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SULPHOCYANIDE IN TONING.

THE advantages of the use of the sulphocyanides for fixing silver prints appear less certain after considerable experiment than was at first anticipated; but they possess certain valuable properties when used in the toning bath which appear well worthy of further attention. Many photographers have sighed for the loss of certain qualities in the old method of fixing and toning at one operation, which they miss in the modern alkaline toning bath. They assert that the prints lost less in depth and brilliancy when toned by the old method, and that bleaching, blueness, and mealiness were alike unknown. As we recently stated, we have heard it alleged more than once that much of the brilliancy of M. Salomon's pictures is due to this mode of toning. The danger of a decomposition in which sulphur is liberated is still, however, remembered, and few photographers, however anxious for the advantages, will deliberately risk the evils, and return to the old method.

The use of gold and a sulphocyanide for toning, followed by the ordinary hypo fixing, possesses many of the advantages of the old method, without its risks. There is no mealiness, and rarely any loss of depth, produced by the toning bath prepared by these agents. The operation of the bath is analogous to that of the old sel d'or bath when used neutral, or to that of a new solution of hyposulphite of soda with a little chloride of gold added, and then filtered. The progress of a fixing operation is the first change which is noted, the toning action not being immediately apparent. The tones produced vary considerably with circumstances, and many of the conditions necessary for producing given tints are not as yet accurately defined. One quality of great importance seems, so far as we have observed at present, to be invariably present: the prints do not grow redder in the hyposulphite fixing bath, but continue to get deeper, keeping, however, precisely in the same key of colour.

The best formula remains to be determined, as no considerable difference in result is produced by the relative proportions of the sulphocyanide and chloride of gold. Dr. Liesegang recommends one gramme of double sulphocyanide of gold and ammonium in two ounces of water, and adds from half a drachm to a drachm of chloride of ammonium; the chief object of the latter, we presume, being to decompose all trace of free nitrate whilst the process of toning is going forward, and so increase the chances of permanency by preventing any portion of free nitrate entering the hyposulphite bath. The double sulphocyanide of gold and ammonium he prepares as follows:—Make a solution of chloride of gold (say four grains to the ounce), and add to it, drop by drop, a 30-grain solution, until the red precipitate at first formed is redissolved. A golden yellow solution is obtained, which for use must be diluted and have chloride of ammonium added as directed. The toning

properties of this bath are very excellent, especially when a deep black is required.

Mr. Alfred Hughes, in the early part of the present Volume, described his experiments with this agent in the toning bath. His mode of using it consisted in adding sulphocyanide to a toning bath of chloride of gold and tungstate of soda. We have not repeated this method (described on page 6 of the present Volume), but we understand that the results are very good.

A very simple formula, which gives good tones, consists in the use of one grain of chloride of gold and six grains of sulphocyanide of ammonium in four ounces of water. In this bath the prints rapidly acquire a purple-black tone, which becomes a little deeper when the print is immersed in the fixing bath, so that great care is necessary to avoid a tone too black. We prefer, however, to use a bath containing a much larger proportion of the sulphocyanide, and a bath containing one grain of chloride of gold and half an ounce of sulphocyanide of ammonium in five ounces of water has given us the tones we have liked best. The first appearance of the print on immersion in this bath is curious. Whatever the colour of the image when it comes from the printing-frame, it rapidly assumes, on immersion, a bistre brown colour, passing in a few seconds to a yellow tint, in which the print seems almost to disappear. It gradually attains strength again, becoming first the tint of raw umber, then of burnt umber, then of a deep chocolate or sepia, and finally black. It is to be noted, however, that the change in the half-tones takes place first. Whilst the shadows remain quite brown, they are acquiring a black or grey tint; and when the shadows are becoming black the half-tones are assuming a rosy purple tint, something like the warm, rosy, pearl-like tones which appear on the face of good Daguerreotypes when gilded. This appears to be an especial peculiarity of this toning process: when the shadows are brown the half-tones are of a cool grey; and when the shadows are black, the half-tones are of a warm, rosy grey. The result, when well managed, is exceedingly brilliant and pleasing, a purer, richer black being obtained by this method than by any other toning process we know.

The tendency of the process of toning to continue in some degree after the print has left the toning bath and been immersed in the fixing bath is very peculiar, and renders attention necessary, as the proper result can only be obtained by removing the print from the toning bath before it has assumed the full depth required. By a very little observation and practice, however, it becomes easy to detect the precise shade of brown in the toning bath, which in the fixing bath becomes a rich, warm black, of great depth and brilliancy.

There is another peculiarity of this bath to be noted: when a solution of chloride of gold is mixed with a solution of sulphocyanide of ammonium, a red precipitate is at