PHOTOGRAPHY.

NEW REDUCING AGENT.

PHOTOGRAPHERS are indebted to the Messrs. Lumière, of France, for one of the most important discoveries in connection with their art that has been made during recent years—a *discriminating* reducing agent.

To know just how far to carry, or just when to stop development, has always been more or less of a difficulty, not only with the tyro, but even with the more experienced; and perhaps more frequently than not, especially with those who aim at work of the highest class, recourse is had to reduction or intensification. Each is valuable in its way, but they have one common fault-the alteration of the now recognized most important feature of a photograph, its values, that is, its truthful rendering of light and shade, or true gradation.

As a means of overcoming the difficulty, it has frequently been recommended to carry development considerably beyond what was known to be sufficient, and then by reduction to bring the negative to the desired state. Of the many reducing agents Farmer's solution, consisting of about a 15 per cent. solution of sodium hyposulphite with the addition of sufficient of a solution of potassium ferricyanide to give it a deep straw color, but they all possess the serious drawback of acting equally over the whole plate, reducing the shadows as much as the lights, practically removing half-darks and middle-tints, and putting the negatives in a condition to give prints that are simply white and black.

What was wanted was a method by which reduction might be obtained without altering the values or tonality secured by something like correct exposure; a reducer that would reduce in proportion to the depth of the deposit, instead of equally all over; that would deal hardly, if at all, with the little that gives detail in the deepest shadows; more, but still gently, with the half-darks and middle-tints, and with its full energy on the half-lights and lights; a reducer, in fact, that would discriminate between the various parts of the image, and, as if acting on that discrimination, reducing each part only to the necessary extent.

A reducer of that much longed for but little to be expected quality has been found in ammonium persulphate by the Messrs. Lumière, not the bisulphate, acid sulphate, or hydrogensulphate, having the formula $NH_4\ SO_4$, and frequently spoken of as persulphate, but probably a true persulphate with the formula $NH_4\ SO_4$. It has been put on the market by the discoverers of its properties in the form of small white crystals, easily soluble in water to at least considerably beyond the strength required, and is supposed to be produced by electrolysis from the hydrogensulphate, the atom of hydrogen being eliminated, and the per-salt formed at the negative electrode, thus $NH_4\ SO_4$—$NH_4\ SO_4$—H. I do not know that it has as yet found its way across the water, but as it has attracted a good deal of attention in Britain, our enterprising stock dealers will soon be able to supply it.

For general reduction, Messrs. Lumière recommend a solution of about five per cent., say, twenty-five grains to the ounce, although solutions as weak as two per cent. seem to answer as well, only occupying more time. The negative is simply placed in a tray containing as much of the solution as will cover it, the tray rocked, and the plate examined from time to time, and when sufficient reduction has been obtained the action stopped by liberal washing, or, better still, immersion in solution of hypo.

Supposing ammonium persulphate be all that is claimed for it, there need no longer be any difficult in knowing when to stop development. It will only be necessary to carry it far enough to be *sure* that it is sufficient without any fear of its being too much, and then, if necessary, reducing it to the desired state.

For local reduction, lowering the tone of a too dense sky or of a too obtrusive light, a stronger solution, even up to ten per cent, may be employed on a tuft of cotton, whereby the artist who knows just what he wants should have no difficulty in getting it.

Nor is its power confine to the reduction of negatives; it is equally applicable to prints, either that have been over-printed wholly or in part. For general reduction the prints may be immersed in a two per cent. solution, or it may be applied with a sponge to lighten a foreground or a too deep shadow, and in that way the photographer may have, to a large extent at least, the control over a silver print, and especially on such as bromide and velox, as is claimed for the gum-bichromate method.

REMEDY FOR OVER-EXPOSURE.

The popularity of the hand camera has largely reduced the percentage of over-exposures, although at the cost of what is worse, a larger proportion of hopeless under-exposures. But there are still some who recognize the advantage of time and a tripod, They, or many of them, find with exposure as with development a difficulty in hitting on just what is right, and it may be that the solution of that problem will also be found in the ammonium persulphate.

As is well known, the result of over-exposure is a thin, weak negative, from which only a flat, tame print can be obtained, a print without a spark of high light, because of the translucence or even the densest part of the negative. Intensification, the only remedy ever tried, only increased the time required for printing, as it could not alter the relative densities: but, according to that well-known authority, W. B. Bolton, over-exposures to any reasonable extent may be, by the assistance of ammonium persulphate, developed to any degree of contrast, even to the black and white characterized as "soot and whitewash."

For this purpose a solution should be prepared consisting of ammonium persulphate twenty-five grains; ammonium bromide, five grains: water, one ounce, and a few drops added to the developer. The action will be slower and the contrast greater in proportion to the tity of persulphate solution added, but a little practical experience will enable the operator to secure the desired result. DR. JOHN NICOL.