THE KOSEL METHOD FOR TWICE-PRINTED PLATINUM PAPER

WALTER ZIMMERMAN

The Editor of American Photography has requested me to translate and review, for the benefit of American readers, a series of articles by Herr H. C. Kosel of Vienna, which he entitles "Combination Platinum Printing." In doing this, I confess that I have made no experiments with the process, and have not made up even one of the several formulas. I am, however, fairly familiar with the whole subject, as well as with gum-bichromate work, referred to in the articles; and have made numerous experiments with both, with results which have been published. The process which has been so carefully worked out by Mr. Kosel is one which, in itself, is extremely interesting; but with its many complications and variations it appears to me to be one that is principally adapted to use by persons having an abundance of time and a liking for experiment.

Another reason for not having dug personally into this process is that some short-cuts occur to me, by which similar results, possibly better, may be obtained with far less expenditure of time and effort. I will suggest these short-cuts to the reader in this prefatory article. Since the whole subject was referred to me for opinion, it has seemed, after a most careful reading and translation of the original text, that there is a large portion of the original treatise which may be advantageously omitted as being unnecessary and confusing. There are also treatments for supposed artistic effect, which to my mind are violations of good taste as to color and values, and to which I shall, however, merely call attention, leaving the treatise so abbreviated to speak for itself in a technical way. May I say that I dislike to mutilate in this way another man's writing just as much as, if not more than, it were my own work being mutilated? The reason is simply that, as first stated, the process may be made most available to the American reader.

A résumé of the process will make the subject simpler. Mr. Kosel's method is to select a grade, surface, and color of paper stock to suit the individual taste; to size it properly, as described; to give a first coating and printing for extreme delicacy and detail in the higher lights and halftones; then, when developed, cleared, and dried, to give a second coating and printing with emulsion adapted to extreme contrast and for a different color or shade; to expose and develop this second coating for harsh contrast; and by this means obtain a two-color or two-tone print with a wider scale of gradation than that obtainable by single printing. He calls attention to this method's being that of gum-bichromate printing, with the inference that it was that which influenced him.

It is quite true that even such a superb printing medium has its serious limitations in the scale of gradation, and that a system for extending that scale successfully should give additional value and beauty to work in that medium. Whether the method described by Mr. Kosel is the best obtainable or not is a matter for demonstration. From what he says as to detailed methods for his system and as to color combinations I feel that I would not like such prints if I were to see them; but that is a matter of proof, like the oft-mentioned pudding.

For one thing I feel sure that the coating and printing of the "strong" print on top of one which has been made for delicate detail is like having the horse follow the cart. If, on the contrary, the "strong" print is made first, giving heavy but graded shadows, and the soft, detailed print follows, then the latter binds the whole picture together and gives the effect that most people of discernment would desire.

Also, I am confident that superimposing a black or brown-black "strong" print, with its harsh contrast, over a thin, detailed print in yellow-brown, is going about the thing in the wrong way, and that if two tones are desired the darker should be underneath. Otherwise the values probably "jump" rather than blend. All of this is decidedly a matter of opinion, for Mr.
DORIS
C. C. TAYLOR

*Ninth American Salon*
Kosel all through his articles shows a desire to have color separation, while my own taste would be very carefully to avoid it. It is on account of this personal difference in taste that I have, from my translation, omitted all directions as to variation in color itself, retaining those as to variation in tone. The treatises include directions for making the "halftones bluish, greenish, or reddish, and the shadows black-brown, sepia, or neutral black." The suggestion of color combinations such as these provoke the use of undiplomatic language in attempting to describe them. As if, however, the color effects already suggested were not sufficiently weird, the treatise further proposes the obtaining of "artistic color effects" by means of dyed varnish on top of previous acrobatic color stunts, such as "solutions of blue, yellow, or aniline dye for the print"—that is, to stain the paper—or kassel brown, burnt sienna, cobalt blue, zinnober green, etc., in either varnish or gum-arabic as a final coating. I have seen Dinah attired for her half holiday, and she was not arrayed like one of these.

But lest the photographer fail to produce a sufficiently "artistic" result with his two colors of printing and third color of dye, the final article in the treatise leads the reader through the shambles of multiple mounting in various colors. The sixth article surely leads us through one riot of color, with constant suggestion as to the effect's being "artistic."

Mr. Kosel is far from being alone in frankly proposing and adopting atrocious color combinations. I could mention names reputed to be great in photographic art whose understanding of color appears to be painfully false. Am I putting myself upon a pedestal in making these remarks? Far from that, I have been through—completely through, I hope—the stage of color-madness; tried to get colors, real colors, empirically, and failed, as I think every one does who makes the attempt. All efforts at color photography by other means than true color separation must, I think, result in failure. Unless we have genuine polychrome, we should stick to monochrome in photography. We may have tones or tints, but not colors, for the simple reason that we cannot possibly hope to have the right colors and values in the right places. It is one of those cases where if one cannot get a thing right it should be altogether avoided; and, with hit-or-miss double printing, with or without the dyeing, etc., there is no possibility of being right. Strictly speaking, there is but one proper color for photographs—and that is no color at all; namely black. All browns, blues, greens, reds, etc., are totally wrong attempts to convey impression of color to try to please the eye. I trust that the reader will forgive the insertion of these rather necessary suggestions.

The real and artistic aim of the Kosel method is to lengthen the scale of gradations of the photograph. When one looks out the window one of these bright summer mornings he sees that which, even in monochrome, cannot possibly be reproduced in the photograph—the brilliant sparkle of the dew on the grass, and the wide range of illumination from sunlight or its reflection to shadow. Therefore to get nearer to nature the photographer needs the wider range of tone gradation, such as the Kosel process in part supplies.

For the lengthening of the gradation scale there are, however, several other and quicker methods. Mr. Kosel mentions the glycerine brush development of platinum, and gives directions for it as if original with him. Such things happen, and unconsciously sometimes. But the method referred to is the published invention of Mr. Keiley of New York City. This method alone accomplishes the result aimed at by double printing; for the one printing is for strength and depth, and the modifications obtained by the brush-glycerine development extend through every possible photographic scale of gradation from absolute black to the white of the paper. A photographic print cannot accomplish more than that, and no series of printings can make the black of the fully deposited platinum any blacker. But brush development requires considerable artistic skill, much time, and great patience; and, after all, it is not purely photographic.

If the photographer be so fortunate as to be adept in both gum-bichromate and platinum...
THE RUDELSBURG FROM A BALLOON
Taken with a Zeiss Temar
printing he may save himself much time and trouble, and obtain results which I, for one, believe to be far better than those from the superimposition of platinum printings. I refer to "gum" printing on top of platinum. The platinum gives delicacy and detail, and the gum-pigment gives strength. This is directly contrary to my own criticism earlier in this article that the "strong" print should come first; but with bought platinum paper there is no avoidance of printing that first; the "gum" print on top of that certainly gives an effect of great richness and depth.

The platinum print for this process should be rather underexposed or underdeveloped, a rather pale print, with detail extending up to the highest lights, and without depth in the shadows. Such prints are "discards" from platinum printing. If the reader has kept his pale discs, I suggest that he try gum printing on top of them. The color should be the same, black on black, or sepia on sepia. Squeeze out a little tube water-color in a small bowl or saucer; add to it a trifle more than an equal quantity of a fifty per cent solution of gum-arabic (one ounce gum, by weight, with one ounce water, by measure, completely dissolved), and grind until the gum solution takes up all of the tube color; then add six to eight times, by guess, saturated potassium bichromate solution in water as compared with quantity of gum solution, and grind all three thoroughly together. With a soft brush, coat this mixture over the face of the pale platinum print as evenly as possible, and then hang to dry in a dark, dry room. If you have followed directions as to the mixture, and have merely washed it evenly over the surface, the paper should be dry and ready to expose in ten minutes, or at least in fifteen. Register by holding the paper in contact with the negative in the printing frame until the darks of the original print neutralize with the clear places in the negative; press the back of print firmly with the fingers, so that it and the negative will not slip, and then attach the backboard of the printing frame. Expose for sepia for precisely the correct exposure of the negative for platinum paper — which you should know — and for black twice that time. Develop by placing for a moment in a tray of water, and then fire a jet of water from a sprinkler at the print until exactly the right quantity of pigment has washed off or rather until precisely the right quantity remains on. This is giving you the simplest possible directions for "gum" printing; but if you will follow them exactly you will — you must — obtain results; and if it be your first attempt at "gum" printing, you will have learned something of it in a very easy way. The directions that I have just given are those for obtaining contrast in the "gum" coating to fit the Kosel idea. A serious objection to "gum" printing on top of platinum is that the platinum paper changes in size after soaking, for the platinum process, and therefore, particularly as to larger sizes, does not register accurately. One overcomes this in part by registering the portions of negative where strongest printing or fullest detail occur, letting the paler, less sharply focused parts go slightly out of register, probably imperceptible with this precaution.

Another method for extending the gradation scale as a simplification of the Kosel process would be to adapt to it a method for obtaining harsh contrast on platinum paper, which I discovered and published about ten years ago; namely, the development of the first print with water, without oxalate. The print on bought platinum paper is by one method exposed until fully printed out, instead of the merely visible image, and is to be developed by pouring hot water over it and clearing with hot acid baths. The other method is to expose for a "reversed" image, the print appearing to be negative rather than positive; such a print is to be developed with cold water and then cleared with hot acid baths. It is but proper economy to use stale paper for either of these methods, the results being as good (or as bad, according to your taste) as with fresh paper. Then by coating and printing for softness and detail, following one of the Kosel formulas, you have the result at a cost of less time and trouble.

In the portion of the translation which follows I have omitted the several lists of paper stocks which appear in the articles, for the reason that they are largely papers not readily obtain-
PORTRAIT
HELEN M. MURDOCH, F. R. P. S.
able in this country; and also because there are much cheaper papers than the costly water-color and drawing papers mentioned in the list, which would answer the purpose still better. My experience has been that with the American writing papers known as the "loft-dried" there is less liability to shrink and swell than with any water-color or drawing paper; and that there is also a large saving in cost, as well as a gain in strength. Ask your paper dealer for sheets of loft-dried writing paper, and select weight, etc., to your taste. Then, with the sizing carefully described in the translation, you will, I am sure, have a better paper than would have been obtained from the list at five to ten times the cost. The distinction is between paper that is "loft-dried" in the sheet and that which is made in the roll and dried in festoons. Greater care is taken with sheet than with roll paper in the manufacture.

COMBINATION PLATINUM PRINTING

HELM. CL. KOSSEL

Adapted by the late Walter Zimmerman

COMBINATION platinum printing is a method by which the scale of tone or the gradation of a photograph may be greatly extended. I have worked out this combination method, and now give my practical experience.

When we examine combination printing in gum bichromate, we perceive the effect which may be obtained by applying this principle to platinum printing. Single-coated gum prints are feeble in comparison with those where additional prints are superimposed. Platinum prints may also be superimposed on the same general principle. Three conditions upon which success in the new process will depend are

1. The choice of the paper.
2. The variety of the color-tones.
3. The quality of the platinum prints may be determined, according to coating and developer.

I. THE RAW PAPER AND ITS TREATMENT.—For combination platinum printing one will select paper over which the coating will spread favorably; as well as one with grain suited to the effect desired; also it must not shrink or swell after soaking. Most papers are glue sized, and such coating is unsuitable. If such papers are used, it will be necessary to unsize them, and afterwards coat them with vegetable sizing, such as arrowroot or agar-agar.

To remove the glue sizing, soak the paper or card for an hour in a mixture of one liter of water and ten cubic centimeters of sulphuric acid; then wash in hot water containing a little ammonia; press the sheets under blotters and hang them to dry in a warm room.

ARROWROOT SIZING.—When about half dry, lay the paper in a tray containing a hot, two per cent solution of arrowroot, leaving it there until the solution soaks completely into the paper; then, without washing, hang the paper up and allow it to dry gradually. In about a minute or so, when some of the surplus fluid has run to the bottom of the sheet, wipe it from the edge with a bit of clean cloth (or absorbent cotton), then take down the sheet and reverse its position, suspending from the end which was lowest. It is to be strongly recommended to prepare a considerable quantity of paper at one time. The arrowroot solution must, however, always remain hot. The arrowroot is first to be made into a thick paste by mixing with cold water, then mixed with the hot water in an enameled metal cup or pot. If the solution is permitted to get cold and is then reheated, balls of paste form which have an unfavorable effect as well as reducing the strength of the solution.

AGAR-AGAR SIZING.—The paper possesses still greater resistance to the penetration of the sensitized emulsion if one gives a second coating with a one per cent solution of agar-agar, as follows: 5 grams of agar-agar in 500 of water, allowed to stand one hour (in order to dissolve
PORTRAIT
HELEN M. MURDOCH, F. R. P. S.
thoroughly), and then cooked for five minutes. Filter the hot solution through muslin and let that which remains stay until it becomes a stiff jelly. Press this twice through coarse linen until it becomes a thick mass, which may then be passed over the paper. With this in view, fasten the sheet of paper to a drawing board (by means of thumb tacks or push pins), rub the agar-agar (that is, the jelly-like mass) thoroughly over the paper by means of a soft sponge, until the whole sheet is equally moistened by it; and then hang the paper up to dry thoroughly.

It is to be recommended that these preparations be made in the evening, in order that over night the paper may become quite dry as well as free from dust, which is more likely to be stirred up in a room where persons pass in and out.

II. **Platinum Coating for Cold Development.**—I will describe the preparation of the normal, usual platinum paper; and after that, will give the preparation for combination printing. The platinum process depends upon the reduction of potassium chloroplatinum into metallic platinum. This transformation is accomplished by the reduction of ferric oxalate through the action of light into ferrous oxalate. One coats the paper with a mixture of ferric oxalate and potassium chloroplatinum, prints the paper under a negative and develops with a solution of potassium oxalate. . . . Absolute cleanliness is required throughout, since the least foreign matter in trays, dishes, or brushes is injurious. For this process, one will need the following chemicals and implements:

1. The lead-iron solution consisting of a ten per cent solution of ferric oxalate in distilled water, mixed with 1 gram lead oxalate in 100 c.c. of the iron solution. The iron and lead-iron solutions are very sensitive to light, and must be kept in a black, yellow, or brown bottle in a dark place. They have excellent keeping qualities.

2. Potassium chloroplatinum. One gram of the red-brown crystals is to be dissolved in 7 c.c. distilled water, and is to be kept in a chemically clean bottle (one which has never previously been used).

3. Chemically pure oxalic acid; one gram dissolved in 10 c.c. distilled water; this to be kept in a dropping bottle.

4. Potassium bichromate, C.P.; one gram in 100 c.c. water; also to be kept in a dropping bottle.

5. Sodium chloroplatinum; one gram of these long, yellow crystals dissolved in 10 c.c. distilled water.

6. Potassium oxalate, neutral; thirty grams dissolved in 100 c.c. hot water.

7. Citric acid; ten grams dissolved in 100 c.c. water.

8. Potassium phosphate.

9. Two round, plain bristle brushes, 1½ to 1¾ inches in diameter. These brushes must be thread bound, free from metal. Fine paste brushes are suitable.

10. A soft badger blender of the kind used in “gum” printing. These brushes are expensive, and one such brush will probably suffice. It should have three or four rows of tufts and be three to four inches in width.

11. One graduate to measure 10 c.c., and another for 25 c.c.; also a glass bowl, such as is used in gum-bichromate work, a liter measure, mercuric citrate, ammonium oxalate and corrosive sublimate.

All of these utensils and chemicals should be kept in a perfectly clean box, separate from any other chemicals and from dust.

### III. Formula for Black or Dark-brown Tones

- 4 c.c. distilled water
- 7 c.c. potash-platinum solution
- 12 c.c. lead-iron solution
- 1 to 2 c.c. soda-platinum solution
- 8 drops oxalic acid solution
- 4 drops bichromate solution
GIRL WITH PARASOL

HELEN M. MURDOCH. F. R. P. S.
This emulsion must be thoroughly mixed with a glass rod and will be poured into the clean glass bowl previously referred to. After the mixture is ready, it should be kept (in a dark place) for fully twenty-four hours, after which the paper may be coated with it. It may, however, be kept for several days.

**IV. Formula for Sepia Platinum Paper**

9 c.c. lead-iron solution
4 c.c. potash-platinum solution
2½ to 4 c.c. saturated mercuric citrate solution
6 drops ammonium oxalate solution, one to ten (of water)
1 to 4 c.c. soda-platinum solution

This emulsion will be poured into a bottle to ripen for a day. If used earlier, a flat, insipid print will result, with gray-brown tones. Too old an emulsion, on the contrary, gives harsh, ugly tones.

Another recipe for sepia platinum paper follows:

5 c.c. potash-platinum solution
10 c.c. lead-iron solution
8 c.c. distilled water
2½ to 4 c.c. (saturated) corrosive sublimate solution
4 drops bichromate solution
1 to 2 c.c. soda-platinum solution

The soda-platinum solution is only useful where very weak negatives are to be exposed with the paper. The presence of the corrosive sublimate in the emulsion has the property of hardening the scale of tones in any case. This last formula must ripen for several days, or at least twenty-four hours, as otherwise an ugly gray-brown print without brilliance will result.

If this formula is used for the ordinary sepia platinum print, the paper will have to be coated twice. This formula is for the production of the halftones. For the ordinary platinum printing, one will dry five minutes at room-temperature, and then for three minutes over a gas-burner at a temperature of 50° C. (120° F.). The second coating will then be applied quickly and the paper will be dried according to the directions which will follow.

The sepia coating has rather less sensitiveness to light than the black printing paper; it has also poorer keeping quality. It is to be developed with an acid developer. The amateur, will, ordinarily, be satisfied with these two emulsions; but for combination printing there will be some modified recipes.

**The Black Print.**—For thin and weak negatives the recipe for black tones is suitable. (This wording appears to apply to the formula under paragraph III, although this part of the treatise distinctly relates to sepia printing).

If, however, the negative be dense and hard, then the following recipe will suit:

6 c.c. platinum solution (evidently the potash-platinum solution)
13 c.c. lead-iron solution
5 c.c. distilled water
½ c.c. soda-platinum solution
6 drops oxalic acid
No bichromate

The sodium chloroplatinate and the potassium bichromate cause sharper, more contrasting tones. Therefore, with weak, flat negatives, one uses decidedly more of the soda-platinum and of the bichromate, as follows:

6 c.c. potash-platinum solution
9 c.c. lead-iron solution
3 c.c. distilled water
2 to 4 c.c. soda-platinum solution
8 drops oxalic acid solution
4 to 20 drops bichromate solution
STUDY OF A HEAD
HELEN M. MURDOCH, F. R. P. S.
The relative proportions of lead-iron likewise cause a change in the printing quality of the emulsion, since the solarization of the print is thereby influenced. The appearance of solarization may be described in this way: that in the development of the platinum print the deep shadows appear yellow-brown, and grated or flaky. The iron influences these appearances; therefore, with hard negatives, printing deep shadows, one will add more iron to the emulsion, in order to prevent the solarization. This, however, for weak negatives, would produce speckled prints.

The developer for sepia paper may, with the sublimate and with the citric acid and phosphate, be varied, so that, by greater or less quantity of sublimate in the developer, one may obtain warmer or colder tones. Further reference will be made to this subject later.

Coating and Drying.—The arrowroot-coated paper should be so marked that the coated side may not be mistaken. It should be fastened to a drawing board by means of glass-head thumb tacks or push pins. If metal tacks are used they should be nickel plated. For cleanliness, the drawing board may first be covered with paper.

The platinum emulsion will be filtered through a clean cloth or filter paper or a wad of absorbent cotton into the bowl; when there, cover it carefully and place in position for use. The paintbrush will be softened in clean water and carefully drained, so that no water may remain in it. Dip the brush full of the platinum emulsion and spread the paper with it quickly. One may also have 12 c.c. of the emulsion in a glass receptacle, pour it over the full sheet of paper and complete the spreading with the brush to make the coating smooth and even. The pouring and brushing is best begun in the center, and worked outwardly to the edges. When the whole surface appears to be equally covered, use the badger blending brush lightly and with long strokes until the coating has a dull appearance, on account of beginning to dry. As soon as dull places appear, the blender will be laid aside; otherwise the brushing will cause spots when printed. During damp weather the prepared paper must be thoroughly dried, as otherwise in coating the emulsion will sink into the paper, and weak, flat prints will result. The entire process of spreading the emulsion on the paper must be complete within two or three minutes, and the coating must be done in a room with very little daylight, or better with artificial light only. Unless large
pictures are to be printed, I advise that the sheets of paper be cut into suitable sizes and the pieces coated as so cut, as one can work more surely and quickly in that manner. After coating, the sheets should, temporarily, say five minutes, be hung to dry with clips; after which they will be transferred to the quick-drying room. The coating-room should have a temperature of at least 60° F. If dried too quickly, the resulting prints will have a grayish veil, and will be weak. If the heat be insufficient, clean-cut pictures cannot be obtained. The right temperature for drying is 122° F. It is needless to say that the drying-room must be dark, for the coating is light-sensitive whether dry or wet.

The prepared and dried paper, if not immediately used, should be kept in a dry place. In order to keep it for a considerable time, it should be packed in tin boxes, with packages of calcium chloride wrapped in paper inclosed. This calcium chloride absorbs any possible dampness and enables the paper to be so kept for many weeks.

In packing, one must be careful to arrange the paper in layers in such manner that no coated side shall touch another coating, the latter having an injurious effect. In laying two pieces face to face and putting away in that manner, I noticed a dull, flat effect in the parts of the surface where the coated parts were in contact.

Combination in Brown.—In order to make two superimposed platinum printings, one must carefully analyze the tone-scale of the picture, both as to the delicate tones in the lights and the quality of the deep shadows. My method is to take a bright, warm-brown print and give a second coating, for strength, in black. This combination leaves the highlights warm and sunny, with shadows deep and dark.

If we examine a negative with a sunny landscape, or a portrait with dark shadows or background, such a negative is suited to my combination printing method.

In order to obtain the most delicate warm-brown possible for the lighter portions of the print I mix the previously described sepia platinum emulsion (the first) with five times the stated quantity of water, as follows:
THE CONVALESCENT

H. M. LONG

*Ninth American Salon*

2 c.c. sepia platinum emulsion with sublimate
10 c.c. distilled water

With this thin emulsion it is important to use a paper that does not swell or shrink. One may test the paper by pressing thumb tacks at four corners of two sheets of paper; by wetting one of them (thoroughly) and then replacing and putting in the thumb tacks again the marks will show whether the wet sheet has swolled.

V. **Sepia Platinum Developer.**—The development of the sepia paper will be by means of this solution:

- 18 to 20 grams potassium oxalate, according to the density of the negative
- 100 c.c. hot water, to dissolve, then
- 3 grams potassium phosphate
- 2 grams citric acid
- 1 gram corrosive sublimate

This sepia platinum developer is only for my own formula for paper coating — that is, for the double-coated and developed sepia paper. It is not suited to the ready-coated sepia paper.

My sepia developer is to be used *cold*. It must be thoroughly mixed with a glass rod, in order that the sublimate be completely dissolved.

The print will develop slowly, that is, in one or two minutes. The printing and development should be strong enough to show detail in the lights, but not to obscure the shadows. Increasing yellowness of tone will be obtained by using additional sublimate in the developer, which, on the other hand, increases the time of development.

VI. **Sepia Clearing Bath.**—The print so developed will now be cleared in three acid solutions, as follows:

- 6 c.c. hydrochloric acid
- Water, 1 liter

The print is to remain in each of these baths eight minutes. If one uses more acid, the delicate tones will be reduced, and the color will be darker brown, since stronger acid releases the mercury from the platinum. Therefore use the smaller proportion of acid and take the longer period of clearing. After the clearing, wash half an hour and then dry quickly.
The developer may be modified to suit. If the print be too hard, use more oxalate; if too weak, use more water; if too cold in tone, use more sublimate; if too yellow, then add some fresh developer without sublimate. All of these details are of importance for obtaining the precise effects, colors, and tones desired.

After the prints made in this way have been quickly dried, the emulsion for the strong print may be applied at any time. The formulas for this second coating are to follow.

THE "STRONG" PRINT.—The "strong" print over the first print for the halftones already described is to supply the strength of depth which the first print lacks. I take the print, completed as to the first coating, and spread upon it the emulsion, modified for the production of harder effects, now described.

VII. EMULSION FOR THE "STRONG" PRINT

6 c.c. potash-platinum solution
12 c.c. lead-iron solution
4 c.c. soda-platinum solution
5 to 10 drops bichromate solution

The spreading of this emulsion over the print is quite as simple a matter as the original coating. The coated paper must also be dried in the same manner as before. The print is, of course, less visible, and the picture with second coat naturally appears muddier and yellower. When the paper is properly dried the exposure may be made immediately. For this, please observe the following rules:

The paper must be absolutely dry, and must be of the same temperature as when the first coating was handled, in order to avoid stretching or shrinkage. If, however, the paper has stretched it should be warmed, to cause shrinking; and if it has shrunk, one may lay it for a few minutes in a cold room, or between two sheets of cool glass, which will cause it to expand. In this fashion, change in the paper may be counteracted. The paper for the second exposure must necessarily register to the first print precisely.
This being done, the exposure, if an exposure-meter be used, will be one grade deeper than for the original print in order that the shadows may be fully printed in. The development will be as follows:

VIII. DEVELOPER FOR THE "STRONG" PRINT

10 grams potassium oxalate, dissolved in
100 c.c. ordinary water, hot; then
2 grams potassium phosphate
2 to 8 drops bichromate solution, according to the degree of contrast desired

This developer is to be used cold. It has the property of not developing the shadow-tones nor the weak transitions; but, on the contrary, in the darker places to show a solid black. In this manner the strong print is placed upon the halftone print, to give the needed effect of shadow, and to produce the desired result.

The partial development of the strong print is, however, another matter. To emphasize the shadows in certain places only, lay the print in glycerine until it softens, then press it down upon a sheet of glass, printed side uppermost, and, with stiff paintbrush, using a twenty per cent oxalate solution (that is, the ordinary solution diluted with four parts water), develop in this manner such portions of the print as are to be emphasized, such as, for instance, part of the foreground of a landscape or the eyes and hair of a delicate portrait. This method gives a wide margin of choice as to method of handling and effects to be obtained for the production of artistic pictures. He who has no knowledge or inclination for work of this character may, on the other hand, complete his development in the ordinary manner.

The partial (glycerine and brush) development may also be effected to produce a two-color print, such as in brown and in black. This would be by development for black with the ordinary oxalate solution, and then, for the warm tones, use one to two per cent sublimate and citric acid. (The meaning is that the two colors may be obtained on a single coating and printing by altering the developer, as has been well known for a number of years.)

The clearing will be in three acid solutions as already described. (This is correct, for if
the clearing bath were that normally used for black-printed paper it would cut the highlights of the under print.) The brilliancy of the finished print may be increased by coating it with either water-color varnish or negative varnish; one part lacquer and two parts absolute alcohol. The varnish is to be spread lightly and quickly over the surface.

IX. Failures and Mistakes

(A) Faults in preparation.

Lightish stripes or spots on the paper. These are caused by unequal coating of the paper.

If the print be weak and insipid, the paper was too slowly dried (too low a drying temperature), or else the (paper or) the solution was exposed to the light.

Solarization (bronzing) of the shadows is caused by too little iron in the emulsion.

(B) Faults in development.

When the print develops too quickly, so that the shadows are blocked, detail is lost, and the highest lights clouded, then the print was (naturally) overexposed. The remedy (not for a developed print, but for one similarly overexposed) is to use a diluted oxalate developer with additional bichromate.

If the image is too long a time developing and only the shadows appear, then (naturally, again) the print was underexposed. The remedy is to use a concentrated hot developer; such a print may, by color-toning, be saved.

If the print appears insipid and dirty in the highlights with insufficient strength in the shadows, the platinum paper was damp. Such paper is (probably) decomposed and unfit for use.

If white specks appear during development, the developer was poured too slowly over the print, causing air bubbles. These may be touched out with the finger (better with a small brush saturated with the developer), and development continued until the spots disappear.
WINTER ON THE COAST

WILLIAM S. DAVIS

autumn gales have come and gone, and now

“The frost spirit comes from the frozen Labrador,—
From the icy bridge of the northern seas, which the white bear wanders o’er.”

Following the winding path over the low hills, where the chill winter breath of the salt air is felt the keenest, through the drifted wind-blown snow, we soon come to a spot from which a view may be had of the white shore spread out below, and realize indeed the significance of Whittier’s lines,

“The wind blew east, we heard the roar
Of Ocean on his wintry shore.”

and well may ask,

“What miracle of weird transforming
Is this wild work of frost and light?”

for the familiar aspects of other seasons have disappeared, and the gay parties of visitors who see the shore only in summer would fail to recognize their favorite haunts, for the beaches and far rippling waves which were brilliant under a July sun are hidden under an icy mantle now, and out from land the white ice fields extend, while along the deserted coast, far as the eye can reach, great cakes of broken ice are piled in confused masses, driven in by the relentless force of the tides and gales, or lie stranded just off shore, while the rocks have their caps of frozen spray, the general effect being dazzling, as the scene lies

“flashing in the sunshine,
Keen as a saber from its sheath,”