

The manufacture and shell-filling plants have used this ointment with very satisfactory results. Men have worked over or taken apart machinery and apparatus containing liquid mustard gas with practically complete immunity from burns when they previously covered their hands and arms with ointment, put on protective gloves and subsequently washed off the ointment.

The ointments have also been used with distinct success in the impregnation of socks, underclothing and leather puttees and gloves, for mustard gas protection.

And this same ointment has also been found to give good protection against other powerful skin irritants which were going to be used when the Armistice was signed, and protective ointments were no longer needed.

SOME FUNDAMENTAL CONSIDERATIONS IN DISPENSING PHOTOGRAPHIC FORMULAS.*

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(A communication from the Chairman of the Sub-Committee on Photographic Formulas, A. Ph. A. Recipe Book.)

To the English reading and speaking photographic world the most potent single influence is the *British Journal of Photography*, together with its supplementary publication, "The British Journal Photographic Almanac, etc."

Naturally then, all weights and measures in these publications, when not expressed in terms of the metric system, are in terms of avoirdupois weights and "Imperial" fluid measure.

The very fact that a formula calls for a twenty or forty fluidounce quantity is a strong hint that the idea of the Imperial pint or quart suggested this amount, rather than some other influence. Also, photographic journals in this country (U. S.) largely quote from these publications, even to the extent of reprinting verbatim entire articles.

What mischief may be spread broadcast by this practice is nicely shown by an instance that happened during 1918.

The *British Journal of Photography* printed an elaborate exposition of the methods of reckoning percentage,—all, and properly so, based on avoirdupois weights and Imperial measure. These were generously copied or reprinted verbatim by various photographic publications in this country.

None, however, called attention to the essential difference in weight of the "Imperial" fluidounce of 437.5 grains and the U. S. liquid ounce of 454.6 grains, at ordinary conditions of temperature, pressure and humidity.

Therefore where a definite effect, or rate, or time limit is stated with any given formula of British origin, identical results can only be expected by actually duplicating the original formula. This can easily be accomplished in the absence of British measures, by weighing the fluids with avoirdupois weights, making due allowance, of course, for specific gravity where necessary. A general admonition is to pay close attention to cautions and precautions by manufacturers of, or dealers in, photographic materials.

* Read before Section on Practical Pharmacy and Dispensing, A. Ph. A., New York meeting, 1919.

To properly advise and inform one's trade in photographic goods it is necessary to fully understand the difference between the ordinary or non-color plates or films, which are sensitive only to the ultra-violet, violet, and blue rays of the spectrum; and the "ortho" or "iso" chromatic plates and films which, in addition to the former, by the use of suitable dyes, are also sensitive to some of the blue-green, green, yellow-green, yellow and up to orange light, thereby rendering more correctly in monochrome (black and white) landscapes, seascapes and cloud effects; and lastly, plates sensitized, more or less, to all the colors, including the red, which make up white light, known as pan-chromatic or spectrum plates, these latter requiring special precautions in the dark room on account of their sensitivity to red light. Brochures dealing with the photography of colored objects, giving very valuable information on this subject, are published by the various makers of these materials and can be had for a nominal price or in some instances gratis. The qualities of the various printing papers should also be fully understood to properly advise in their use.

In photography, given the proper instrument for making the exposure, the proper exposure and the proper medium (plate or film) for recording the effects of the exposure, one of the most important procedures is the development of the latent image to produce a negative of proper quality. This is accomplished by a preparation called generally "the developer" composed of various ingredients possessed of certain properties and subserving definite functions. To properly compound and preserve this most important preparation of photography requires thorough understanding of its purpose and the functions of its several ingredients. The finished preparation should be kept in containers as full to the stopper or other closure as practical, the oxygen of the air and not the light does the harm.

A developer consists, *firstly*, of a reducing, so-called "developing" agent of from one to several ingredients; such as metol or its various substitutes, hydroquinone, pyro, etc., whose function is to attack the light-weakened silver compound and reduce it to the metallic state; *secondly*, of a preservative agent to prevent the reducing agent from being too rapidly destroyed by atmospheric and other non-photo-salt agencies; such as sodium sulphite and bisulphite, and potassium meta bisulphite, etc.; *thirdly*, an accelerating agent which may possess a direct synergic action on the developing agent, but hastens the reaction principally by softening the gelatin base of the sensitive salt; such as the fixed alkalis, alkaline carbonates, etc.; *fourthly*, the restraining agent, whose function is to prevent the reducing action on that portion of the sensitive silver salt not affected by the light of the image, the prevention of "chemical fog," as this action is called, such as bromide, iodide, etc. Those particularly interested in "chemical fog" are referred to an article under this title by J. I. Crabtree in the 1919 *American Annual of Photography*.

Different developing agents show varying degrees of stability to atmospheric conditions and a varying sensitivity toward the "restraining" influence of the "bromides," the restrainer generally used.

With each developing agent and the various other ingredients of the developer there exists a proportion of each which affords the maximum action, together with the greatest preserving, accelerating and restraining influence, without causing fog;

a developer in such condition is called "well balanced." The experienced photographer varies the proportion, within certain limits, of these several agents to produce specific effects. Consequently the importance of producing a preparation exactly as called for by the formula. The sequence of mixing the ingredients also has an important bearing on the properties and action of the consequent solution, because of conditions of solubility, and of new compounds, either desirable or undesirable, being formed. To enumerate these would take us too far afield photographically, and from the purpose of this paper.

The soda salts, however, require some attention. The preservatives usually are sodium sulphite or bisulphite, and potassium meta bisulphite, and the accelerators are the fixed alkalies, or more generally their carbonates. Thus we may have sodium sulphite anhydrous or crystalline, and sodium carbonate of several degrees of anhydration, and crystalline; both salts differing greatly in their content of active chemical, accordingly. It will readily be seen, therefore, that the proper salt the formula calls for, or its equivalent in any of the other forms, should be employed so that the relative concentration of absolute salt be not altered. For halving or doubling the relations of either or both of these salts must produce such different results as to destroy the confidence in either the compounder or the formula.

It is highly advisable to use the brands of these salts marketed as "photographic," since they are of the necessary degree of purity and have a definitely stated degree of anhydration. The proper compounding of developers for making prints is scarcely of lesser importance, perhaps, than for negatives since readily staining compounds must be avoided. The watchword in general is "cleanliness," to avoid contamination.

Of the various processes for modifying negatives or prints, the more important are "intensification" and "reduction." The pharmacist who would cater to tyros and amateurs should have available, and be able to compound correctly, the "mercury bichloride," and the "mercuric iodide" intensifiers. He should be able to recommend a reducer for,—*uniform reduction*; one for *reduction for increasing contrast*, that is, for reducing shadow details; and a reducer to *diminish contrast*, that is, for reduction of high lights. The ferricyanide-hypo reducer should be mixed either as needed, or, each ingredient may be dissolved separately and mixed when needed; when separately dissolved keeps for some time. Users should be informed, however, that after mixing, the preparation soon loses its yellow color, after which it is useless for its intended purpose. This latter information is usually not found, even, in photographic formularies.

An "equalization" process, a form of reduction and redevelopment, may be found in the 1919 *American Annual of Photography*, under the title "The equalization of values in negatives," by A. Brooker Klugh. Every work on a special branch of photography usually contains formulas germane to that particular branch.

For photographic formulas, in general, and for descriptions of new processes, the writer would recommend the *American Annual of Photography* and the *British Journal Almanac* as affording a wealth of such formulas, for a comparatively small outlay financially.
