

certain point this increase in size gives a vast increase in sensitiveness, and "instantaneous plates" are prepared by prolonged cooking or by treatment of the emulsion with ammonia and slight heat.

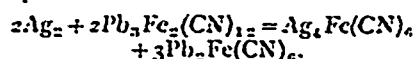
In the case of a collodion emulsion, the light transmitted is of an orange or ruby tint, the violet, blue, and some of the green rays being absorbed, and it is just these absorbed rays which most readily reduce the silver salt, the orange and red rays being comparatively inert, and having even a retarding action on chemical change in some instances. According to what is known as Draper's law, a chemical change in a substance by the action of light involves the absorption of the chemically active portion by the light of the substance. This leads me on to orthochromatic photography, that is, the production of photographic images in their correct color value. So far this has not yet been quite achieved, but much has been done to that end. The silver salts in the film are not acted upon by the various colors in the same ratio as the eye is impressed by them, that is to say, the "photographic" and visual intensities of light are very different. Thus a blue object looks much less intense for light value to the eye than a red object, yet the light reflected from the blue is much more intense in its chemical action upon a film of silver salt than the light from the red. In showing how to correct this difference, Professor Vogel, in 1873, found that the silver haloid salts were rendered more sensitive to yellow and greenish-yellow rays by tinting them in a collodion film with coal-tar dyes, such as eosin, cyanin, etc., that is, these dyes acted as sensitizers of the silver salts for yellow and greenish-yellow rays. Since then other dyes have been used for these and other colored rays, but the greatest photographic intensity is still, as a rule, possessed by the violet and blue rays, although that is almost surmounted by placing a screen of tinted yellow glass before the lens, which absorbs some of the blue rays and modifies the action of that colored light upon the plate. I have here specimen photographs of flowers in vases taken with an ordinary film and an orthochromatic film with the yellow screen. The difference in gradation of tone will be evident. To prepare the plates they are either dipped for a time in a solution of the dye, then dried, or the dye is added to the emulsion before coating the plate.

The chemistry of orthochromatic photography is still based to a large extent upon theories which have not been corroborated by facts, although much experimental work has been done. The following explanation is based upon a number of interesting experiments by Captain Abney, which I have not time to give in detail.

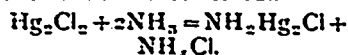
It has been observed that amongst the most sensitive dyes are those which most readily fade. If a dyed plate be exposed for a long time in the spectrum, it is found to be bleached in the region of the yellow

and red rays, or that part which is sensitized. If a short exposure be given and the plate be developed, the silver salt is found to be reduced most in the part which would be bleached by a long exposure, although sometimes the region of greatest intensity is somewhat intermediate between the maximum of the silver salt alone and that produced by the dye. Under the action of light of a certain color or wave length, the dye seems to decompose, forming products which have the power of reducing the silver salts below it, so that on development it is further reduced to the metallic state. Eosin, erythrosin, cyanin, and rose Bengal seem most suitable for obtaining a wide range of photographic intensity. Lippmann, by exposing a film of albumen treated with bichromate of potash solution and backed with a mirror of mercury, has obtained a plate which, when wet, shows an image by reflected light, which very nearly approximates to the natural colors. So far as I am aware no nearer approach to direct color photography has yet been made.

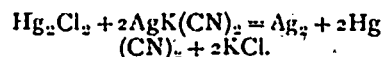
I now pass on to the "Chemistry of Intensification of the Image," and what follows must be very brief. One of the best and simplest methods of intensifying or increasing the density of the image is one which was introduced not long ago by Selle, and I mention it first because I wish to intensify half of a plate by this method in order to show the change which is effected. The intensifier consists of uranium nitrate and potassium ferricyanide, and the reactions are probably as follows: Uranium ferricyanide is formed in solution, and this is poured over the plate. The metallic silver on the plate has a reducing action on the ferricyanide causing insoluble ferricyanide of uranium and ferricyanide of silver to be formed, the former salt having a brown color. The color of the intensified image is very pleasing. Lead ferricyanide is used in the same way, and the reaction may be represented thus:



The favorite method of intensifying consists in bleaching the image with a solution of mercury bichloride, and afterwards changing the color to brown or black with ammonia or the double cyanide of silver and potassium. On treating with the first solution, the silver reduces the perchloride to insoluble white subchloride of calomel, and silver chloride is formed at the same time. On adding ammonia solution, the subchloride of mercury is converted into insoluble black di-mercurous-ammonium chloride, and the silver chloride is dissolved out.



If the perchloride treatment be followed by the application of the double cyanide of silver and potassium, the black deposit is found to consist largely of silver with some mercury, cyanogen, and a trace of chlorine. The chief reaction might be represented thus:



Chemistry of the Toning of Silver Prints.

—In albuminized sensitized paper, the salted albumen surface consists of albumen and ammonium chloride. The "salted paper" is floated on a bath of silver nitrate, then dried; a surface of silver chloride and silver albuminate being formed. On toning the silver image with gold or platinum chloride, the reduced silver salts, which constitute the image, in turn reduce the gold or platinum salt in solution, and a fine film of gold or platinum metal is deposited over the surface of the image, changing its color. The silver salts, unaffected by light, are dissolved out on fixing with sodium thiosulphate, as previously explained. Such salts as ammonium sulphocyanide are added to the gold solution in order to form salts of gold, which are more easily reduced than the chloride, and alkaline additions, such as borax, bicarbonate of soda, chalk, etc., are intended to prevent the formation of free acid, which would act as a restrainer and stop the toning process.—*British and Colonial Druggist.*

A Severe Case.

Two weeks ago I was summoned to the bedside of Djoahanne Sdtlecometzler. The involute and labyrinthine tangle of his symptoms made me suspect at first that he had absorbed his own name. But further examination convinced me that he was the victim of typhomalaripneumophthisicotrychinotetatoaxione-phreticosplenitis. Owing to the ubiquity of pathogenic bacilli, antiseptics are always indicated, so I exhibited calcium betanaphtholalaphamonosulphonate. As the patient suffered from severe non-localized pain, I gave orthooxyethylanamionobenzoylamidoquinoline combined with salicylaldehydethylphenylhydrazine. For his insomnia I gave trichloraldehydphenyldimethylpyrazolone.

His wife asked me what ailed him. I told her, and she said "yes," and turned very pale. Upon examining him on the next morning I became convinced that the vital forces had misconstrued the remedies, and that a congeries of retro-absorptions had resulted. I then wrote out the following prescription:

- R. Tetrahydrobetanaphtholamine,
Sodium thioparatoluidinesulphonate,
Orthosulphamidobenzoic anhydride
Amidoacetoparaphenetidine aa 5j.
M. Sig.: A teaspoonful every hour.

When the wife presented the prescription to the druggist he instantly dropped dead! The patient is up and about, but something is wrong with his Broca's convolution—he mutters in a multisyllabic lingo that is intelligible only to modern pharmacists. I am in hiding where the spiral melody of the woodbine that twineth blendeth ever sweet, low, soothing, murmurous quadrisyllabic rhythmic rune of the gentle polygonum punctatum.—*Dr Cooper, in Medical Gleaner.*