incapable of taking up water. Consequently, the high lights swelled up fully in water, the shadows remained unchanged, and the middle tones showed various degrees of swelling corresponding to the gradation of the negative. If the print was blotted off and greasy inks spread upon it by means of a properly shaped brush, the inks were entirely repelled by the swollen high lights which had absorbed water, and completely retained by the fully tanned shadows, while the middle tones, in proportion to the amount of tanning, retained or repelled the greasy ink more or less completely.

In this process, for the first time, there was found a possibility of changing various parts of the image absolutely at the worker's will, even during the progress of the work. By the use of harder or softer inks it was possible to color the swollen high lights more deeply, or to hold back the shadows so that they did not take up all the ink that was possible. It was possible to leave certain parts of the print entirely untouched and work up other parts to the highest degree; in short, oil

printing opened the way to free artistic handling of the print.

Thus, the oil process was the first photographic printing process in which we were completely emancipated from the previous inflexibility which ruled in all printing.

Nevertheless, a number of disadvantages attach to oil printing which hinder its general use. The most important shortcoming of this process is that bichromated gelatine as a printing medium can only reproduce a comparatively short scale of tone values. The production of prints from contrasty negatives is therefore impossible, for the shadows are much overprinted before details appear in the high lights, or on the other hand, there is no detail in the lights if the shadows are fully printed. This difficulty can be only partly overcome by the most skilful use of inks of various consistency. It is indeed possible to ink up the lights by the use of very soft ink, but this does not replace the missing details; and overprinted shadows, which it is tried to improve by keeping down the quantity of ink applied, appear empty. Thus it happens that most of the oil prints yet exhibited show a certain muddy family likeness, which, at first, when the process was new, was considered to be advantageous on account of the novelty of the effect, but later received deserved criticism. A second disadvantage of the oil print is the fact that it is not possible to observe the progress of the printing on the bichromated gelatine film. The brownish image on a yellow background is very deceiving, and it is usually necessary to determine the proper amount of printing for each individual negative by actual experiment, and to make additional prints by means of a photometer.

Another inconvenience of other previously known

printing processes, to which oil printing is also subject, comes from the fact that the great majority of negatives are now made with small cameras. On account of the extraordinary perfection of modern objectives, the small negatives produced by modern hand cameras can be enlarged practically without limit. The advantages of a portable camera are so considerable that large and heavy tripod cameras have practically gone out of use, except for certain special purposes. On the other hand, however, direct prints from small negatives are, as a rule, entirely unsatisfactory from an artistic standpoint. If we desire to use any of the previously mentioned positive processes, including oil, to produce artistic effects, we must first make an enlarged negative. This requires, in the first place, the production of a glass transparency from the small negative, from which we may prepare the desired enlarged working negative.

Various workers held various views as to whether this requirement were a help or a hindrance, but it was universally accepted as a necessity. The way from the plate to the enlarged negative, nevertheless, always remained uncertain, tedious, and expensive. Simple as it may appear to be, it includes a whole series of stages where it is possible to come to grief. At every single step lurks the danger that undesired changes of gradation in the negative may result from inaccuracy in exposure and development, from the use of improperly chosen sensitive material, and from various other causes, and even if these factors are all correctly handled, there is still an unavoidable loss of detail. Therefore the path from the small original negative to the enlarged negative necessary in previously used processes is neither simple nor safe.

Naturally it was also necessary to travel this wearisome path in working the oil process, when it was desired to make large prints from small negatives.

When it was announced in England that Welborne Piper had discovered a process which started from a finished silver bromide print instead of from a gelatine film sensitized with bichromate, new vistas were opened. If the process should prove to be practically useful, we could consider that all the previously mentioned difficulties were overcome at a single stroke.

The principle of this process, *bromoil printing*, is the removal of the silver image from a finished silver bromide print by means of a bleaching solution while, simultaneously with the solution of the silver image, the gelatine film is tanned in such a way in relation to the previously present image that the portions of gelatine which represent the high lights of the image preserve their capability of swelling, while the shadows of the image are tanned.

Therefore the bromoil process is a modification of oil printing, based not upon a bichromated gelatine film, but upon a completed bromide print. This represents extraordinary progress. The two previously mentioned disadvantages of oil printing are completely avoided in the bromoil process. We now have at our command the far longer scale of tone values of bromide paper and we can use the great possibilities of modification allowed by the highly developed bromide process. The difficulties of printing are completely removed, for we have at our command a perfectly visible image as a starting point. A further advantage which can not be too highly estimated is inherent in the bromoil process: *complete independence of the size of the original negative.*

When I began my investigations in the field of bromo-oil printing, the process had, as far as practical value went, only a purely theoretical existence, as is the case in the early days of most photographic processes. The fact that it was possible to produce images on a bleached bromide print by the application of greasy inks was well established. The practical application of the process was absolutely uncertain and only occasionally were satisfactory results obtained. Most of the prints produced in this way were flat and muddy. It is easy to understand that the process could find no widespread popularity while it was so incompletely worked out. The researches, which I then began, showed that most bromide papers took up greasy inks after development by any method and subsequent bleaching of the image. The pictures thus obtained, however, were muddy, flat, and not amenable to control, and therefore were less satisfactory than the bromide prints from which I had started. During the course of my work, I have succeeded in obviating these difficulties, in the first place, by preparing a satisfactory bleaching solution, next, by determining what properties bromide paper must possess in order to give perfect bromo-oil prints, and, finally, by working out a series of other necessary conditions, which I have described in this book and which must be adhered to if the process is to work smoothly and certainly, and produce satisfactory results.

The bromo-oil process, which is now completely mastered, offers, in brief, the following advantages:

Simplicity, certainty and controllability of the printing material;

Independence of the size of the negative and easy production of enlarged artistic prints;

Freedom in the choice of basic stock and its surface;
The possibility of freely producing on the print any desired deviations from the negative, during the work;
Full mastery of the tone values without dependence on those of the negative;

Independence of daylight, both in printing and in working up the print;

The possibility of the most radical alterations of the print as a whole and in part during the work;

Freedom of choice of colors;

The possibility of preparing polychromatic prints with any desired choice of colors, and complete freedom in the handling of the colors;

The possibility of comprehensive and harmonious modifications of the finished print;

The possibility of producing prints on any desired kind of non-sensitized paper by the method of transfer.

The description of working methods will be divided into the following phases:

- I. Production of the bromide print;
- II. Removal of the silver image;
- III. Application of the ink;
- IV. After-treatment of the finished print.