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### A MONO-HYDRATED SODIUM CARBONATE. (THE SO-CALLED CRYSTAL CARBONATE.)

ORDINARY washing soda consists, as is pretty generally known, of water to the extent of nearly two-thirds, and of somewhat over one-third of the real carbonate of sodium. In other words, its composition corresponds to the formula  $\text{Na}_2\text{CO}_3 + 10\text{H}_2\text{O}$ , and if the numbers corresponding to this composition are calculated, it will be found that the salt contains 62.93 per cent. of water, and 37.07 per cent. of the real sodium carbonate, or carbonate of soda. Apart from this, it is by no means an unfrequent thing for the commercial "soda" to contain a considerable proportion of sodium sulphate in the place of the carbonate, and as this sulphate is quite inactive in the developer, failures not unfrequently happen as a result of using the ordinary washing soda.

Although the salt containing ten molecules of water of crystallization is the one which is ordinarily met with in commerce, and is perhaps easiest to manufacture on a large scale, there are several sodium carbonates in which the proportion of water is different, and among the best known of these is the mono-hydrated salt,  $\text{Na}_2\text{CO}_3\text{H}_2\text{O}$ , which is deposited when a solution saturated at  $104^\circ\text{C}$ . is concentrated by boiling, and this salt only contains about like 17 per cent. of water. This latter has recently been introduced into commerce by Messrs. Gaskell, Deacon, and Co., and it possesses decided advantages over the ordinary washing soda as regards making the developer. Of course one might suppose that it would be a matter of convenience to always use the anhydrous salt, but this is not so, as this latter gives rise to a considerable evolution of heat when dissolved in water, and, moreover, tends to cake together at the bottom of the vessels used, forming a hard mass which dissolves but slowly.

The ordinary carbonate,  $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$ , gives rise to a notable fall of temperature when dissolved, and consequently often unfits the developer for immediate use. In the case of the so-called crystal carbonate, however, there is but a trifling change of temperature either way when solution takes place (it is in the direction of heat); while the minute crystals in which the new carbonate is sent into the market offer so much surface, that solution takes place almost immediately.

The crystal carbonate, or monohydrated carbonate, will, no doubt, soon be in the hands of all the usual dealers in photographic materials.

With respect to the use of the monohydrated (or crystal) carbonate in making up the developer, one must bear in mind that 210 grains of the new salt are equivalent to one ounce of the ordinary carbonate, as represented by the purest washing soda.

It may be mentioned that crystallized sodium carbon-

ates containing other proportions of water are known to chemists, although they have no commercial existence; examples of these being the following:—

$\text{Na}_2\text{CO}_3 \cdot 15\text{H}_2\text{O}$  (Jaquelain), obtained by cooling a solution of sodium carbonate to  $-20^\circ$  Centigrade.

$\text{Na}_2\text{CO}_3 \cdot 6\text{H}_2\text{O}$  (Mitscherlich).

$\text{Na}_2\text{CO}_3 \cdot 5\text{H}_2\text{O}$ .

$\text{Na}_2\text{CO}_3 \cdot 7\text{H}_2\text{O}$  (2 modifications).

$\text{Na}_2\text{CO}_3 \cdot 8\text{H}_2\text{O}$ .

It may be mentioned that the crystals of the monohydrate will not effloresce in the air unless the atmosphere is exceptionally dry, also that they have scarcely any tendency to agglomerate together, even at a temperature which will occasion aqueous fusion of the salt containing  $10\text{H}_2\text{O}$ .

### MARKINGS IN GELATINE PLATES.

#### THE COMPARATIVE KEEPING QUALITIES OF GELATINO-BROMIDE AND GELATINO-CHLORIDE PLATES.

AT a recent meeting of the London and Provincial Photographic Association, two matters of considerable practical interest to photographers were discussed. One was that of a peculiar marking round the edge of a certain sample of gelatino-bromide plates, which, although probably in a greater or less degree familiar to all who have experimented at all largely with emulsions, was evident to a very unusual degree in the particular example which was exhibited. The other matter was that of the relative keeping qualities of gelatino-bromide and of gelatino-chloride plates.

To take the matter of the peculiar marking first. The negative shown had a very opaque portion all round the edge, the width of it, perhaps, about half an inch. This shaded off into a perfectly clear strip, which was of about the same breadth as the opaque portion. The transparent part again shaded off into the central portion of the negative, which represented in all parts, more than about an inch from the edge, the appearance of a normal negative of average density. At first sight it appeared undoubted that the outside opaque border was simply chemical fog, and it is probable that this impression would have been left on the minds of all had not Mr. A. L. Henderson, who had brought the plate, pointed out that the small portions which had been protected by the wires of the dark slide from light during exposure were still quite clear, and that, moreover, the detail, although enveloped in fog, was quite distinguishable through the whole of the very opaque outer edging. In fact, the outer part of the plate was enormously more sensitive than the central portion, whilst the intervening strip was less so.

The appearance was explained by Mr. Henderson, on the assumption that the emulsion with which the plate had been